ADAPTATION FUND

FULLY DEVELOPED PROPOSAL FOR SINGLE COUNTRY

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Innovative adaptation financing to build the resilience and adaptive capacity of smallholder farmers in Bhutan (InAF-Bhutan)
Country:	Bhutan
Thematic Focal Area:	Innovative adaptation financing
Type of Implementing Entity:	Multilateral Implementing Entity
Implementing Entity:	World Food Programme
Executing Entities:	Ministry of Agriculture and Livestock
Amount of Financing Requested:	USD 4,983,389 (in U.S Dollars Equivalent)
Letter of Endorsement (LOE) signed:	Yes ☒ No ☐

NOTE: The LOE should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: https://www.adaptation-fund.org/apply-funding/designated-authorities

Stage of Submission:

☒ This proposal has been submitted before including at a different stage (concept, fully developed proposal)

☐ This is the first submission ever of the proposal at any stage

In case of a resubmission, please indicate the last submission date: Click or tap to enter a date.

Please note that fully-developed proposal documents should not exceed 100 pages for the main document, and 100 pages for the annexes.

A. Project Background and Context

Summary of problem statement and proposed solution

With altitudes ranging from 100 metres in the foothills to over 7,500 meters in the north, the fragile mountainous ecosystems of Bhutan render the country extremely vulnerable to the impacts of climate change[1]; it is already highly prone to a range of hydrometeorological hazards, including glacial lake outburst floods (GLOFs), flash floods, riverine floods, landslides, landslide dam outburst floods, cloudbursts, windstorms, droughts and river erosion.[2] Smallholder farmers who rely mainly on rain-fed agriculture are already affected by unpredictability in the timing of monsoons, and localised water shortages and prolonged drought in some areas.[3] At the same time, farmers, especially women who predominate in the agricultural sector, lack a credible risk transfer mechanism such as affordable crop insurance that could prevent them from resorting to negative coping strategies, and have insufficient access to the climate-resilient agricultural approaches, technologies and finance that they could harness to enhance the resilience of their agriculture-based livelihoods and address the climate impacts already experienced, and prepare for the future climate risks.

To address this problem statement, **the project will roll out the primary innovation in the Bhutanese context of micro index insurance for smallholder farmers, predominantly women, in an integrated and iterative fashion that harnesses multiple perspectives on innovation and encourages the integration of secondary innovations identified at the community level.** For food insecure farmers who are exposed to recurrent shocks and who under-invest to minimize their risks, microinsurance offers the opportunity to manage their climate-related shocks and encourages them to invest in their plots so that they can make their livelihoods more climate resilient. Through an integrated risk management approach, the risk transfer mechanism of insurance will be layered with risk reduction activities (in the form of enhanced natural resource management and climate resilient agricultural technologies), as well as increased access to savings to help households cope with smaller, more frequent shocks (sustainable risk absorption). In this way, vulnerable smallholder farmers will be supported to generate increased production and obtain more income from their farming activities in a risk informed manner. By also supporting improved access to markets for climate-resilient produce to enable livelihoods diversification, and access to microfinance, farmers will be able to make further investments in developing climate resilient livelihoods (prudent risk taking). This implementation strategy will result in increased household food security and income and will contribute to the post COVID-19 revitalization and transformation of agriculture in Bhutan.

Location and climate

Situated on the southern slope of the Eastern Himalayas, Bhutan is a small, landlocked country with an area of 38,394 km^2. [4] It extends approximately 170 km north-to-south and 300 km east-to-west, bordering China to the north and India to the south, east and west. The vast differences in altitude, the influence of the North Indian monsoons, and the location at the northern periphery of the tropical circulation result in three distinctive climatic zones: (i) Subtropical southern belt (altitude of 200 – 2,000 metres) with high humidity and heavy annual rainfall (around 1,500 mm), and a temperature range of between 15°C to 30°C all year round; (ii) Temperate central belt (2,000 to 4,000 metres) consisting of main river valleys, characterized by moderate rainfall (about 1,000 mm per annum) with cool winters and hot summers; in the monsoon season from June to September (JJAS) temperatures are between 15°C and 26°C, with the winter range between -4°C to 15°C; and (iii) Alpine region in the north with snow-capped peaks and alpine meadows above 4,000 metres, which has cold winters and cool summers, and about 40 mm of annual precipitation, mostly in the form of snow.[5] The three climatic zones encompass numerous micro-climates due to dramatic variations in elevation and topography.[6] About 70 percent of the country's rain falls during the summer monsoon (JJAS), and 20 percent in the pre-monsoon season.

Environmental and agro-ecological conditions

Bhutan's varied topography results in a rich natural heritage: it is one of the world's top 10 biodiversity hotspots, has one of the most extensive protected area systems (51 percent of total area).[7] Bhutan's extensive forest coverage decreased to 69.7 percent in 2022 compared to 71 percent in 2016; however, the carbon sequestration capacity of Bhutan's forests has increased to 11 million tonnes of carbon dioxide from 9.6 million tonnes estimated in 2015. [8] Thanks to the proactive environmental conservation approach, many of the high-biodiversity value habitats such as primary forests, high altitude wetlands, and home ranges of flagship species fall within the protected area system. The area under glaciers was approximately 1.6 percent of the land cover in 2018[9], while 2.6 percent of the land is used for

[1] National Environment Commission (2020) Third National Communication to the UNFCC.
[2] RGoB and World Bank (2015) Modernizing Weather, Water and Climate Services: A Road Map for Bhutan.
[3] RGoB and World Bank (2015) Modernizing Weather, Water and Climate Services: A Road Map for Bhutan.
[4] National Environment Commission (2020) Third National Communication to the UNFCC.
[5] National Environment Commission (2020) Third National Communication to the UNFCC.
[6] NCHM (2019) Analysis of Historical Climate and Climate Projection for Bhutan. National Centre for Hydrology and Meteorology, RGoB.
[7] National Environment Commission (2020) Third National Communication to the UNFCC.
[8] Bhutan State of the Forests Report, 2023
[9] The status and decadal change of glaciers in Bhutan from the 1980s to 2010 based on satellite data. http://www.icimod.org/?q=13008

agriculture.[10] Bhutan is rich in agricultural biodiversity, with more than 100 species of agricultural crops; 384 landraces of rice, 105 of maize, 36 of wheat, 10 of sweet buck wheat, 11 of bitter buckwheat, 32 of barley, 22 of amaranth and 36 of millets; and around 230 species of Crop Wild Relatives.[11]

Direct pressures on biodiversity include land use conversion, forest fires, over-extraction of timber and fuel wood, overgrazing, forest offences and wildlife poaching, unsustainable agricultural practices, pollution, invasive species, and human-wildlife conflict; climate change acts as a risk multiplier, increasing the incidence of pests and diseases, invasive species, and forest fires; and aggravating the loss of species, agro-biodiversity, and traditional knowledge and practices ("biocultural" loss).[12] The country's limited land resources are threatened by different types of land degradation: water induced degradation (gully, landslides and ravine formation), wind and cultivation erosion, and in-situ degradation such as depletion of soil organic matter, nutrient mining, topsoil capping and subsoil compaction.[13] Causes of land degradation overlap with drivers of biodiversity loss, and include forest fires, excessive use of forest resources, overgrazing, unsustainable agricultural practices, poor irrigation management system, infrastructure development without proper environmental measures, mining, industrial development and urbanization.[14] Bhutan's 2022 State of Environment Report highlights accelerated construction of farm roads, electricity transmission lines, industries and urbanisation as the main sources of increasing pressure on land resources; and notes emerging signs of forest degradation, as well as increasing illegal logging and poaching.[15]

Socio-Economic Characteristics and Vulnerabilities

Population, economy and poverty

Bhutan has a population of 748,931, with 52.19 percent male and 47.81 percent female in 2020; 60 percent of the population is below the age of 25 years[16]. The country is still largely rural, with only 37.8 percent of the population residing in urban areas in 2017[17]. Bhutan is administratively divided into 20 districts, which consist of 205 gewogs ("blocks"), four larger towns ("thromdes"), 18 district towns and 42 satellite towns.

Bhutan's economic development policy is guided by the overarching philosophy of Gross National Happiness (GNH), based on the four pillars of sustainable economic development; preservation and promotion of culture and tradition; conservation of the environment; and good governance. Bhutan recorded a growth of 5.46 percent in 2019, taking its GDP per capita to USD 3,411.94 from USD 3,331.40 in 2018.[18] The economy contracted a record 10.1 percent in 2020 due to stringent COVID-19 pandemic containment measures, including two prolonged nationwide lockdowns that immensely slowed economic activity across sectors, but expanded again by 4.1% in 2021.[19] The economy grew by 4.3 percent in the financial year (FY) 21/22 (July 2021 to June 2022), as social and mobility restrictions eased and fiscal support to boost activity continued; economic growth of 4.5 percent is expected in FY22/23.[20]

Currently the world's first carbon-negative country, Bhutan aims to mitigate growing emissions from economic development by pursuing low emission development pathways across all sectors;[21] in 2015 the country recorded net negative emissions of 5.6 million tons of CO2.[22]

In 2022, the service sector had the highest share of the economy at 53.5 percent followed by the secondary sector at 31.8 percent and the primary sector with 14.7 percent.[23] The climate-sensitive primary sector, comprising agriculture, livestock and forestry, contributed -0.16 percentage points to GDP growth in 2022, mainly due to reduced performance of the crop sector.[24] Agriculture absorbs the highest workforce with 49.9 percent of the total employed persons followed by the service sector with 36.6 percent[25]. However, agricultural workers earn on average a tenth of what is earned by service sector workers.[26] More women than men are farmers – approximately 61.7 percent against 41.7 percent of men – a growing trend referred to as the 'feminisation of agriculture' in Bhutan.[27]

In addition to climate impacts experienced, some of the major challenges in farming, especially in the eastern parts of the country, are (i) human-wildlife conflict (HWC), (ii) steep slopes and unfertile land; (iii) water shortages and inadequate irrigation infrastructure; and (iv) pests and diseases.[28] Agriculture and food items account for 17 percent of the country's total import expenditures, with over 90 percent of food imports coming from India. Despite considerable agricultural

[10] RGoB, Bhutan's 21st Century Economic Roadmap. Sector: Agriculture, Food Security and Nutrition, and Biotechnology.
[11] National Environment Commission (2016) Fifth National Report to the UNCBD.
[12] National Environment Commission (2016) Fifth National Report to the UNCBD.
[13] Dorji, T et al (undated) Land Degradation in Bhutan – An Overview. https://www.nssc.gov.bt/wp-content/uploads/2021/04/land-degradation.pdf
[14] RGoB (2014) National Action Plan to Combat Land Degradation. Submitted to the UNCCD.
[15] National Environment Commission (2022) Bhutan State of the Environment Report 2022.
[16] Bhutan at a Glance 2020, National Statistics Bureau
[17] Population Projections Bhutan 2017-2047. Bhutan's urban population will be 56.8 percent by 2047.
[18] National Accounts Statistics 2020
[19] ADB Bhutan Fact Sheet, April 2023
[20] https://www.worldbank.org/en/country/bhutan/overview accessed 03 July 2023.
[21] RGoB (2020) National Climate Change Policy.
[22] RGoB (2021) Kingdom of Bhutan Second Nationally Determined Contribution submitted to the UNFCCC.
[23] National Statistics Bureau (2023) National Accounts Statistics 2023.
[24] National Statistics Bureau (2023) National Accounts Statistics 2023.
[25] 2020 Labour Force Survey Report, National Statistics Bureau
[26] Nu 67 per hour, compared to Nu 604 per hour earned by a worker in the service sector. Source: Annual Report 2020, Royal Monetary Authority
[27] As noted in MoAF 2021, RNR Strategy 2040, Policy and Planning Division, Ministry of Agriculture and Forests, Thimphu, Bhutan
[28] College of Natural Resources, personal communication, 17 June 2022.

constraints, Bhutan's varied agro-ecological zones allow for a wide variety of produce to be grown and there are significant opportunities to increase the impact of the agri-food sector.[29] Bhutan's unemployment rate of 5 percent (6 percent for females and 4.1 percent for males) is the highest to date, with urban unemployment (10.1 percent) four-times higher than that of rural areas (2.7 percent); the youth unemployment rate in 2022 was estimated at 28.6 percent, an increase of 7.7 percentage points compared to 20.9 percent in 2021.[30] The male youth unemployment rate (24.4 percent) is lower than that for females (32.8 percent). Thus, a pre-eminent challenge is youth unemployment and the social issues associated with this;[31] the increase in youth unemployment is a factor driving increased outmigration.

Bhutan has steadily reduced its poverty rate, from 31.7 percent in 2003 to 8.2 percent in 2017 (using a poverty line of Nu. 2,195.95 or USD 33 per person per month at average 2017 exchange rate).[32] According to the 2022 Poverty Analysis Report (PAR), poverty in rural areas (17.5 percent) is significantly higher than urban areas (4.2 percent),[33] further substantiating the focus on rural areas for the proposed project. Only 0.4% of the population is subsistence poor, i.e., persons belonging to households with per capita consumption below food requirements of Nu. 2,852. Amongst the employed, poverty rates are higher in households whose heads are working in the agriculture sector. Bhutan's moderate rural poverty rate of 17.5 percent marks substantial disparity across the 20 districts (districts), with the headcount ratio in 2017, i.e., the proportion of people living below the national poverty line, ranging from merely 0.4 percent in Paro to 38.6 percent in Dagana. Moreover, while poverty as measured by both the headcount ratio and the number of the poor is more concentrated in the south and southeast regions of the country, neighbouring districts in the same region might have significantly different poverty conditions, highlighting the need for disaggregated poverty mapping to target interventions effectively.[34]

The majority (99.5 percent) of the population has access to an improved water source with hardly any disparity between poor and non-poor households, while at least 92 percent of households have access to improved sanitation; between poor and non-poor households, both in urban and rural areas, the disparity is around 8 percent.[35] According to the 2022 Bhutan Poverty analysis Report, ownership of mobile phones (whether smart phones or not was not specified) is almost universal across poor and non-poor groups and urban and rural areas, but internet access is slightly lower among the poor households. An earlier analysis indicated that among non-poor households, 67 percent have at least one smart phone, compared to only 29 percent among poor households.[36] Nationally, only 43 percent of poor households have television, compared to a national average of 72.5 percent.[37]

Gender and development

The Constitution of the Kingdom of Bhutan, 2008, provides an overarching framework to ensure gender equality. While women in Bhutan enjoy relative gender equality with men, influences from socio-cultural perceptions at times hold women as more vulnerable than men.[38] Although women's status is relatively high in Bhutanese society, there is an ongoing perception that women and men have specific roles to play; women being viewed as 'homemaker, wife, and mother' has limited their access and opportunities, whilst confining them to household and agricultural activities where productivity and earnings are relatively low. Men's participation in regular paid employment is, therefore, higher at 36.5 percent against 19.3 percent for women. Bhutanese women predominate among unpaid family workers and workers with low earnings, and thus bear a disproportionate responsibility for domestic unpaid care work that largely goes unrecognized. A recent study on violence against women in Bhutan revealed that one in three ever-partnered women aged 15–64 years had experienced one or other forms of domestic violence in the last 12 months, and 44.5 percent in their lifetime.[39] The same study cast light on the extent to which domestic violence was condoned by Bhutanese women, who often accept abuse as their plight or their 'karma' whilst the culture of silence prevents them from accessing available public services. This situation is compounded by the economic dependence of many women on their husbands.

Bhutan ranks 130 out of 156 countries in the Global Gender Gap report, having closed 63.9 percent of the gender gap, using indicators of economic participation and opportunity, educational attainment, health and survival and political empowerment to assess the extent of gender parity.[40] The importance of gender mainstreaming across policies, plans, programmes and projects has increased recently in Bhutan. While about 60 percent of rural women hold land registration titles, which is higher than anywhere else in South Asia, areas in which women are at a disadvantage compared to men are politics and decision-making, tertiary education and economy, with rural women being more vulnerable.[41] Women's

[29] MoAF (2021) Food Systems for Gross National Happiness: transformative pathways for Bhutan.
[30] National Bureau of Statistics, Bhutan Labour Force Survey Report 2022
[31] RGoB, Bhutan's 21st Century Economic Roadmap, Executive Summary.
[32] https://www.nsb.gov.bt/publications/poverty-analysis-report/
[33] National Statistics Bureau of Bhutan (2022) *Bhutan Poverty Analysis Report 2022*.
[34] NSB Bhutan (2019) Small Area Estimation of Poverty in Bhutan: Poverty Mapping Report 2017.
[35] Bhutan Poverty Analysis Report, 2017.
[36] Bhutan Poverty Analysis Report, 2017.
[37] Bhutan Poverty Analysis Report, 2022.
[38] https://www.ncwc.gov.bt/notifications/324
[39] NCWC (2017). National Survey on Women's Health and Life Experiences: A study on Violence against Women and Girls in Bhutan. National Commission for Women and Children, Royal Government of Bhutan, Thimphu.
[40] Global gender Gap Report 2021
[41] National Environment Commission (2020) Third National Communication to the UNFCC.

urban literacy rate of 63.9 percent is lower than that for men (78.1 percent),[42] which translates into lower levels of female participation in formal employment and high public office.

Effects of the Covid-19 pandemic

In addition to the adverse impact of Covid 19 on economic growth, inflation was expected to rise from 3 percent in FY 2020 to 6.4 percent in FY 2021, due to supply chain disruption and panic buying, but forecast to ease to 5.3 percent in FY 2022, as prices were expected to trend lower in India and as domestic conditions improved.[43] Food prices increased by approximately 15 percent in 2021, which poses a risk to food and nutrition security and the livelihoods of vulnerable people, particularly as the country still imports about 50 percent of the total food consumed.[44] The dependency on food imports led to major food insecurity in the country as COVID-19 lockdown restrictions disrupted international supply chains, especially affecting fresh produce distribution. The Economic Contingency Plan developed by the RGoB in response to the pandemic prioritised the need to increase national food self-sufficiency, as already prescribed in the 12th Five-year Plan (2018-2023) and other policies. Tourism has been the worst hit sector, as it was closed to foreign tourists leading to loss of jobs: in 2020 up to 30,000 people had to seek work or migrate back to their villages.[45] The COVID-19 pandemic and recurrent lockdowns have increased unpaid work especially for women and girls, strongly reinforcing social and cultural norms where women and girls are expected to do unpaid household chores.

Health, nutrition and food security

Bhutan has made significant improvements in reproductive, maternal, new-born and child health (RMNCH) and almost all households have access to improved drinking water and sanitation facilities.[46] Child malnutrition requires further attention as one-fifth of children were stunted in 2015; of these, 1 in 3 were severely stunted and 4 in 10 were anaemic.[47] Overall, 7 percent of girls and boys are underweight, while 35 percent of children aged 6-59 months and 44 percent of women of reproductive age are either anaemic or iron deficient. Malaria is on track to being eliminated by 2022, while other climate-related diseases such as dengue and chikungunya have emerged over the last few years and indicate a growing trend.[48] Bhutan has been lauded for its efficient COVID-19 pandemic preparedness and response efforts, which kept caseloads far lower than elsewhere in the region. Although 98 percent of households in Bhutan are food secure, 88 percent of children aged between 6 to 23 months do not have a minimum acceptable diet. This indicates that food security is not enough for achieving nutritional status[49]. In 2019, Bhutan produced only 49,948.05 Metric Ton of irrigated and upland rice, one of its main staple foods,[50] and imported 84,584 MT in the same year - an increase by 18 percent from 2018[51].[52] The high dependency on imported food has had a knock-on effect on food consumption patterns in Bhutan and is contributing to already high levels of stunting and anaemia in many rural areas.[53] Increasing pressure on prime agricultural land (especially paddy fields) from growing urban areas, as well as rural agricultural lands increasingly being left fallow due to rural-urban migration, have serious implications for food and nutrition security.[54]

Climate Change Vulnerabilities, Impacts and Risks

Climate trends and projections

Observed trends

While Bhutan's lack of long-term temperature and rainfall data[55] limits the detection of accurate trends, validated proxy data[56] from 1976 to 2005 show a mean annual temperature increase of 0.8 degrees Celsius, with the highest increase during the winter season (1.3°C), and a decreasing trend in rainfall at mean annual scales with high variability.[57] Daily minimum temperatures are increasing at a greater pace than daily maximum temperatures.[58] The southern areas are prone to dry-spells and drought induced by the variability of monsoon rainfall.[59] Over recent years, more frequent extreme weather events, including hailstorms and heavy rainfall, have been observed and precipitation patterns have altered. Increased temperatures have accelerated the shrinkage of glaciers, leading to more rapidly forming glacier lakes that are increasingly hazardous.[60]

Projected changes

[42] PHCB 2017, quoted in NEC (2020): TNC to the UNFCCC.
[43] https://www.adb.org/news/bhutan-economy-shrink-2021-expected-rebound-2022-adb
[44] https://kuenselonline.com/economic-impact-of-covid-19-worsening-the-malnutrition-status-in-asia-and-pacific-un/
[45] RGOB, 2020. Rapid Socio-Economic Impact Assessment of COVID-19 on Bhutan's Tourism Sector: An analysis of the vulnerability of individuals, households, and businesses engaged in the tourism sector. National Statistics Bureau and UNDP: Thimpu.
[46] Ministry of Health Bhutan. Annual Health Bulletin 2021.
[47] Ministry of Health Bhutan. National Nutrition Survey. (2015).
[48] National Environment Commission (2020) Third National Communication to the UNFCCC
[49] UN Family 'scaling up' on nutrition (unicef.org)
[50] http://www.moaf.gov.bt/agriculture-statistics-2019-online/#
[51] https://kuenselonline.com/import-of-rice-increase-by-18-percent/
[52] Rice and cooking oil are among the top ten commodities imported by Bhutan, rice contributing 2.42 percent share and cooking oil contributing 1.24 percent share.
[53] Bhutan Country Nutrition Profile, 2018
[54] National Environment Commission (2022) Bhutan State of the Environment Report 2022.
[55] The observed data sets, of which most are in the middle and southern parts of the country, have only been available since 1996.
[56] From the Climatic Research Unit (CRU), University of East Anglia, UK.
[57] NCHM (2019) Analysis of Historical Climate and Climate Projection for Bhutan. National Centre for Hydrology & Meteorology, RGoB.
[58] Climate Risk Country Profile: Bhutan (2021): The World Bank Group and the Asian Development Bank.
[59] NCHM (2019) Analysis of Historical Climate and Climate Projection for Bhutan. National Centre for Hydrology & Meteorology, RGoB.
[60] NCHM (2019) Science seminar on 'Climate change-induced risks and vulnerabilities of Glacial Lake Outburst Floods'.

Simulated projections for South Asia and for Bhutan show increasing temperature and precipitation in both winter and summer with large anomalies during the monsoon season.[61] The increase in temperature under an intermediate global emissions scenario or Representative Concentration Pathway (RCP) 4.5 is projected to be about 0.8°C– 2.8°C during 2021-2100, while projections under a high global emissions scenario of RCP 8.5 show increases of between 0.8°C to more than 3.2°C towards the end of the century. Greater warming is indicated during March-April-May (MAM) and December-January-February (DJF) seasons, and a larger increase is projected in higher altitudes.[62]

The mean annual rainfall over Bhutan is likely to increase in the future under both RCPs: under RCP 4.5, an increase of 10 percent to 30 percent is projected, with a 5-15 percent increase in summer rainfall (JJAS). While a likely increase of rainfall during the winter (DJF) is also projected, some parts in the north and northwest could experience a decrease in rainfall. Under RCP 8.5, an increase of above 30 percent is projected for the whole of Bhutan by 2100. However, the north-west is expected to experience decreased winter rainfall (DJF). All emissions pathways project an increase in the precipitation associated with a maximum 5-day rainfall event across Bhutan, with heaviest rainfall occurring in the southeast of the country.[63]

Climate models project a significant increase in the likelihood of heatwaves and droughts, which are likely to impact more severely on communities in Bhutan's lowlands. By the 2090s, the median probability of a heat wave[64] in Bhutan is projected to increase dramatically from the current probability of 2 percent to approximately 20 percent under RCP 4.5, and as high as 36 percent under RCP 8.5.[65] Higher temperatures are projected to also contribute to increased snowmelt which could change patterns of river discharge and water availability, with potential impacts on infrastructure growing significantly in the second half of the 21st century.[66] Cold waves are also projected to increase under climate change.[67]

Current and future vulnerabilities, risks and impacts of climate change

As a mountainous country within the Hindu-Kush Himalayas (HKH), Bhutan is highly prone to a range of hydrometeorological hazards, including GLOFs, flash floods, riverine floods, landslides, landslide dam outburst floods, cloudbursts, windstorms, and river erosion. Across most of the HKH including Bhutan, glaciers have thinned, retreated, receded, and lost mass since the 1970s, increasing the risk of GLOFs[68]. With climate change, the frequency and intensity of extreme events are expected to increase.[69] The country already ranks fourth highest in South Asia in terms of relative exposure to flood risks, with 1.7 percent of the total population at risk. Most of the infrastructure, fertile agricultural land, and over 70 percent of settlements are located along the main drainage basins and are therefore at high risk of flooding and landslides, especially during the monsoon season. In the mid-mountains, landslides triggered by cloudbursts are frequent, and recent occurrences of landslide dam bursts have caused major destruction in low-lying areas, including the Thimphu Valley. Bhutan is also at risk for tropical cyclones. Flash floods are a recurrent phenomenon, with the eastern and southern regions being the most vulnerable.[70] The country's economy is predominantly dependent on the climate-sensitive sectors of agriculture and hydropower; and the mountainous landscape makes communication and transport fragile and expensive.[71]

Table 1: Impacts of climate-related extreme weather events in Bhutan

Extreme weather events	Year	Remarks
Glacial lake outburst (GLOF) flash flood	1994	Damaged 965 acre of agricultural land
Rice blast epidemic	1996	80-90% crop loss in high altitudes
High-intensity monsoon rain, nationwide	2004	Damaged 39 irrigation channels
Northern corn blight	2007	>50% crop loss in high altitudes
Unusual windstorm	2008	Damaged maize crops of 320 hhs in Eastern Bhutan
Cyclone Aila/flash flood	2009	>100 acre land washed away
Flash flood and landslides	2010	Affected 809 acre of land, damaged irrigation channels
Hailstorm in Punakha	2012	30–40% rice crop damaged
High-intensity rain/windstorm	2013	>100 acre maize crop damaged, erosion and damaged irrigation structures
Hailstorm/flash flood	2015	>100 acre rice crop damaged
High-intensity rain	2016	>100 acre rice crop damaged

Source: Chhogyel and Kumar, 2018 (Adapted from IPCC and NEC)

Climate variability and change threaten to reduce productivity and performance of key socio- economic sectors such as agriculture, hydropower, and tourism.[72] Changes in precipitation patterns are impacting the availability of water for drinking and energy production in the short, medium and long-term, with cycles of flooding during monsoons and very

[61] Chhogyel, N., and Kumar, L. (2018) Climate change and potential impacts on agriculture in Bhutan: a discussion of pertinent issues. *Agric & Food Secur* **7**, 79 (2018). https://doi.org/10.1186/s40066-018-0229-6
[62] National Environment Commission (2020) Third National Communication to the UNFCCC.
[63] Climate Risk Country Profile: Bhutan (2021): The World Bank Group and the Asian Development Bank.
[64] Defined as a period of 3 or more days where the daily temperature is above the long-term 95th percentile of daily mean temperature.
[65] Climate Risk Country Profile: Bhutan (2021): The World Bank Group and the Asian Development Bank.
[66] Climate Risk Country Profile: Bhutan (2021): The World Bank Group and the Asian Development Bank.
[67] National Environment Commission (2020) Third National Communication to the UNFCCC.
[68] ICIMOD (2019) *Summary of Hindu-Kush Himalaya Assessment Report.*
[69] RGoB and World Bank (2015) Modernizing Weather, Water and Climate Services: A Road Map for Bhutan.
[70] RGoB and World Bank (2015) Modernizing Weather, Water and Climate Services: A Road Map for Bhutan.
[71] National Environment Commission (2020) Third National Communication to the UNFCC.
[72] NCHM (2019) Analysis of Historical Climate and Climate Projection for Bhutan. National Centre for Hydrology & Meteorology, RGoB.

low flows and drying streams during other seasons. Extreme weather events expose infrastructure assets (such as hydropower and road network) to increased risk of floods and landslides.

Agriculture is particularly vulnerable to current and projected climate change, with associated risks to rural livelihoods and food security, as more than 60 percent of the rural population depend upon it for their livelihoods. Women are more vulnerable to climate change impacts than men due to their substantial engagement (at 61.7 percent against 41.7 percent for men) in agriculture, compounded further by the increasing feminization of agriculture sector. Moreover, climate change impacts are more pronounced for Bhutanese women due to the existing discriminatory patriarchal laws, norms, customs and institutions.[73]

Monsoon seasons with high rainfall, flash floods and landslides have damaged existing irrigation schemes and disrupted market access for many smallholders. These impacts have a major bearing on the RGoB's goals of food self-sufficiency and inclusive green socio-economic development, due to the impacts on smallholder farms. Apart from a few areas of open valley, agricultural land is generally located along steep geographic terrain, with more than 31 percent of agricultural land located on slopes greater than 50 percent resulting in soil losses of 8.6 tons/ha from traditional farming practices that are not resilient to increased runoff during the monsoon season, particularly after long dry periods.[74] Heavy rainfall experienced between October 16-21, 2021 caused extensive damage to harvested paddy in the fields, as well as to national highways and farm roads, mainly in the western and central districts.[75] It affected more than 2,500 acres in 17 rice growing districts (including Paro, Samtse, Punakha, Wangdue, and Dagana).[76] In addition to this recent example of the adverse effects of climate change on farmers and agricultural production,[77] increased intensity and duration of dry periods is already occurring, and will become more serious – for example, rice yield in the southern subtropical regions is expected to be adversely affected by heat waves, drought and changing patterns of precipitation.[78]

Farmers increasingly report unstable crop yields, production losses, declining crop quality, and decreased water availability for farming and irrigation.[79] These impacts will be worsened by the projected increases in temperature and in intensity of heavy rainfall events, as well as reduced water availability. Pests and diseases, some of which are related to changing weather and climate, are a significant challenge for rural smallholders. An example is army worm infestation of numerous crops important for household food security, including maize and rice. Without effective adaptation, the impact of climate change on both global food security and local production is likely to increase hunger and malnourishment in Bhutan.[80]

Bhutan is expected to experience a wide range of climate-related health risks. Rising temperature and unpredictable weather patterns will affect water supply to communities and influence the epidemiological pattern of vector-borne, airborne, and water-borne diseases.[81] The impact of flooding on human health and livelihoods is expected to grow and could be 4 percent of GDP by the 2030s.[82] Emergency medical health requirements will also rise with climate-induced disasters such as GLOFs, floods and landslides. The health impacts of projected increases in both heat and cold waves have not yet been studied in any detail but are likely to be severe in the absence of effective adaptation.[83]

Multi-dimensional vulnerability and barriers to adaptation

Multi-dimensional vulnerability

The socio-economic and climatic vulnerabilities discussed above constitute a context of multi-dimensional vulnerability to climate change, operating at different levels. Multidimensional vulnerability as expressed on the Notre Dame Global Adaptation (ND-GAIN) Index[84] is depicted in Figure 1.

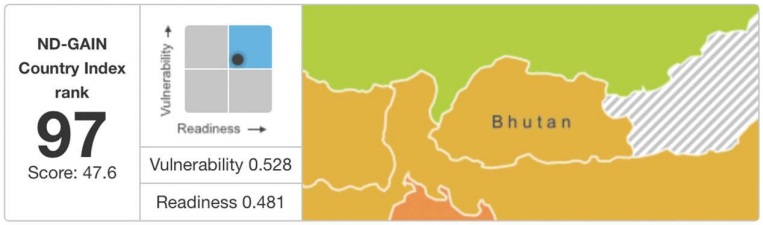


Figure 1 ND-GAIN index ranking for Bhutan

The high vulnerability score and high readiness score of Bhutan places it in the upper-right quadrant of the ND-GAIN Matrix. This score indicates that while Bhutan is on the road to responding effectively to climate change, the adaptation

[73] Yeshey, K. (2022) Gender Assessment Report for the Bhutan AF Larges Innovation Grant project. Report submitted to WFP Bhutan.
[74] UNDP (2019) Annex IV of the GCF proposal for the project 'Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan'.
[75] Department of Disaster Management (2021) Initial Damage Assessment Report on the Recent Heavy Rainfall (October 17-19, 2021).
[76] The numbers in the original source (DMC, 2021) have been corrected through a personal communication from the Department of Agriculture, 20 July 2022.
[77] *Initial Damage Assessment report*. Department of Disaster Management, MoHCA, RGoB, 2021.
[78] Chhogyel, N., and Kumar, L. (2018) Climate change and potential impacts on agriculture in Bhutan: a discussion of pertinent issues. *Agric & Food Secur* **7**, 79 (2018). https://doi.org/10.1186/s40066-018-0229-6
[79] NCHM (2019) Analysis of Historical Climate and Climate Projection for Bhutan. National Centre for Hydrology & Meteorology, RGoB.
[80] Climate Risk Country Profile: Bhutan (2021): The World Bank Group and the Asian Development Bank.
[81] National Environment Commission (2020) Third National Communication to the UNFCC.
[82] Climate Risk Country Profile: Bhutan (2021): The World Bank Group and the Asian Development Bank.
[83] National Environment Commission (2020) Third National Communication to the UNFCC.
[84] The ND-GAIN Country Index uses two decades of data across 45 indicators to rank 181 countries annually based upon their vulnerability and their readiness to successfully adapt.

needs and urgency to act are greater. Particularly vulnerable areas under this index are assessed to be agricultural capacity, and projected change of flood hazard. The relatively high readiness score relates largely to high scores for good governance, masking the low scores on this index for social readiness, education and innovation.[85] All of these factors are critical for enhancing the resilience of smallholder farmers. Bhutan is ranked as the 32nd most vulnerable country and the 60th most ready country, out of 181 countries.

Gender and vulnerability to climate change

Women experience the effects of climate change differently to men and they respond and adapt to climate change impacts differently. As measures to alleviate climate change impacts, men are more inclined to 'look for alternative employment' and 'migrate to city'; leaving women to carry out men's work in addition to their already substantial workloads. On the other hand, women struggle more than men in finding alternative livelihoods, entering formal employment sector, or migrating due to cultural barriers and lack of economic opportunities and education. Thus, women reported alternatives, including; 'change in consumption patterns', 'changing farming practices', and 'taking children out of school'. Bhutanese women (rural women in particular) are therefore more susceptible and vulnerable than men to the climate change impacts. Domestic violence is more prevalent in rural areas and affects women's economic activities as well as their quality of life[86]; this also reduces their adaptive capacity and increases their vulnerability to climate change. While all children are in general more vulnerable to climate change than are adults, Bhutanese children are at less risk than those in other south Asian countries: Bhutan's rank on the children's climate change risk index is 111 out of 163 countries, while Nepal ranks 51, India ranks 26, and Bangladesh ranks the highest at 15.[87]

Barriers to adaptation

The specific socio-economic and cultural factors influencing gender and vulnerability to climate change in Bhutan, as summarised above, constitute barriers to women farmers' adaptation to climate change. In addition, the National Adaptation Plan (NAP) process has identified the following overall barriers to adaptation In Bhutan: access to sufficient finance; coordination, learning and awareness; technical capacity for climate information; systematic identification and appraisal of adaptation options; and monitoring and evaluation.[88] The Gender Assessment, secondary literature review, and stakeholder and community consultations have highlighted the following more specific barriers affecting smallholder farmers in Bhutan:

General barriers to enhancing climate resilient agricultural livelihoods in Bhutan: Significant challenges faced by smallholder farmers, both women and men, in addition to changing weather patterns and extreme weather events are labour shortages, lack of market opportunities and infrastructure, and lack of inputs and/or untimely supply of inputs by commissioning agents. High levels of post-harvest losses (PHL) in the project localities have dramatically reduced household economies, with farmers having to sell or consume many of their perishable products within weeks. These challenges have led to the 'empty households' syndrome observed in Bhutan's rural areas. Market linkages are a critical issue to address, including for organic production so that this can deliver the potential increased incomes for vulnerable smallholder farmers. Human-wildlife conflict (HWC), which includes damage to crops by wildlife, depredation of livestock and retaliatory killing of wildlife, emerged as a priority in the community consultations. Annual Forestry Statistics 2021 reported crop damage of 8.65 acres and livestock kills of 27 affecting about 66 households[89]; however, it is difficult to know the exact extent of HWC as accurate and consolidated statistics are not available.

Access to climate-resilient agricultural approaches and technologies: Despite programmes implemented and trainings conducted in many parts of the country to increase knowledge of and ability to use climate-resilient agricultural approaches and technologies, stakeholders reported that the understanding of this was shallow in most parts of the country. While in practice a higher proportion of women are engaged in agriculture in Bhutan, access to climate resilient agricultural technologies, information, trainings, and agricultural inputs are more limited for rural women in Bhutan, for a range of reasons – including the lack of gender-sensitivity of many interventions,[90] and lack of access to gender-sensitive agricultural tools and machinery. This differs from region to region in the country, with women participation reportedly higher in the western and eastern parts of the country, while it is lower in the southern districts.[91] Farmers are often reluctant to use pesticides for religious or spiritual reasons – for example, with a recent army worm infestation of maize in Mongar district, farmers reportedly did not want to use available pesticides as the whole month was auspicious *Saga Dawa*.[92] While this may be a barrier with respect to conventional agriculture, these beliefs may help to predispose farmers towards adoption of organic production practices, if provided with ongoing support and effective inputs. To date there has been insufficient development and dissemination of improved organic fertilisers and biopesticides.

[85] https://gain-new.crc.nd.edu/country/bhutan accessed 23 September 2021.
[86] Bhutan Gender Equality Diagnostic of Selected Sectors (ADB, 2014)
[87] Unicef (2021) *The climate crisis is a child rights crisis.*
[88] http://www.nec.gov.bt/projects/details/preparation-of-a-national-adaptation-plan-nap-for-bhutan-with-a-focus-on-the-water-sector-2019-2023 last accessed 10/06/22.
[89] National Environment Commission (2022) Bhutan State of the Environment Report 2022.
[90] Yeshey, K. (2022) Gender Assessment Report for the Bhutan AF Larges Innovation Grant project. Report submitted to WFP Bhutan.
[91] RENEW MFI, personal communication provided at the Validation Workshop for the CN of the proposed Bhutan AF LIG, Thimphu, 20 July 2022.
[92] https://kuenselonline.com/armyworm-and-drought-damage-maize-crops-in-mongar/ last accessed 03/07/22.

Access to rural finance to invest in climate resilient livelihoods: This is in general insufficient for the needs of Bhutan's smallholder farmers, and particularly so for women. Despite Financial Institutions equal and non-preferential treatment, and government's concerted efforts to advance financial inclusion such as priority sector lending, limited access to finance is one of the many constraints faced by rural women. This limited access could be attributed to lack or limited resources for collateral, limited decision-making power and position, complex loan procedures, and loans not suitable to their needs. Although there are numerous savings and credit schemes, they are mostly commercially-oriented and entrepreneurship focused, with insufficient support to subsistence farmers to help them become more commercial. There are insufficient rural-women-targeted schemes that are focused on enhancing the adaptability and resilience to climate change of smallholder farmers. Although indemnity insurance for crops is available, this is mainly oriented towards the more commercial farmers, and relies on time-consuming and resource-intensive inspection of damages for each household insured. Key challenges faced by youth agricultural entrepreneurs in eastern Bhutan are environmental issues, lack of access to financial support, and management issues. Lack of access to markets is also a significant constraint, but access to land and farm inputs is less of a barrier.[93]

B. Project Objectives

The project's **main goal** is to enhance the resilience of smallholder farmers in Bhutan to key identified climate risks and enhance their food security by rolling out innovative index-based microinsurance through an integrated resilience building approach.

The project will achieve its goal through the following *three* **objectives**:

1. Strengthen climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers;
2. Roll out innovative climate risk transfer mechanism and build smallholder farmers' resilience through integrated approach; and
3. Institutionalise innovative climate risk management for long-term sustainability.

The project will meet these objectives through three interlinked components as detailed in Part II.A that will deliver an integrated package of interventions to address key causes of vulnerability to climate change and food insecurity for vulnerable smallholder farmers in selected districts in Bhutan.

Project area and target groups

The target group for the concrete adaptation activities to be implemented under the proposed Large Innovation Grant (LIG) in Bhutan is climate-vulnerable smallholder farmers in four districts or districts, namely Dagana, Tsirang, Lhuentse, and Trashigang, with an emphasis on women, youth and most vulnerable groups – such as female-headed rural households. Until recently, there has been no systematic district-level climate risk vulnerability assessment; while this is needed, it will be challenging due to the limited observational data, the varied and mountainous topography, and the relatively small size of the country, which influences the reliability of downscaling from global climate models. In general, the entirety of the agricultural production areas are highly vulnerable to increased runoff resulting from more intense rainfall, which is already being experienced across the country, together with increased drought risk in some areas. Studies carried out for various project proposals and annual agricultural statistics point to a heightened level of vulnerability to differentiated climate risks affecting agricultural production and rural livelihoods – for example, the eastern and southern regions are the most vulnerable to flash flooding, while in the mid-mountain areas, landslides related to intense rainfall are a primary threat. While all parts of the country are reportedly experiencing more erratic rainfall and increased dry periods related to rainfall variability, rice yield in the southern subtropical regions is expected to be adversely affected by heat waves, drought and changing patterns of precipitation,[94] and drought is emerging as an increasing risk in the eastern parts of the country.

Given the above factors, for the Concept Note (CN) the project team selected six preliminary districts to be considered for inclusion in the proposed LIG project, based on the following criteria:

i. vulnerability to climate risks, as assessed by the RGoB;
ii. poverty levels; and
iii. agricultural potential, including for climate-resilient and sustainable agriculture and commodity landscape-based organic production.

The six preliminary districts were Paro, Punakha, Dagana, Tsirang, Lhuentse, and Trashigang. Paro and Punakha are located in the west of the country, and Dagana in the south; these districts are predominantly within the temperate zone,

[93] Dendrup, T., R. Chhetri, and C. Dolma (2021) 'Challenges of young agripreneurs in Eastern Bhutan'. *Social and Management Research Journal,* Vol.18, No.1, pg.53-72. http://dx.doi.org/10.24191/smrj.v18i1.12383

[94] Chhogyel, N. and Kumar, L. (2018) Climate change and potential impacts on agriculture in Bhutan: a discussion of pertinent issues. Agric & Food Secur 7, 79 (2018). https://doi.org/10.1186/s40066-018-0229-6

although part of Dagana lies within the sub-tropical southern belt. Lhuentse and Trashigang are located in the east of the country, which has received relatively reduced investment in agricultural development and experiences heightened drought risk. Tsirang lies in the central part of the country and has been selected for preliminary consideration based not only upon the climate risks and vulnerabilities experienced, but also because of its potential for large-scale conversion to organic agriculture.[95] Three of the six districts were selected for community consultations to develop the CN, as these provided a range of livelihood systems and were feasible in the context of COVID-19 restrictions: Paro, Punakha, and Dagana. A summary of the findings of the community consultations can be found in **Part II.J**.

During full proposal development, the four specific project districts of Dagana, Tsirang, Lhuentse, and Trashigang were identified based upon an in-depth vulnerability assessment and climate risk-based crop suitability assessment (**Annex 2**), as well as a detailed insurance feasibility study that was conducted during the full proposal (FP) development process. The targeted gewogs and communities will be identified during the project inception phase, under a targeting strategy that will identify and ensure meaningful benefits for the most marginalised and vulnerable communities, within the stated focus of 70 percent women and a focus on youth. Once the project districts were selected in a broad sense, local and community consultations were carried out in the project localities to ground truth the findings of the VA and climate risk-based crop suitability assessment, and gather important disaggregated and gender-responsive local-level information on climate risks, livelihood systems, and socio-economic factors; gaps in service provision including climate services, agricultural extension, and financial services; experience of and willingness to pay for insurance, appropriate value chains to develop, and other aspects necessary for insurance product. Please see **Annex 5** for a detailed report on the consultations.

There is good alignment between the four project districts identified and the criteria included in the 'Climate change and vulnerability analysis' (CCVA) mapping carried out for the development of the National Adaptation Plan (NAP) process in Bhutan, which includes a district-level vulnerability mapping against various criteria, including climate variability, hazards, and various socio-economic parameters. For example, Dagana and Lhuentse are among the top four districts with over 80 percent of females involved in agriculture, while that for Tsirang is over 70 percent. Dagana and Trashigang, together with Samtse, have the highest sensitivity to climate change arising out of their livelihood and economic situation, with out-migration being the highest in Trashigang (nearly 11.67 percent in 2017). Tsirang and Dagana score low in terms of presence of adaptation strategies such as irrigation, improved farm machinery and social capital, while Trashigang has a medium score in this regard. Dagana and Tsirang are also ranked very low in terms of adaptive capacity, while Trashigang scores low and Lhuentse scores medium in terms of adaptive capacity. In terms of overall vulnerability, Dagana is ranked the second most vulnerable district, while Tsirang is the fourth most vulnerable.[96]

Final decisions for the four districts to be included in the project, which were reduced from six due to the need to avoid fragmentation of resources, were based on the above criteria, as well as additional climate risk, socio-economic, political and environmental variables, including gender, education and nutritional indicators; and the presence of the necessary pre-conditions for large-scale roll-out of index-based microinsurance. The latter include access to existing microfinance channels, production of selected crops at a sufficient volume for the necessary aggregation, value chain development and marketing activities, and the presence of suitable distribution channels for the insurance. A further criterion was the ability to leverage off the activities of existing and planned projects, in order to promote efficiencies and synergies across investments. For example, it was agreed that it would promote efficiencies and enhance effectiveness to build on the recently approved Building Resilient Commercial Smallholder Agriculture (BRECSA) project in the central and southern districts of Zhemgang, Trongsa, Tsirang, and Sarpang, as well as the activities of the Commercial Agriculture and Resilient Livelihoods Enhancement Programme (CARLEP) in the eastern districts.[97] The full set of criteria to identify project districts was developed in a participatory fashion during full proposal development and a robust multi-criteria analysis (MCA) process was conducted and documented (see **Annex 2** for further details).

The in-depth vulnerability assessment and climate risk-based crop suitability assessment drew strongly on the National Adaptation Plan (NAP) assessments, in order to determine the project localities, and provisional crops that could be promoted. The NAP assessments were the 'Climate change and vulnerability analysis' (CCVA) mapping; as well as the NAP sectoral assessments for agriculture, water, forests and biodiversity, and human health. In addition, best available studies such as the CIAT study on climate risks for agriculture in Bhutan (2017) and the ADB climate risk profile for Bhutan (2021), as agreed with the RGoB, as well as key analyses found through a literature survey. In addition, the project team consulted the 2022 Labour Force Survey Report[98] and the 2022 Poverty Analysis Report[99], for more up-to-date socio-economic variables that better reflect recent trends.

The MCA summary matrix presented in Table 1 (see **Annex 2**) indicates that Dagana, Tsirang, Lhuentse and Trashigang have higher levels of vulnerability to climate risks than do Paro and Punakha. They also score lower on the whole with respect to poverty, gender and the socio-economic variables considered. The MCA process showed that Tsirang, Lhuentse and Trashigang have poverty rates higher than the average for Bhutan. Moreover, Trashigang is the district

[95] This potential was confirmed by a personal communication with the Head of Programmes, National Centre for Organic Agriculture, 16 June 2022.
[96] Climate change and vulnerability analysis mapping for formulation of the NAP process in Bhutan. Draft dated, July 2021, prepared by pwc for UNDP.
[97] During a multi-stakeholder workshop held in Thimphu on 15 June 2022.
[98] National Statistics Bureau (2022) Labour Force Survey report (LFS report) 2022.
[99] National Statistics Bureau of Bhutan (2022) *Bhutan Poverty Analysis Report 2022*.

with the second highest share of poor individuals, out of the total in the country, accounting for 9.5%, while Tsirang has 5.2% of the share of poor individuals. In the agriculture sector, Dagana (75.4%) and Tsirang (67.7%) have the highest proportion of employed persons, followed by Trashigang (65.8%) and Lhuentse 61.7%.[100] These four districts thus comprise the largest pools of agricultural livelihoods in the country, further emphasising their suitability to be included in the proposed project, with its focus on microinsurance and associated secondary innovations for agricultural livelihoods. It was consequently agreed with the RGoB that Dagana, Tsirang, Lhuentse and Trashigang are, out of the six considered, the four priority districts for inclusion in the proposed project. The community consultations further ground-truthed these findings, demonstrating both need as well as several opportunities upon which the LIG project implementation could build, as further discussed throughout this proposal.

The primary project beneficiaries will be poor smallholder farmers with high levels of vulnerability to current and projected climate risks in Dagana and Tsirang in south-central Bhutan, and in Lhuentse and Trashigang in eastern Bhutan. The project will target more women than men, in recognition of the feminization of agriculture in Bhutan, and the differentiated needs and increased vulnerabilities of rural women. Thus the project will aim to **target 70 percent women**, which exceeds the gender assessment recommendation of 60 percent, and will especially focus on female-headed households that are more food insecure. The project will include a focus on rural youth living in areas with high levels of climate risk and low employment opportunities. The particularly vulnerable groups identified for inclusion in the project are female-headed households and poorer households.[101] The project will include **10,000 direct beneficiary households**, which equates to **40,000 direct beneficiaries** at an average rural household size of four, who would receive the integrated support package of index-based microinsurance and associated activities. At least 7,000 of the direct beneficiaries will be women, with an emphasis female-headed households. The project will empower at least **30 women and youth climate champions**, of whom at least 21 will be female, to serve as advocates for further uptake and scaling out of index insurance and integrated resilience building. In addition, the project will have a further estimated **47,000** indirect beneficiaries who will benefit from enhanced access to existing climate services and to microfinance in the project districts. The project could potentially benefit the entire rural population of Bhutan through activities to institutionalise the approach to microinsurance for smallholder farmers.

C. Project Components and Financing

[100] LFS 2022

[101] Households that include family members living with disabilities are also considered more vulnerable; however, as the community consultations revealed only one household with a person living with a disability, this will not be a major focus for targeting.

Project Components	Expected Outcomes	Expected Concrete Outputs	Countries	Amount (USD)
1. Strengthened climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers	1.1 Strengthened access to last mile climate services and increased understanding of smallholder farmers on index insurance benefits	Output 1.1.1. Linkages facilitated with existing climate services and support to gender-responsive digitalised dissemination Output 1.1.2. Sensitisation of targeted smallholder farmers on the benefits of index-based microinsurance Output 1.1.3 Leverage ongoing local adaptation planning to assist smallholder farmers to plan their adaptation responses for increased resilience and income	Bhutan	576,620
	1.2 Strengthened capacities for climate-resilient agricultural support and incentives for sustainable resilience building	Output 1.2.1. Consolidate existing climate-resilient agricultural support and develop and implement recurring training strategy to fill identified gaps Output 1.2.2. Identify and empower climate champions for effective peer-to-peer learning to increase resilience and income Output 1.2.3 Feedback loop for learning from activities on the ground		324,000
2. Innovative climate risk transfer mechanism rolled out and smallholder farmers' resilience built through integrated approach	2.1 Smallholder farmers adopt sustainable pathways for climate risk transfer and diversified livelihoods	Output 2.1.1. Risk transfer mechanism for smallholder farmers implemented and scaled up Output 2.1.2. Farmers have increased access to savings products and microfinance Output 2.1.3 Linkages facilitated to enhance diversified livelihoods through value chain and marketing support for climate-resilient value chains	Bhutan	2,992,051[102]
3. Innovative climate risk management institutionalised for long-term sustainability	3.1 Strengthened ecosystem for sustainable climate risk transfer through microinsurance	Output 3.1.1. Support stakeholders and develop enabling environment to institutionalise innovative climate risk management	Bhutan	302,128
Project Execution cost				398,441
Total Project Cost				4,593,240
Project Cycle Management Fee charged by the Implementing Entity (if applicable)				390,149
Amount of Financing Requested			**USD**	**4,983,389**

The project will contribute to the Adaptation Fund's Innovation Pillar expected results: **ER1**: Successful innovations rolled out. Innovative adaptation practices, tools and technologies that have demonstrated success in one country

[102] Of this, USD 1,266,250 will be allocated to insurance products (USD 690,000 for premium subsidies under the project's graduation strategy, USD 138,000 for distribution support, and USD 438,250 for developing and fine-tuning annually the insurance index and product. The remainder of the Component 2 budget of USD 2,992,051 will fund concrete adaptation assets to be enabled through increased access to micro finance and value chain and marketing support for climate-resilient crops and products.

spread to new countries/regions; and **ER4** - Evidence base generated. Evidence of effective, efficient adaptation practices, products and technologies generated as a basis for implementing entities and other funds to assess scaling up. The project is aligned with the Adaptation Fund's revised strategic results framework, in particular with **Outcome 6:** Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas; and with **Outcome 8**: Support the development and diffusion of innovative adaptation practices, tools and technologies. Specific outputs the project will contribute to are **Output 6**: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability; and **Output 8**: Viable innovations are rolled out, scaled up, encouraged and/or accelerated. The project will contribute to the AF's impact-level result of "Increased adaptive capacity of communities to respond to the impacts of climate change".

D. Projected Calendar

Milestones	Expected Dates
Start of Project Implementation	May 2024
Mid-term Review	October 2027
Project Closing	April 2029
Terminal Evaluation	October 2029

PART II: PROJECT JUSTIFICATION

A. Project components

The project will deliver an integrated package of interventions, through three interlinked components, to address key causes of vulnerability to climate change and food insecurity for smallholder farmers in vulnerable districts in Bhutan. Smallholder farmers, primarily women with heightened vulnerability to climate change, will gain access to innovative index insurance by investing their time and labour in adapting their farming practices to be more climate resilient, leveraging off and strengthening existing initiatives, including climate-smart agriculture (CSA) and good agricultural practices (GAPs) for low-external input sustainable agriculture (LEISA), and organic agriculture which is a priority of the RGoB. This support will be layered with access to an integrated risk management package that includes enhanced access to climate services, financial savings, and microfinance, to complement and enhance the sustainability of the microinsurance, as well as improved access to structured markets for climate-resilient produce. This will enhance smallholder farmers' capacity to effectively participate in the food system by breaking the vicious cycle of climate change - food insecurity – lack of access to financial services and markets that undermines Bhutan's agricultural system.

The LIG will be framed within the goal of sustainable transformation of Bhutan's agricultural sector, as part of post-COVID-19 recovery, and developed to leverage WFP's comparative advantages in support of the RGoB's policy priorities and the identified needs on the ground. The bulk of the project funding will go to support innovative and 'concrete' adaptation activities on the ground; the identified innovation of **index-based microinsurance** (either weather index insurance or area yield index insurance) will be layered with risk reduction activities (enhanced access to existing climate services and climate resilient agricultural technologies and inputs), micro finance to generate a positive tangible impact on the lives of vulnerable communities.[103]

The project's innovation strategy will be to roll out the primary innovation in the Bhutanese context of micro index insurance for smallholder farmers in an integrated and iterative fashion that harnesses multiple perspectives on innovation and promotes the integration of secondary, local-level innovations that have demonstrated effectiveness in the project localities. This will include building on traditional and cultural knowledge and practices, for example to strengthen dissemination of targeted and localised existing climate services. The innovation strategy includes institutionalising this innovative approach to climate risk management by strengthening private sector, civil society and government capacities at different levels, supporting smallholder farmers to advocate for the benefits of the approach, and developing the enabling environment to ensure ongoing sustainability. Affordable insurance for smallholder farmers was identified as an overriding priority by national stakeholders as well as community members, thus the entire project structure has been developed around this.

A graduation strategy will be included that supports farmers in a sequential way to take over paying the insurance premium, which will be initially covered by the project. Building on existing initiatives in the project areas, farmers will be provided with financial literacy training that underscores the importance of an integrated approach to managing climate

[103] This will be done through the WFP-developed integrated approach for microinsurance, which is based on the principle of layering climate risk management tools together to form one cohesive programme that increases participants' adaptive and resilience capacities. The four pillars of this 'R4' approach are risk reduction, risk transfer, risk retention, and prudent risk taking. Please see https://www.wfp.org/r4-rural-resilience-initiative

risks --- highlighting the critical role of microinsurance, short-term and long-term savings, microfinance and investing in productive assets.

A key theme running through the project logic is for evidence-based and systematic approaches that build systems for sustainability and further scaling out.[104] A critical part of the sustainability strategy is the development of an effective distribution strategy, to ensure farmers can access insurance when they wish. This entails establishing an insurance ecosystem for accessible, affordable and beneficial microinsurance.

In line with the policies of the RGoB, the AF and WFP, as well as in recognition of the findings of the Gender Assessment, gender equality and women's economic empowerment is a central element of the project design. Beneficiary targeting and design of activities will be carried out to meet these goals in a tangible way. In addition to mainstreaming gender in a meaningful way, the project will promote entrepreneurship and private sector participation in climate change responses, especially with respect to women, youth, and micro, small and medium enterprises (MSMEs). The project will significantly develop the capacities of the insurance providers in Bhutan, most of which are private sector enterprises. By providing a risk transfer mechanism to the targeted farmers, 70 percent of whom will be women, through microinsurance, they will be able to increasingly venture into commercial farming which will open various entrepreneurship opportunities.

Although there is a general perception that 'youth are not interested in agriculture', recent surveys in Bhutan have indicated that the situation is more positive and nuanced. Youth are indeed wary of agricultural work that is laborious, precarious, and low paying; however, recent developments such as the loss of private sector jobs due to the pandemic have made agriculture "one of the most viable employment options and an increasingly attractive choice for many young people regardless of their educational status".[105] While economic gain is an important motivator for youth to engage in farming, many also see working the family lands as an important way to benefit their family and community. Most young farmers in a recent survey that covered two of the project target districts said they perceive farming as meaningful from an individual and social perspective, providing them with more than an income. It is also seen by youth as essential for preserving Bhutanese culture and traditional ways of life. Thus if agriculture can deliver a better income it does hold promise for arresting the migration of youth – and other sectors of the rural population – into the urban centres and abroad.

The community consultations confirmed as well that youth are interested in agriculture is this can deliver a reasonable income, particularly if this is technology-enhanced agriculture. There are examples of youth agricultural groups in all of the project districts, with some youth involved in the production of high value crops – for example, organic pineapple production in Trashigang, and vegetable production in Dorona, in Dagana district. Activities targeting youth have been developed to address the above factors as well as these key findings of several recent studies on addressing negative youth perceptions of agriculture, namely: (i) the use of technology attracts young people to the agriculture sector; (ii) youth are interested in entrepreneurial opportunities along the value chain; and (iii) de-risking agriculture will enhance youth participation in the sector. The project will engage with the Youth Development Forum, which has established Young Farmers Groups in 18 gewogs, when further developing its youth engagement approach.

Component 1: Strengthened climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers

Component 1 focuses on enabling risk reduction to decrease overall exposure to more frequent and less severe climate risks on the part of smallholder farmers, through two main windows. Firstly, the project will facilitate linkages with existing climate services in the project localities so that the project beneficiaries can make more climate risk-informed decisions on their farming and livelihood systems. The project will provide additional support to gender-responsive digitalised dissemination of climate services, where this is feasible. Secondly, the project will support farmers to adopt behaviours that will improve their capacity to withstand future shocks, such as natural resource management, good agricultural practices, conservation agriculture and/or organic agriculture techniques combined with post-harvest loss management activities. The essential activity of sensitisation of farmers so that they understand how the index-based microinsurance functions and what the benefits could be for them will also take place under Component 1. All of the activities under Component 1 will be delivered with the understanding that they are essential in order for farmers to have an effective, multi-layered approach to climate risk management. Lessons learned by WFP, governments and other agencies are that index-based microinsurance needs to be part of an integrated package of financial services to mitigate and manage the financial impact of climate risks, supported by climate services, agricultural adaptation, enhanced savings and access to credit, value chain development, and enhanced market access. The ensuing description of activities provides more information on the necessary functional, and progressive, linkages that will be made between the delivery of the insurance product and other associated activities.

[104] The project will also ensure that it avoids an ad hoc approach and supports the building of long-term institutional systems and programmes in Bhutan, including with respect to implementing the 12th Five Year Plan, the 21st Century Economic Roadmap, the National Climate Change Policy, the National Adaptation plan (NAP) under development, etc.
[105] BRECSA Youth Engagement Strategy, 2022, available at https://carlep.gov.bt/resources/reports/ , accessed 31 July 2023.

Outcome 1.1 Strengthened access to last mile climate services and increased understanding of smallholder farmers on index insurance benefits

Output 1.1.1. Linkages facilitated with existing climate services and support to gender-responsive digitalised dissemination

Output 1.1.1 addresses an overriding priority expressed by both national stakeholders as well as community members for strengthened access to last mile climate services. As 70 percent of the project beneficiaries will be women, this will significantly increase women's access to reliable climate services.

Smallholder farmers participating in the community consultations identified erratic rain patterns leading to either an excess of rain or deficit of rain as key climate risks in all four districts. Erratic rainfall is affecting the performance of important crops such as maize and paddy, as well as other productive activities beyond farming. Increasing temperature, flooding and landslides, windstorms, and drought were further concerns, as well as increasing cold in the two highland gewogs of Trashigang, which affects the yaks upon which many livelihoods depend. Secondary data confirms these findings and underlines that climate change impacts are negatively affecting farmers through drying of irrigation sources and crop damage. Untimely rains, drought, and windstorms have led crop losses of up to 20 percent. Enhanced access to reliable last-mile climate services, packaged with agricultural advice (agro-met advisories) is an essential aspect of to reduce these climate risks for smallholder farmers, as it would enable them to manage their planting, pest and disease control, irrigation, and harvesting in a climate-risk informed manner. Enhanced access to seasonal forecasting would help them to identify which crop, out of the range produced, to focus on for a particular season, in order to reduce losses and maximise agricultural income. As such, more reliable and targeted climate services are an essential element of a risk-layering approach that includes climate risk insurance.

Community and local consultations revealed that while all participating farmers have access to the weather forecast, either through BBS TV, radio, or via smart phones, they do not consider these to be particularly reliable, as the forecasts are primarily at the district level and not specific to their location. Thus they refer to the forecast primarily as a loose gauge, and usually follow traditional farming patterns based on historical climate patterns. Farmers also consult the *zakar* (which highlights auspicious days for carrying out certain activities), for planting and planning other farming activities. As weather patterns change, farmers are becoming aware of the need for better climate information services, and that traditional cropping calendars need to change.

Daily weather forecasts for a 24-hour period are issued by the National Centre for Hydrology and Meteorology (NCHM) and shared among all agricultural extension staff in the country via a WhatsApp/Telegram group. These forecasts are shared with villagers and farmers by the gewog agricultural extension officers, of which there is one per gewog. There are many opportunities to enhance the reliability of this dissemination process, and further develop the digital platform so that this could be available to farmers too, packaged with improved agro-meteorological (agro-met) advisories. In addition to more reliable and better disseminated forecasts that are more targeted to the different micro climates and differentiated agro-ecological zones, farmers also require medium-term (10 days) and long-term (30 days) weather forecasts to plan properly, as well as enhanced seasonal forecasts. An AgroMet app is currently under development by the DoA.

In order to avoid duplication and build synergies with other initiatives, and at the express wish of the Designated Authority (DA) for the Adaptation Fund (AF) in Bhutan, the project will focus under Output 1.1.1 on facilitating linkages to existing *localized* climate services linked to adaptation planning and implementation. There are several existing / planned initiatives that will invest in enhancing climate services for smallholder farmers in Bhutan, including the UNDP / Green Climate Fund (GCF) project 'Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan'; and the World Bank / Japan / European Union-funded 'Strengthening Risk Information for Resilience' project. In addition, the endorsed AF Full Proposal (FP) submitted by the Bhutan Trust Fund for Environmental Conservation (BTFEC), which is a National Implementing Entity (NIE) accredited by the AF, includes an output on enhancing climate services. The planned FAO GCF project on the Water Flagship will also contain activities to improve forecasting and climate services, particularly with respect to pests and diseases. The project will also complement the World Bank Risk Reduction project, which is in 11 districts, that is looking at the gaps in climate services – under the Regional Integrated Multi-Hazard Early Warning System (RIMES).

Thus, an initial step will be to undertake or to complement any existing stocktaking of localized climate services in the project districts, in order to map out the ongoing and pipeline activities in the project activities and to identify any gaps in terms of provision of improved climate services. The project will then develop and implement a strategy to address the gaps identified and to enhance gender-responsive dissemination. The LIG will build on and enhance where necessary the existing activities of the range of projects and initiatives set out above. Likely areas of enhancement are with respect to gender-responsive digitalised dissemination, to overcome barriers experienced by women in accessing climate services in general and digital services in particular; as well as bringing in WFP skills on last mile climate services (LMCS) to ensure that existing climate services are refined to be culturally appropriate, and to enhance their targeting and localisation, for greater uptake and effectiveness. The project will also support the ongoing process to enhance more localised agro-met advisories, where this is needed.

There are opportunities for harnessing cultural and traditional knowledge to enhance the dissemination of climate services, as well as for the sensitization activities on insurance, and for enhancing local adaptation strategies. As part of the process to undertake or complement any existing stocktaking of localized climate services, the project will identify aspects of cultural and traditional knowledge and practices that could be built on in a sensitive and respectful manner.

Activities under Output 1.1.1:

Activity 1.1.1.1 Undertake/complement existing stocktaking of localized climate services in the project areas and develop strategy to address gaps and enhance gender-responsive dissemination

Activity 1.1.1.2 Support the NCHM and DoA to develop more targeted and effective agro-met advisories for the project areas

Activity 1.1.1.3 Implement steps identified in strategy (Activity 1.1.1.1) for enhanced gender-responsive digitalised and non-digitalised dissemination

Output 1.1.2. Sensitisation of targeted smallholder farmers on the benefits of index-based microinsurance

Community consultations revealed that while there is demand for affordable agricultural insurance, which is also a strong RGoB policy priority, community members at the same time lack good understanding of agricultural insurance in general and have not yet had any experience of index-based insurance. To many members of the community in all Gewogs, insurance is seen as another form of tax, given that the Dzongkha word used for insurance and tax is similar ("Tey" or "Tre"). Female and male youth and the more educated farmers have a better understanding of the benefits of insurance and consequently expressed more enthusiastic opinions on it. Some of the misconceptions about insurance relate to farmers not yet having seen the results of crop insurance, in the form of claims payouts.

Consequently, the project will implement a coherent and recurring sensitisation strategy based on WFP's demonstrated global experience with rolling out the tested innovation of index-based microinsurance. This has highlighted the importance of spending adequate time on sensitisation of targeted smallholder farmers on the benefits of index insurance and the necessity for a layered approach to climate risk management, as a crucial element in the insurance sustainability strategy. The WFP Climate Risk Insurance specialists have extensive experience in designing and supporting the implementation of sensitisation activities, and recommend that an awareness and literacy period, during which the training of trainers and farmer sensitisation (and other training) is conducted, should start 3-4 months before the planting season/coverage period.

In addition to enhancing community members' understanding of insurance, a key sensitisation message will be that index insurance needs to be part of an integrated package of financial services to mitigate and manage the financial impact of climate risks, supported by climate services, agricultural adaptation, value chain development, and enhanced market access.

The sensitisation activities can be delivered working through WFP's Social and Behaviour Change Communication (SBCC) approach, tailored to suit the Bhutanese context. The WFP CO has assisted the RGoB to conduct in-person and social media awareness campaigns using the SBCC approach in the context of the RGoB's school meals programme. The sensitisation activities will be synergised with the activities to enhance access to existing last mile climate services (LMCS) under Output 1.1.1, to ensure that the LIG activities benefit from a more climate risk-informed approach. The sensitisation of farmers on the benefits of index-based microinsurance will be gender-responsive and designed to build on traditional and cultural knowledge and practices in Bhutan, to represent an additional innovative element in the process of rolling out the microinsurance. Sensitisation workshops and other trainings conducted under the project will aim to set up child care facilities when trainings are conducted so that women can participate fully and comfortably.

The sensitisation activities will need to engage with and complement the important cultural and religious practices as preparation and coping mechanisms in the project areas. Gewogs conduct prayers either at the start of the year or at the start of the season, hoping that this will encourage sufficient and timely rain for agricultural production. While older people tend to have more belief in the impact of these practices and youth may be more sceptical, all age groups and genders cited this as their primary coping mechanism for whatever risks or complications they face in the field.

Contextualised awareness raising material on the benefits of microinsurance and the integrated climate risk management strategy of the project will be developed. Because of the technical nature of index-based insurance, WFP will provide technical support so that the sensitisation materials are designed to be farmer-focused, visual more than textual to address possible lower levels of literacy, can be translated into local languages, and to include gamified activities. Farmer-focused awareness materials consider the context as well as farmers' internal motivations and fears. WFP-supported insurance initiatives also adopt group games that prompt identification of risks faced and the different ways these can be managed, as has been utilized successfully in, for example, Mozambique and Zimbabwe.

There will be two main delivery avenues for sensitisation: recurring targeted *in-person* insurance and finance sensitisation and ongoing *digital and social media* insurance and finance sensitisation. In both delivery avenues, the

sensitisation on insurance and the need for this to be part of a multi-level risk management strategy will be delivered together with financial literacy and awareness. This will encompass literacy on savings and microfinance. This activity will include enhancing existing financial literacy initiatives in the project localities, such as those delivered by the microfinance institutions (MFIs), who have reach across the entire country. Existing events such as gewog food days, cattle festivals, international soil days, and other events organised by different projects will be leveraged. The sensitisation strategy will consider whether and how to harness cultural and traditional knowledge for a greater impact. Opportunities include building on previous initiatives to support youth theatre groups to develop advocacy plays that are grounded in Bhutan's cultural richness, and discussing with Gewog leaders whether there could be a role for powerful figures, such as the *Atsaras*[106], who are storytellers and masters of ceremony, amongst other roles, at the Bhutanese *tsechus* or festivals.

The sensitisation activities will aim to harness the considerable cultural capital in the project localities, including by engaging with trusted community leaders such as the Gups, village lamas, teachers, and lead farmers. A hybrid approach is conceptualised for effective sensitization that encompasses digital technology and influencers (targeted at youth) and cultural and traditional practices like song and dance (targeted at older farmers).

Sensitisation activities will be gender-sensitive, as will all awareness raising and training activities of the LIG. Specific ways in which this will be facilitated include as a minimum providing temporary free child care for training and awareness raising activities. The project will additionally advocate for and try to ensure (through other investment windows and partners) longer-term solutions to child care to enable women's economic empowerment in the project localities. Given the recognised feminization of agriculture in Bhutan, and women's enduring larger share in child care, this is seen as a fundamental element of enabling greater resilience of rural women farmers. The project will draw on lessons learned by the CARLEP project on engaging youth in agriculture, and tailor its sensitisation processes to be appealing to female and male youth. Both CARLEP and BRECSA projects have a Youth Engagement Strategy, which has been factored into the development of this proposal and will be a useful guide to the implementation of the AF activities.

Targeted awareness raising activities will also be conducted with policy makers (senior government officials and Parliament) on the benefits of index-based insurance as part of an integrated approach to manage climate risks. This will be an initial step to facilitate the institutionalisation activities set out under Component 3, which in turn is an essential element of the project's sustainability strategy.

Activities under Output 1.1.2:

Activity 1.1.2.1 Develop targeted, gender-responsive and climate-informed insurance sensitisation strategy and materials

Activity 1.1.2.2 Provide advocacy and sensitization to policy makers on benefits of index-based insurance as part of an integrated approach to manage climate risks

Activity 1.1.2.3. Train aggregators and distribution and delivery channels on the climate risk insurance and finance product, as well as ARDCs, academic/ research institutions, extension officials, and community leaders and influencers, on implementing insurance sensitisation strategy

Activity 1.1.2.4 Implement targeted in-person insurance and finance sensitisation strategy linked to financial literacy and awareness

Activity 1.1.2.5 Implement ongoing digital and social media insurance and finance sensitisation strategy

Output 1.1.3 Leverage ongoing local adaptation planning to assist smallholder farmers to plan their adaptation responses for increased resilience and income

While smallholder farmers in the project area do adopt a number of climate risk management strategies, these are often in the form of coping activities, with insufficient proactive planning. Many of these measures are insufficiently robust to prevent loss of income and reduced livelihoods as a result of the erratic rainfall, increased temperatures, and increasing drought, flood, and windstorm risks. Agricultural extension officers and farmers – women and men – have identified the need for enhanced extension support that is climate-risk informed and provided in an ongoing and coherent way.

In order to assist farmers so that their decisions on the layered risk reduction technologies they will adopt and how they could best optimise the role of insurance in their livelihoods are coherent and climate risk-informed, it is important that these decisions are made within a supported approach to local adaptation planning. Activities under this output will bring together the outcomes of output 1.1.1, which will result in farmers having access to enhanced climate services with gender-responsive digitalised dissemination, and leverage off those of output 1.2.1, which will ensure farmers have enhanced and ongoing climate-resilient agricultural support. In addition, farmers will be sensitised on the range of on-

[106] https://www.dailybhutan.com/article/atsara-the-bhutanese-clowns-who-are-not-just-clowns accessed 20 August 2023.

farm income-generating activities available in the area through existing initiatives, including opportunities for agricultural diversification for increased resilience, as well as existing processing and value addition options.

To reduce duplication with other investments and avoid creating a parallel system of local level adaptation planning, the project will make linkages with and leverage off existing village- and gewog-level plans in which the project beneficiaries have already participated. In project localities where such plans have already been developed, the project will provide support to help farmers refine their existing planned adaptation actions. For example, the BRECSA project will develop gewog-level agricultural resilience plans, so where project localities overlap with the BRECSA districts, the project will not duplicate these activities but will synergise with the BRECSA project so that the planning process is shared where possible. The project will build on processes put in place through the UNCDF-supported Local Climate Adaptive Living Facility (LoCAL), which has been supporting local governments in Bhutan to enhance community resilience and adaptive capacity for climate change through a system of performance-based climate resilience grants (PBCRGs). Where no participatory local level adaptation planning has been carried out, the project will support a rapid participatory community-based adaptation planning process, informed by any relevant statutory requirements of the RGoB as well as WFP's expertise in community-based participatory planning (CBPP). Currently, there is no specified process for local adaptation planning in the RGoB's policy framework; however, the government recognises the importance of this as a way to assist farmers as well as make national-level adaptation planning more bottom-up.

This output will draw on and integrate information from the sectoral climate risk assessment for agriculture and the climate change and vulnerability risk assessment carried out for all districts (and down to gewog level) under the NAP process; as well as WFP's Consolidated Livelihood Exercise for Analysing Resilience (CLEAR) process that is planned under the BRECSA project, which is intended to inform national and local level adaptation planning roll out. The CLEAR had not been developed by the time of completion of this proposal, but the LIG will make use of the disaggregated livelihoods and climate risk information in detailed design during the project inception stage; as well as in local level planning and implementation of the LIG. More detailed agro-ecological zones (AEZs) that will reflect the multiple micro-climates of Bhutan more accurately are currently under development and will also provide an input into the local-level adaptation planning. An additional input into the local-level adaptation planning will be the disaggregated information from the development of the insurance index, which will include delineating downscaled agro-ecological zones. Using all of these sources, the project will develop clear and distilled messaging, designed for both literate and illiterate community members, on current and future climate risks. Gender-responsive and user-friendly materials will be used in a rapid participatory local adaptation planning process that will be developed with technical support from WFP specialists, to support farmers to make proactive and informed adaptation decisions.

Activities under Output 1.1.3:

Activity 1.1.3.1 Develop supplementary gender-responsive training strategy and materials for rapid participatory local adaptation planning, building on existing initiatives[107]

Activity 1.1.3.2 Train district-level officials, MFIs, community leaders and influencers on rapid participatory local adaptation planning, leveraging existing initiatives

Activity 1.1.3.3 Hold participatory community workshops on local adaptation planning that integrates climate risk insurance and savings, and advocate for the integration of local adaptation plans into district and national adaptation plans

Outcome 1.2 Strengthened capacities for climate-resilient agricultural support and incentives for sustainable resilience building

Output 1.2.1. Consolidate existing climate-resilient agricultural support and develop and implement recurring training strategy to fill identified gaps

Output 1.2.1 is designed to deepen the risk reduction impact of the increased access to climate services activities under Output 1.1.1. Risk reduction is an essential complement to insurance, as it contributes to reducing the effects shocks have on households and communities, increasing farmers' adaptive capacity to climate change. Thus, risk reduction decreases the overall exposure to weather shocks, allowing the insurance to be focused on the low frequency / high impact years and thus helping to keep the cost of insurance to acceptable levels.

Community consultations revealed that while smallholder farmers adopt a wide range of climate risk management strategies, some of these are not robust and there is insufficient proactive planning. Measures are generally adopted without the appropriate technical and financial support to make them sustainable. The range of measures adopted across the four districts include improved access to water sources and irrigation and water management; rainwater harvesting; crop diversification; shifting crops to higher altitudes; shifting crop calendars; cultivation of more resilient varieties; and cultivation of high value crops. Many of these have been supported to some extent by the extension

[107] These initiatives include the district-level adaptation planning conducted by the LoCAL project and the Agriculture Resilience Plans (ARPs) to be developed by BRECSA, which will be at the gewog level.

services. Farmer-based methods include traditional methods of pest control (ashes, cow's urine, and applying grease); and a traditional form of cultivation that is similar to conservation agriculture. Agroforestry has been adopted to a limited degree only. The community consultations revealed that rituals and prayers for rainfall and good harvest remain of overriding importance for farmers, being almost always mentioned as the first port of call when asked how they try to deal with adverse weather conditions.

Output 1.2.2 will involve carrying out a stocktaking of existing activities and capabilities for climate-resilient agricultural support, identifying gaps and developing a recurring training strategy for the chosen natural resource management (NRM) risk reduction conditionality – will bring together existing extension plans and capacity development initiatives and other elements in the dzonghags / localities. The project will then implement the identified capacity development activities including enhanced training for agricultural extension officers and support for farmer-to-farmer learning on a recurring basis. This may include some support to the capacity development activities of existing projects and initiatives, as well as some additional capacity building activities where required.

The project will use the existing institutional framework of the Ministry of Agriculture and Livestock to strengthen capacities for climate-resilient agricultural support through its specialized agriculture research and development centres (ARDCs) covering the whole country, as well as through the district and gewog (block-level) agricultural extension staff. The mandate of the ARDCs includes leading the development and implementation of research and extension programmes in districts, gewogs, and communities, and managing and sharing knowledge and Information on research and extension. The research institutions are further supported by the district and gewog level agricultural extension officials who operate in a collaborative framework and facilitate direct implementation of programmes, provide technical advisory support, monitor progress and results, and compile administrative data for better decision making. Under output 1.2.1, the project will undertake an exercise, through the district-level agriculture officials (DAOs) and the gewog-level extension officers to consolidate climate-resilient agricultural support in project districts and, together with the ARDCs, develop a localised strategy for enhanced technical support. This will include identifying how best to support production of the climate-resilient crops that would promote household nutritional outcomes, as well as those that would generate enhanced income for farmers. Under normal programme operations, the agricultural support network provides support on marketing to farmers, which is often identified as an important barrier to enhanced rural livelihoods. In addition to these normal activities that will form the context of the project activities, the project will specifically support additional climate-resilient value chain development and market access, under output 2.1.3.

The specific NRM and climate resilient agricultural technologies to be implemented will depend on the exact project localities and associated climate risks. The insurance feasibility study has proposed that the product should be crop-agnostic – in other words, no crop will be specified but rather the insurable interest will be agricultural income (see discussion under Component 2 for further details). The insurance approach will thus support farmers continuing to grow a range of crops, and also remove dependency on one form, allowing for further diversification, which is seen as an important element of rural resilience. The project will adopt a two-fold approach in order to experiment with and encourage secondary innovations in the process of rolling out the primary innovation of index-based microinsurance:

- In some of the project areas, the project will support climate resilient agricultural technologies and good agricultural practices (GAPs) for low-external input sustainable agriculture (LEISA); while
- In other project areas with suitable conditions and agricultural products, the project will directly promote organic agriculture, which is a priority of the RGoB.

An example of the former approach would be the promotion of GAPS and conservation agriculture as a conditionality for receiving access to the microinsurance in the production of maize which is at sufficient scale in the more remote and neglected eastern parts of the country. These areas have high poverty levels and in general the most significant climate risk is increasing drought and dry spells in the growing period. In this case, conservation agriculture, which has proven effective in many dry and drought-stricken parts of the world, and on which there has only been minimal training in Bhutan to date, would be an effective conditionality for insurance.[108] The institutional base in the east is strong with respect to research centres that could partner with the project. Although the focus will be on low-external input sustainable agriculture (LEISA), the project will not encourage or provide any chemical inputs, but rather support farmers to adopt LEISA as a potential pathway towards organic production, where this may be feasible.

Regarding the latter approach, the Department of Agriculture (DoA), through the National Centre for Organic Agriculture (NCOA) has indicated that Tsirang is an example of a district where organic production could be the conditionality for receipt of microinsurance under the project and is supportive of the approach of using insurance as a risk transfer factor and to stimulate the more formal transition to organic agriculture. The latest Intergovernmental Panel on Climate Change (IPCC) assessment recently emphasised the need to expand organic agriculture for multiple benefits: reducing GHG emissions from agriculture, improving soil fertility, promoting biodiversity and enhancing grassroots adaptation. Moreover, there are examples in the region of successful approaches at scale using no chemicals. Comparison of

[108] Head of Programmes, National Centre for Organic Agriculture, Yusipang; personal communication, 16/06/22.

climate resilience indicators across organic and conventional rice systems in the Philippines indicated that organic rice systems are more climate resilient than their conventional counterparts.[109] [110]

The National Organic Flagship Programme (NOFP), which falls under the DoA, was launched two years ago in clear evidence of the high policy priority of organic production.[111] It has the following components: (i) Increased organic production of bio-inputs leading to phased import substitution of agrochemicals; (ii) Enhanced organic value chain and marketing through private sector engagements and enterprise development; and (iii) Organic standards, inspections and certification system developed and implemented. The 2021 transformative pathways for Bhutan's food systems emphasizes that to achieve the policy priorities for pursuing organic production, facilities and enterprises to provide organic seeds, organic composts, biofertilizers, bio-feed and bio-pesticides will be fast tracked and established; these are intended to be operationalised by 2024.[112] Bhutan has a comparative advantage over other countries in the region for organic production in that very low levels of chemicals are used across the country, thus reducing conversion costs.

According to the 2019 RNR Survey, just under 95 percent of farms use farmyard manure or compost, while only 25 percent use chemical fertilizers and five percent of farms use protective coverings (plastic houses, glasshouses, or shades).[113] The two main areas of agricultural chemical use are fertilizer for potato, which is grown at scale; and insecticides against weevils for rice. There is an opportunity in Bhutan to produce organic fertilizers which would also reduce impact on the soil; these, together with biopesticides are being tested and scaled up. The project will explore the possibility of promoting youth and other entrepreneurship activities for organic fertiliser production; this could be extended to the production of biopesticides if successful and provided the DoA and other authorities are satisfied that the necessary safeguards can be met. There is evidence that Bhutan could harness the considerable potential for organic agriculture by promoting an integrated approach, which should include organic management practices such as growing fodder legumes;[114] the stocktaking activity under Output 1.2.1 will investigate and make recommendations to fill any identified gaps in the promotion of organic, as well as other climate resilient agricultural technologies in Bhutan. While Bhutan has locally developed organic standards and certification, barriers to increased benefits for smallholder farmers include better market access both domestically and internationally. The project will implement activities to overcome these barriers under Output 2.1.3.

During the identification of the specific project localities within the four selected districts, during the inception phase, the project execution team under the guidance of the Technical Working Group will consider the possibility to include the development of one or more certified commodity-based organic landscapes, in line with the DoA's recent exercise on the 'Future of Organic Farming'.[115] Promoting landscape-based organic farming for enhanced production and sustained livelihood systems is one of the adaptation strategies identified in the recent climate change risk assessment for the agriculture sector.[116] The NCOA of the DoA has indicated that areas next to forests are particularly suitable for this, as all state forests are organic.[117] Geographical opportunities for this within the project's designated districts include almost the entire district of Tsirang, which is *de facto* organic and incudes a gewog with very good agricultural extension that has been identified by the NCOA as a potential starting point. The process for delineating organic landscapes could be completed in 3-6 months and includes discussing this with the district government and then identifying an agreed area to be delineated through community consultations. As the DoA is already in the process of requesting districts for organic proclamation, this could be consistent with the project inception time frames.

Youth groups cultivating state land with a land use certificate (LUC) are amongst those registered for organic production, thus indicating the potential of this approach to engage female and male youth in the project's activities. The local and community consultations revealed a steadily increasing engagement with organic agriculture; for example, in during the meetings in Bidung gewog,Trashigang district, the extension officer was meeting with 63 farmers in a neighbouring gewog the next week to discuss organic registration. In Trashigang alone, three youth groups had been initiated for organic production of high-value commodities via LUCs: one has a focus on commercial production of organic pineapples, while the other two focus on a range of fruits, including kiwi fruit, pears and passion fruit. Tomato, asparagus and groundnuts are also being cultivated organically.

Within these two broad approaches – LEISA and organic production – the project will identify a range of secondary methodologies and innovations to promote climate-resilient agriculture to support. Possible options identified during the community and local consultations, as listed above, were used as a starting point for an Innovation Workshop held in Thimphu on 8 August 2023. This was convened to identify secondary innovations to accompany the primary innovation of climate risk insurance for smallholder farmers, through a participatory workshop that facilitated discussion between

[109] Heckelman A, Smukler S, Wittman H (2018). Cultivating climate resilience: a participatory assessment of organic and conventional rice systems in the Philippines. Renewable Agriculture and Food Systems 33, 225–237. https://doi.org/10.1017/ S1742170517000709

[110] A further example is the Zero Budget Natural Farming (ZBNF) involving more than 100,000 farming families in Andhra Pradesh, India, with multiple food security, social, and environmental benefits. ZBNF deploys a range of farming methods, including applying fermented microbial culture to the soil, intercropping and mulching https://www.fao.org/agroecology/detail/en/c/443712/ last accessed 11/07/22.

[111] A total of 10,095.29 acres of farmland across the country operated by 1,265 households has been registered for organic production. Maximum agriculture area registered during is from Samtse, Sarpang, Samdrupjongkhar, Zhemgang, Paro and Tsirang. https://flagship.gnhc.gov.bt/nofp-fp/ accessed 03/07/22.

[112] MoAF (2021) Food Systems for Gross National Happiness: transformative pathways for Bhutan.

[113] MoAF (2019) RNR Census of Bhutan.

[114] Neuhoff, D., Tashi, S., Rahmann, G. et al. Organic agriculture in Bhutan: potential and challenges. Org. Agr. 4, 209–221 (2014). https://doi.org/10.1007/s13165-014-0075-1

[115] Under this approach, the first step would be identification of a suitable product for the market, after which the necessary support would be layered for certification for organic, access to finance, linkage to markets, etc., as a whole package of support interventions.

[116] RGoB and UNDP (2021) Assessment of climate risks on agriculture for National Adaptation Plan (NAP) formulation process for Bhutan.

[117] The NCOA has implemented a small project on model organic villages with ICIMOD that was close to completion at the time of development of the CN, involved one each in Wangdue, Sarpang, Haa, Luentse, and two in Chhukha (50 households in each village). Activities included developing the concept, definitions, and indicators, to set the scene for working with villages to gradually scale up to organic production.

government stakeholders, researchers, representatives of NGOs and CBOs, and farmers' organisations. A robust landscape of GAPs methodologies and secondary innovations on climate-resilient agricultural technologies and inputs was identified, with sound technical inputs from the DoA, ARDCs, and the CNR, as well as experiences and insights from the field from the farmers present, one of whom was an organic farmer.

The GAPs methodologies and innovations considered most suitable and promising within the project context are summarised in **Table 2** below.

Table 2. Menu of GAPs methodologies and secondary innovations

Category	Methodology / innovation	Examples / expertise	Notes
Sustainable land management and soil fertility enhancement	Contouring and terracing on sloping land e.g. contour grass hedgerows	CARLEP project National Soil Services Centre	Any terracing would only be at the farm level and not at any larger scale
	Small springshed protection	CARLEP project, ARDC Wengkar	CARLEP has tested a range of methods for SLM and protection of watersheds in the eastern districts
	Bio-composting, vermi-composting, organic soil nutrient management	ARDC Wengkar	Farmer-originated and science-developed methods can be combined and tested for enhanced impact
Traditional and cultural varieties and knowledge	Cultivation of heritage grains and legumes such as foxtail millet, finger millet, small millet, amaranths, soya beans, lentils, buckwheat, etc. Promotion of indigenous crop varieties over hybrid	Farmers across the country, e.g. in Pemagatshel as documented by PEER project ARDCs	Documentation of interventions and success stories is required Enhancement of traditional varieties through science is recommended
Improved resilient varieties	Provision of improved resilient varieties e.g. heat-tolerant maize	ARDCs National Seed Centre	
	Resilient paddy seeds that require no additional water input. The varieties are Wengkhar Kamja 3 (mid-high altitude) and Samteling Kamja 3 (low altitude)	National Seed Centre	
	Other resilient fruit and vegetable varieties	National Seed Centre ARDCs	
Plant protection and animal health	Bio-pesticides – on-farm production Test and improve farmers' own methods for plant protection – e.g. fermented cow urine for red ant	Farmers in Samdrup Jongkhar and Mongar, amongst others ARDCs Organic farmer /Chair of Agro-Logistics and Marketing Cooperative (ALMC)	As documented in the CNR PEER Farmers Field Visit Report, Dec 2022
	Jholmal[118]: can be used as a bio-fertilizer and as bio-pesticide depending on raw materials used		
	Pest and diseases control detector / sensor		This will be considered for inclusion should the budget allow
Organic farming and management	Adoption of organic farming management practices (use of compost, local seeds /breeds, etc.)	NCOA	Organic farming promotes carbon sequestration Farmers note that it is more pest and disease resilient
	Model should be modern organic agriculture for increased yield and income	NCOA	

[118] See https://www.icimod.org/jholmal-a-chemical-free-solution-for-farmers-in-kavre last accessed 07 September 2023.

	New loans for organic farmers	NCOA / MFIs	This can be facilitated through the project's access to credit activities, in due course
Livestock-related	Integrating livestock into the farming system (for organic manure) Biogas for cooking and organic slurry/ manure		The project will not supply any livestock but will provide extension advice on integrating livestock into the farming system for resilience
Water-related	Improved rainwater harvesting	Many examples across country; tested by ARDCs	
	Drip irrigation		
Additional GAPs (Good agricultural practices) not mentioned above	Good farm design to facilitate effective farm operations and sustainability	ARDC Wengkar Other ARDCs Farmers in Samdrup Jongkhar and Mongar, amongst others	As documented in the CNR PEER Farmers Field Visit Report, Dec 2022
	Good orchard management, fruit tree pruning and training, etc.		
	Diversified crop rotation, crop combination, etc.		
Automation	Smart automation for irrigation systems – e.g. automation of micro-irrigation technologies such as drips and sprinklers	This is being piloted for example under the DHI Innotech Semjong Water project in Tsirang district[119]	The possibilities for including simple automation systems will be considered during development of the TA package, under output 1.2.1
	Automated soil testing with recommendations for action	National Soil Services Centre and tech entrepreneurs	

Please note that **Table 2** is not necessarily an exhaustive list, but rather a starting point for the stocktaking exercise. The DoA has compiled a package of 46 climate-smart agriculture (CSA) technologies within the research and development programmes and agencies,[120] which could provide the stocktaking exercise with additional options to consider, if it is found that existing options implemented in the area are insufficient to support the desired sustainable increase in production.

It is also not intended that each project locality would implement all of the climate-resilient agricultural methodologies and innovations in the table – rather, the stocktaking exercise and community adaptation planning processes would identify which options would be most suitable and desirable for the project localities and community members' available assets and intentions for their farms.

Once the stocktaking exercise has identified which options are the most suitable and desirable for the project localities, targeted technical assistance packages will be developed for the project localities. These will be kept relatively simple and targeted to start with, for maximum uptake and impact. For example, a recent study in Pemagatshel district found that the top five CSA practices that farmers adopted or were willing to adopt were seed saving, using farmyard manure, planting a mix of crops, improving crop varieties, and integrating livestock on the farms.[121] The TA packages will seek to promote a combination of traditional and scientific methods. For example, where organic production is the agreed approach, the model should be modern organic agriculture for increased yield and income, using open pollination varieties (OPV). The technical assistance will include operations and maintenance guidelines and plans, particularly for any technology and mechanical-based intervention, to promote sustainability.

The TA packages will be reviewed on a regular basis, in accordance with the DoA's annual planning process at different levels. Once the initial TA package in an area has been demonstrated to be effective, the review process will consider whether simple automation systems can be included in the TA, in accordance with the project budget. Automation systems could also be bundled with the insurance linked to the project's value chain and marketing activities – see output 2.1.1.

The technical packages will be developed with attention to nutrition-sensitivity, as well as climate resilience and potential for stimulating enhanced income for farmers. It is important to remember that poor dietary quality and overconsumption

[119] This includes a sustainable irrigation platform (SIP) installed by the Ministry of Agriculture and Livestock, which is an open source Raspberry pi based python program that provides user interface using web technology and can be accessed from any browser on laptop, desktop, and mobile phones. https://innotech.dhi.bt/projects?news=31 accessed 11 July 2023.

[120] DoA (2021) Inventory of Climate Smart Agriculture Technologies in Bhutan. Department of Agriculture, MoAF, SAARCH and IFAD Publication.

[121] College of Natural Resources (2023) Climate Smart Agriculture in Pemagatshel District: A Cross Sectional Survey in Bhutan. Handbook

of staples are key drivers of malnutrition in Bhutan.[122] A further implication of the recent Fill the Nutrient Gap (FNG) findings is that it would be important to try to support the move from a staple-based farm to a more diverse and nutritious farm. Given that crop diversification is positively correlated with climate resilience, it is likely that synergies can be found between nutrition and climate resilience goals.

In addition to direct climate risks such as erratic rainfall, increasing temperatures, windstorms, flooding and landslides, and drought, significant challenges for farmers as revealed in the community consultation are pests and diseases, conflicts with wildlife, a lack of irrigation water, labour shortages, and post-harvest losses. The TA packages will be developed to address as many of the above challenges as possible. Human-wildlife conflict (HWC) is being addressed under a number of separate projects and will not be a major focus for this project, as it is not a direct impact of climate risk (although there may be an indirect correlation); however, during the stocktaking exercise, inexpensive but effective options that could be supported will be considered to assist farmers in reducing their overall risks. For example, ARDC Wengkhar is developing a bioacoustics repellent device to minimise human wildlife conflict; this would greatly reduce the time farmers have to spend in guarding their fields.

There is good evidence of strong uptake adoption of adaptation technologies by farmers in Bhutan when targeted training and support is provided. For example, in Ngarpentang climate-smart village in Mongar, 90 percent of respondents adopted integrated fruit and vegetable cultivation, 35 percent adopted stress tolerant crops such as heat-tolerant maize, 35 percent adopted crops with reduced water requirements such as upland paddy, 69 percent adopted composting, and 79% adopted water-efficient technologies, especially sprinkler irrigation.[123]

Inputs, tools and equipment

Input support for farming in Bhutan is provided through the gewog extension officials, agriculture and livestock sector heads in the districts, as well as the divisions and central programmes of the DoA and DoL, amongst others. This network of support for farmers will be instrumental in determining what inputs may be provided to farmers as part of the AF project, in addition to the enhanced technical assistance that all farmers in the project localities will receive. It is expected that the project will focus on providing farmers with resilient and improved varieties, including non-hybrid seeds, access to organic fertilisers and pesticides, and provide simple tools and equipment. While protected agriculture allows for external factors to be controlled, and promotes the efficient use of water and fertilizers, it is not expected that the proposed project will directly provide greenhouses to farmers, as the DoA is already facilitating this through other projects and programmes across the country. Furthermore, concerns have been raised about the proliferation of plastic in the environment through the provision of greenhouses. Given that there are many other options for enhancing climate-resilient production that have not yet been sufficiently supported in the project areas, it is not considered essential to include provision of greenhouses.

There are labour shortages in almost all of the districts in Bhutan, which have an impact on agricultural activities and productivity. This is apparent with the number of *gungtong* (empty households) and increasing fallow land. Thus project interventions will be further designed to address the labour shortage, including through the provision of suitable tools and equipment, as well as small-scale processing machinery (see output 2.1.3). To ensure that women farmers are adequately supported, the project will identify and source the most appropriate gender-sensitive tools and equipment to promote. Examples could include mini-power tillers, grass cutters, chaff/fodder cutters, seeders, weeders, mini-threshers, milling machines, etc., which are easy to use in terms of weight, operation and also user-friendly in the Bhutanese terrain, given the narrow terraces on many hill slopes.

The tools and equipment to be promoted and distributed will be identified based on the specific needs in the project gewogs, once these are identified during project inception, as well as the environmentally sound nature of the technology. For example, while mini-power tillers have been distributed to some farmers through the RMFPL microfinance scheme, these would need to be assessed in terms of environmental and social impacts before they could be included in the project. Key issues are related to the fuel source, as well as the noise levels which have been found to be hazardous to farmers in some countries. The project will explore other innovative sustainable farming tools through the innovation initiatives and platforms identified. Tools and equipment to be provided will be assessed through a set of criteria, to include environmental impact, social acceptability, ability to reduce the drudgery of women in rural areas; ease of maintenance and availability of repair services; and potential to stimulate additional business opportunities for rural entrepreneurs through provision and maintenance of the tools and equipment.

In addition to promoting selected secondary innovations identified above, the project will also promote the integration between agricultural and financial services, as discussed under Component 2.

Under the integrated resilience building approach adopted by the project, when registering as beneficiaries for the microinsurance, farmers will commit to specific NRM and climate resilient agricultural technologies as a conditionality for accessing subsidised insurance premiums with the integrated package of support, through the project funding. Thus Output 1.2.1 will be carried out in conjunction with Output 2.1.1 in each project locality, supported by the sensitisation

[122] FNG, 2022

[123] CARLEP project report 'Impacts of Climate Smart Agriculture (CSA) Interventions on Livelihoods and Climate Resilience – The Case of Ngarpontang Climate Smart Village (CSV), Mongar Bhutan'. Available at https://carlep.gov.bt/resources/reports/ accessed 31 July 2023.

activities under Output 1.1.2 and complemented by the enhanced access to financial services under Output 2.1.2 and the linkages facilitated to enhance diversified livelihoods through value chain and marketing support for climate-resilient value chains under Output 2.1.3.

Activities under Output 1.2.1

Activity 1.2.1.1 Consolidate climate-resilient agricultural support in project districts and develop localised strategy for enhanced technical support

Activity 1.2.1.2 Enhance existing initiatives to train extension staff on a recurring basis to develop practical skills on climate-resilient agriculture to increase farmers income

Output 1.2.2. Identify and empower climate champions for effective peer-to-peer learning to increase resilience and income

Under Output 1.2.2, the project will identify a range of advocates or 'climate champions', building on the approach taken by the ongoing Commercial Agriculture and Resilient Livelihoods Enhancement Programme (CARLEP) in the eastern parts of the country, which has empowered lead farmers in this way. The project will build on and extend the CARLEP approach to encompass farmers' groups and youth agricultural entrepreneurs as well. The project will select individuals and groups who have already participated in the project's sensitisation activities under output 1.1.2 and some of the trainings on climate-resilient agricultural technologies under output 1.2.1 and further empower them to serve as advocates for further uptake and scaling out of the prioritised innovation of index insurance, as well as the integrated resilience building approach through which the insurance will be delivered. In line with the project's targeting approach, the majority of the climate champions will be women, with a focus as well on youth. The focus will be on demonstrating the value of a climate risk-layering approach for increasing farmers' resilience and income. The climate champions will be empowered though access to more specialised training to be delivered by the extension services, and through the provision of additional inputs beyond the standard TA package to be received by all project participants.

Activities under Output 1.2.2:

Activity 1.2.2.1 Extend the approach of CARLEP to further empower lead farmers and youth agricultural entrepreneurs to be climate advocates for increasing farmers' income through risk layering

Output 1.2.3 Develop and implement learning, knowledge management, and communication strategy and feedback loop for learning from activities on the ground

Output 1.2.3 will focus on developing the project's learning and knowledge management, and communication (L,KM&C) strategy and on designing a feedback loop for learning from a range of activities that take place on the ground. Output 1.2.3 will include activities to support dialogues on 'innovation to increase climate resilience' between research organisations and climate-vulnerable communities to engender action as well as a sense of hopefulness in rural areas with empty households and high youth unemployment. Through specialised services provided by research institutions such as the College of Natural Resources (CNR), a regular series of dialogues will be carried out within and between the project districts, to promote farmer-to-farmer learning, farmer/researcher/extensionist learning, and cross-district learning involving all these stakeholder groups, as well as the agricultural system at different levels.

The project will use the existing institutional framework of the Ministry of Agriculture and Livestock to strengthen engagement between research institutions and local communities through its specialized agriculture research and development centres (ARDC) covering the whole country, whose mandate includes leading the development and implementation of research and extension programmes in districts, blocks and communities, and managing and sharing knowledge and Information on research and extension. The research institutions are further supported by the district and block level agriculture officials who operate in a collaborative framework and facilitate direct implementation of programmes, provide technical advisory support, monitor progress and results, and compile administrative data for better decision making. In addition to strengthening the engagement between research institutions (ARDCs and local universities) and local communities, the outcomes of these innovation-research dialogues will be an input into the community adaptation plans under Output 1.1.3.

Research institutions such as the ARDCs, the CNR and the College of Science and Technology (CST), will play an important part in evidence generation for the project, so that the impact of innovative project activities is regularly analysed and documented, for policy advocacy within Bhutan and to share lessons regionally and globally. The project will document the experience with and impact of the integration of secondary innovations with the primary innovation of index-based microinsurance, as well as conduct key studies necessary to promote the institutionalisation of the project's approach and the sustainability of the insurance scheme, as further detailed under Component 3.

The project's internal learning activities will include the feedback loop to continuously improve the insurance product, which will include *inter alia* feeding back the daily rainfall data on a monthly basis to the project management unit, as

well as National Centre for Hydrology and Meteorology (NCHM) and the Department of Agriculture. A customer journey study will be an important part of implementation, as well as an alternative dispute mechanism (see **Annex 8** for a description of the project's Grievance Mechanism) to ensure that concerns and questions of farmers about the products and services are heard and addressed. As these specific L&KM activities should be the main responsibility of the insurer, they are included under Component 2, but will be included in the conceptualisation of the overall L,KM&C strategy under activity 1.2.3.1. The feedback loop will also incorporate learning from the supply side (insurance providers) to enable dispelling risk perceptions and to expand the scale of investors. Additional details on the L,KM&C strategy are contained in Part II.I.

Activities under Output 1.2.3:

Activity 1.2.3.1 Develop learning, knowledge management and communication strategy

Activity 1.2.3.2 Support dialogues on 'innovation to increase climate resilience' between research organisations and climate-vulnerable communities

Activity 1.2.3.3 Develop feedback loop for learning from activities on the ground

Activity 1.2.3.4 Develop and disseminate knowledge products and implement communications strategy

Component 2: Innovative climate risk transfer mechanism rolled out and smallholder farmers' resilience built through integrated approach

The bulk of the project budget will be allocated to Component 2 for the rolling out of index insurance, including for the necessary associated activities of increasing access of predominantly women farmers to savings products and microfinance and of facilitating concrete adaptation activities to enhance climate-resilient production, as well as diversified livelihoods through value chain and marketing support for climate-resilient value chains.

Rolling out the microinsurance will include capacity strengthening in the insurance sector (government and private) to facilitate the efficient and effective functioning of all players within the 'insurance ecosystem' – i.e. insurance companies, financial services providers, distribution channels, aggregators, and the insurance regulator.

Insurance is only one part of an integrated portfolio of solutions, which is best suited to address specific risks from lower frequency / higher impact shocks. If insurance payouts are too frequent, the product would become too expensive, limiting its application in very high-risk areas or access to low-income populations. The project will leverage WFP's global expertise in delivering index-based microinsurance, which is an innovative type of insurance based on a proxy (a figure that can be used to represent a value) for losses. Index-based insurance compensates farmers based on changes in a pre-determined index correlated with agricultural yield (or harvest), rather than on-site assessments of actual damage incurred to crops due to insured risks. Insurance payouts are distributed to insured farmers if the index falls beyond a pre-determined threshold, for example when rainfall recorded over a certain period is below the value set in the index for drought coverage.

The insurance feasibility study conducted during full proposal development found that there is an urgent need to support smallholder farmers in Bhutan to improve their climate risk management portfolios. This involves offering a suitable risk transfer scheme that can manage the most severe and less frequent climate risks. In addition, this implies reinforcing access to credit and savings to: (i) manage less severe and more frequent risks, and (ii) address the funding gap to adopt climate change adaptation measures. The study further found that Bhutan has a wide network of support entities that see the need to manage climate risks using different instruments, including insurance; however, most of the support institutions are not involved in the design and implementation of insurance schemes, and none of them has experience with the design of index-based insurance schemes.

The insurance feasibility study further found that insurance should not be the only risk financing instrument to be promoted to manage climate risks. In line with the approach set out in the Concept Note, insurance should be integrated with efforts to promote saving capacity to increase risk absorption, and access to credit to finance smart risk taking and the adoption of climate adaptation measures. In parallel, it is essential to reinforce the capacities of the MFIs and banks to which smallholder farmers have access to: (i) improve the offer of formal savings products to build emergency funds; (ii) the offer of loans that encourage the adoption of climate adaptation measures; and (iii) the responsible offer of emergency lending in the context of climate shocks.

The full feasibility study was conducted by the WFP specialists at the Climate Risk Insurance (CRI) team at headquarters in Rome. The study focused on: (i) Mapping of opportunities and barriers (country context, access to financial services); (ii) Supply of agricultural and climate risk insurance; (iii) Demand for agricultural and climate risk insurance by target group; (iv) Enabling environment (policy, regulatory and supervisory environment); and (v) Providing recommendations. The Executive Summary of the full feasibility study is contained in **Annex 3** and the full text of the 100-plus-page feasibility study is available on request.

The feasibility study confirmed key findings of the pre-feasibility study that while there is currently no insurer offering index-based climate risk microinsurance in the country, Bhutan has prioritised financial inclusion and there is a strong presence of microfinance institutions in the rural areas, with an existing pay-at-harvest pre-financing scheme and experience in bundling of credit and crop insurance (through which the insurance pay-out can be utilized for paying back loans). There is strong interest and willingness on the part of the insurance companies to engage in microinsurance, and strong demand from women and men farmers for suitable microinsurance products. Although there are currently no regulations to guide microinsurance in the country, the policy environment is strongly supportive of this approach (see Part II.F).

There are two insurance companies in Bhutan, the Royal Insurance Corporation of Bhutan (RICB), and Bhutan Insurance Limited (BIL), which have a country-wide reach. Both of these local insurance companies have been pre-identified for and have indicated their interest in being involved in the project. They have actively participated in all relevant stakeholder consultations during the CN and FP phases and have been central and active participants in the detailed insurance feasibility study during FP development. They will be also actively involved in the subsequent design of the insurance product. Several MFIs that are operational throughout most of Bhutan, namely RENEW Micro Finance Private Limited (RMFPL) and Taryana Micro Finance Limited (TMFL), have also participated in the development of the CN and the FP and have expressed interest in playing a role in project implementation. Please see **Annex 6** for a summary overview of the insurance landscape and experiences in Bhutan, which indicates familiarity with the concept of insurance in rural Bhutan, although not with the concept of index insurance. Thus, the proposed project will include ongoing sensitization activities (Output 1.1.2) as well as identifying and empowering climate champions for effective peer-to-peer learning and project outreach (Output 1.2.2); significant and recurring capacity development of the key insurance and financial services providers and regulators will be needed and is contained within the activities of Components 2 and 3.

The insurance pre-feasibility study and numerous discussions with stakeholders during the development of the CN considered whether the index-based microinsurance delivered in Bhutan should be either weather index-based insurance (WIBI) or area yield index insurance (AYII). These two types of index insurance have different characteristics and strengths and weaknesses.

Under **weather index-based insurance (WIBI)**, payouts are triggered when a specific weather parameter such as rainfall measured by a particular weather station or satellite over a given period of time reaches a pre-determined threshold. The terms of the insurance contract are set to correlate, as accurately as possible, with the value of loss for a specific crop type or more broadly the impact of a weather event (drought, flood or strong winds). If the index reaches the threshold, subsequently all people insured in the defined area will automatically receive the same payout without assessing individual losses.

With **area yield index insurance (AYII)**, payouts are based on the realised average yield of a geographic area such as a district, gewog, or even a village, not the actual yield of the insured farmer. The insured yield is established as a percentage of the historical average yield for the area. A payout is triggered if the realised yield for the area is less than the insured yield, regardless of the actual yield achieved on the insured individual's farm. Credible and consistent yield data over a multi-year time period at the selected scale of geographic area is required to effectively design this type of index insurance product.

The following are similarities between the two:

- **Transparency**: Index insurance contracts usually allow the policyholder direct access to the information on which the pay-outs will be calculated. Trust is strengthened by transparency.
- **Low operational and transaction costs**: Index insurance requires limited individual underwriting (client assessment). It can be distributed, and claims can be settled, at a relatively lower cost.
- **Lack of adverse selection:** Index insurance requires that all insured farmers within the defined area have the same insurance pay-out conditions, regardless of their specific risk exposure.
- **Lack of moral hazard**: All producers in the defined area are treated equally.

The following are differences between WIBI and AYII:

- **Sources of Data**: WIBI will require weather data such as rainfall while AYII will require the historical average yield of the area to establish the indices.
- **Perils covered**: Although WIBI usually covers limited perils, it can be designed to cover various perils – for example both lack and excess of rainfall, wind speed, and temperature; AYII may cover more perils because the basis of pay-out is the area yield, which can cover losses that may accrue from various weather events, including losses from pest and diseases.
- **Period of pay-out**: AYII takes longer because of the verification/crop cuts process.
- **Cost of service providers:** AYII can be more expensive because crop cuts are needed.

As noted above, both AYII and WIBI can be designed to be multi-peril. Furthermore, while AYII may cover more perils, it does require that the crop to be covered be specified. It was premature to specify this for the LIG in the CN, before the in-depth vulnerability assessment and climate risk-based crop suitability assessment under changing climatic conditions was conducted. This was important to ensure that farmers are not encouraged to continue with specific crops and livelihood systems that may become unfeasible in the near- to medium-term, as climatic impacts intensify. In addition, an important issue raised in the stakeholder consultations for both the CN and the FP was the need for a more 'tailor-made' insurance approach that can address the varying needs of different smallholder communities in Bhutan, given the different micro climates, livelihoods systems and climate risks associated with Bhutan's diverse topography and huge range in elevation within gewogs across the country. Therefore, the selection of either WIBI or AYII was dependent on the detailed insurance feasibility study, that was in turn based upon an in-depth vulnerability assessment and climate risk-based crop suitability assessment, conducted during the full proposal development process (**Annex 2**).

Given Bhutan's diverse topography and agro-ecological zones, it had been proposed in the CN that the Bhutan LIG would support the development of weather index-based insurance (WIBI) to cover a range of different crops that are both climate resilient and adapted to the risks going forward into the future within specific localities, and can also be produced at sufficient scale so that there is enough aggregation upon which to base effective value chains and marketing linkages. This was important to ensure that farmers could realise significant livelihood gains and increased income, and insurers can maintain effective and sustainable insurance products. The findings of the in-depth vulnerability assessment and preliminary climate risk-based crop suitability assessment (**Annex 2**) were incorporated into the detailed insurance feasibility assessment (**Annex 3**), to determine the specific forms of index-based microinsurance that are most appropriate for the identified project localities.

According to the DoA, priority crops for consideration were rice, maize, potatoes, and chilies. During full proposal development, these crops were considered together with other options under the in-depth vulnerability assessment and climate risk-based crop suitability assessment, to avoid unintentionally promoting maladaptation. The DoA and other stakeholders also indicated the importance of including more traditional, climate-resilient and nutritious crops that are likely to have good export markets as well, such as millets and buckwheat, and quinoa that was introduced successfully in 2015.

Preliminary indications of suitable commodities to include in the proposed project were maize in the east of the country[124], and (organic) vegetables in Tsirang – for example potatoes and chillies – in the south central part of the country. During the December 2022 stakeholder consultations, an informal ranking exercise was conducted to determine whether there was any convergence amongst the group of technical experts on the potential crops to be targeted for the index insurance and value chain development work. Maize was a clear priority for the eastern districts, followed by vegetables. In the south-central parts, paddy emerged as the priority, followed by vegetables. In the west, paddy was prioritised, followed by potato. Agricultural statistics bear out this informal ranking exercise. For example, Lhuentse has high productivity in maize, paddy, onions, and apples. Trashigang, which receives between 1,607 mm and 1,864 mm of precipitation annually, has high maize productivity and a high net sown area to geographical area ratio, indicating a strong agricultural presence[125]. Moreover, Dagana is the second highest producer of maize in the country. Rice is one of the main staples of Bhutan and constitutes the highest production by mass.

Detailed vulnerability assessment and climate risk-based crop suitability assessment

Due to conflicting sources of data, the climate risk-based crop suitability assessment conducted during full proposal development was able to provide a preliminary rather than an absolute assessment. The findings of the NAP agricultural assessment indicated productivity increases for almost all the 11 priority crops that were selected for their economic and/or livelihoods importance, for both RCPs (GHG emissions pathways)[126] and for all three time slices (short term: 2021 – 2050, medium-term: 2051 – 2069, and long term: 2070 – 2099). The 11 crops were rice, maize, chili, potato, tomato, kiwi, apple, mandarin, cardamom, quinoa and onion. However, caution is needed in using these findings, due to the poor quality of some of the data, and as the model used for the agriculture sectoral assessment did not capture the growing effects of climate change on the occurrence of extreme weather events, pests and diseases, and crop water management. The main variables used in the crop suitability assessment were temperature and rainfall. Therefore, while the findings are important, these limitations in the methodology mean that other factors, and in particular the impacts of recurrent extreme events, need to be considered when assessing how farming systems will be affected by climate change.[127] A key finding of the CIAT study was that all the crops assessed show reduced suitability to various extents in some current growing areas, especially in the lower altitudes in the south. Therefore these areas require more intensive adaptation efforts or need a diversification of crops, with selected crops becoming more suitable in new altitudes. Elevation is a key factor for climatic suitability of crops in a mountainous country such as Bhutan, which ranges from 97 metres above sea level (m.a.s.l.) in the southern lowlands to 7,570 m.a.s.l. at its highest peak. The CIAT study

[124] Potential districts to be considered in the east of the country include Trashigang, Lhuentse, Pemagatshel and Samdrup Jongkhar.
[125] Assessment of climate risks on agriculture for National Adaptation Plan (Nap) formulation process in Bhutan
[126] RCP 4.5 (stabilisation scenario) and RCP 8.5 (overshoot scenario) were used. See
[127] Additionally, the studies do not reflect the many micro-climates in Bhutan. There is limited availability of hydrological data given the variable topography and as localized soil data is missing, the assessment had to use soil data from a global source. Accurate rainfall data is available from 20 sites but only from 1996 onwards. There are approximately 60 AWS; the number of class C stations is being reduced as the quality of data produced from them was not reliable.

mapped elevation with a 30 m resolution ASTER GDEM.[128] The CIAT study provides support for the suitability under future climate risks in the medium-term (up to 2050) of maize (especially in the eastern parts of the country) and rice (but not along the southern border and in the south east). Farmers in Bhutan have recently had good experiences with hybrid maize designed for heat and drought tolerance, as well as a resistance to stem and root lodging. Farmers in Mongar doubled their yields using this variety.[129] While there are still large parts of the country that will be suitable for potato, this crop shows the largest expanse of areas of current cultivation that will no longer be suitable. These findings of the CIAT study should be interpreted with some caution, given that more up-to-date climate projections are now available – but they do factor in the critical variable of elevation.

The ADB climate risk study further notes that over the longer-term future, sustained temperature increases, and particularly daily, monthly and annual maximum temperatures are likely to drive a northward range shift in the optimal growing ranges of current crops. This finding, although not disaggregated for individual crops, largely supports the CIAT study findings. The ADB study states that temperatures for some areas may result in expanded growing seasons and a net gain in agriculturally productive land. However, the increase in other stressors may offset these gains.[130]

Thus, while the NAP assessments and the CIAT study provide support for the climate resilience of both maize and rice going forward, both approaches do have certain caveats and other studies provide more nuanced perspectives. These provisional crop suitability findings were further discussed by stakeholders and decision makers.

Recommendations for product and programme design of the insurance feasibility study

The insurance feasibility study recommended that the product should focus on the significant climate-related perils faced by farmers of excess and deficit of rain and erratic rainfall. There have been deviations from average or historical rainfall patterns for a specific period, which further results in flooding and, on occasion, landslides. Given the high concern about damages to crops from pests and diseases, as well as through human-wildlife conflict (HWC), the study proposed a layered approach: Savings and Insurance Layering (SAIL).

On the subject of crops to be insured, and motivated by the fact that every district has its own priority crops and the insurance model must aim for scalability, the feasibility study proposed a crop-agnostic product. For this model, the proposed insurable interest is the agricultural income lost by farmers due to insurable risks. This is known as a business interruption approach to insurance.

The insurable interest can be quantified through:

- Average costs of production to be established and linked with programme building market access and value chain development; or
- Where the insurance is bundled with a loan, the loan amount is linked to the cost of production or the cost of the green intervention to adopt. The average loan provided by RMFPL is around USD 1,000, while the lowest amount provided by TMFL is around USD 500.

Although the insurance product will be crop-agnostic, all of the above points on crop suitability under changing climate conditions are extremely important to ensure that the project does not promote maladaptation and will continue to be taken into account in the implementation of the project – for example, during the activities to identify the focus for the enhanced climate-resilient agricultural technologies under outcome 1.2, and in the project activities to identify and support climate-resilient value chains under output 2.1.3.

The feasibility study found that weather index-based insurance (WIBI)[131] is a suitable approach mostly considering the business interruption approach. A phased approach is recommended, with initial roll-out of a minimum viable product (MVP), which will consist of the crop-agnostic weather index-based microinsurance together with actions to promote savings as an essential risk retention element. As the MVP will not be developed specifically for a particular crop, the threshold that would trigger the insurance payout will be determined with respect to average income of farmers in the project area. The sum insured for the microinsurance will be calculated using the average amount of income; the methodology for this will be discussed and determined during the product design phase.

This Savings and Insurance Layering (SAIL) approach is based on the need for different perils that farmers face to be managed by different financial products. Relying on insurance for very frequent risks can result in an unsustainable insurance programme. Given that Bhutan has a high savings culture – about 92 percent of households have saving accounts and 7.8 percent of households have recurring deposit accounts[132] - it is proposed to start with a layered product in which the savings component can help farmers manage their more frequent risks. The climate risk insurance trigger will pay out upon severe climate events, while the savings component will help the farmers during the frequent perils

[128] CIAT study, 2017
[129] https://www.cgiar.org/news-events/news/farmers-harvested-double-yield-by-adopting-wengkhar-hybrid-maize-1-in-bhutan/
[130] ADB 2021 Climate Risk Profile for Bhutan
[131] Weather index-based insurance, often referred to as parametric insurance, is a type of insurance that pays out based on predefined weather-related triggers rather than traditional loss assessment. Pay-outs are triggered when a specific weather parameter such as rainfall measured by a particular weather station or satellite over a given period reaches a pre-determined threshold. The terms of the insurance contract are set to correlate, as accurately as possible, with the value of loss for a specific crop type or more broadly the impact of a weather event. If the index reaches the threshold, subsequently all people insured in the defined area will automatically receive the same pay-out without assessing individual losses.
[132] 2022 Bhutan Living Standard Survey

they have. Increased savings will also result in increased access to productive loans. For example, upon a deposit of USD 4.8 (400 Bhutanese Ngultrum, or Nu), a farmer could access a USD 48 (4,000 Nu) loan that could help her to buy agricultural inputs. Financial (savings bonuses) and non-financial incentives will be provided. The SAIL approach should also contribute to strengthening MFIs' business model.

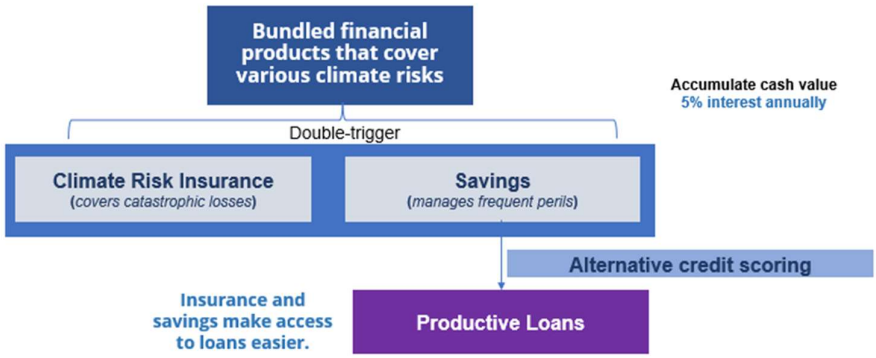


Figure 2. Savings and insurance layering approach

In summary, the proposed approach is for a minimum viable product (MVP) that consists of weather-index based microinsurance against the peril of excess of and deficit of rainfall, combined with increased access to savings to help farmers cover the impacts of more frequent and less significant hazards. This is known as Savings and Insurance Layering (SAIL). In return for receiving premium subsidy support, farmers will commit to adopt either organic production or a low external input sustainable agriculture (LEISA) approach, with specified good agricultural practices (GAPs); their commitment will include attending all necessary awareness raising and training sessions. Farmers will not be obliged to commit a certain amount of money towards savings in order to access premium support but will be sensitised and incentivised to increase their savings to cover the more frequent risks. The MVP will be delivered in an integrated manner with the range of activities (including sensitisation activities, enhanced access to existing climate services, enhanced technical assistance (TA) for climate-resilient agricultural technologies, enhanced access to business support and credit, and marketing support) covered by the project. The insurance product will be designed to be modular – so that farmers could purchase additional insurance protection if they wished to in the future. This may be linked with access to credit, in the form of green loans.

The following diagram is provided for indicative purposes, as the exact nature of the modular products will be developed with the TSP, insurers, banks, and MFIs during project implementation. Output 2.1.3, which focuses on additional value chain and marketing support for high value and climate-resilient commodities, will provide the opportunity to test a modular approach under which additional targeted inputs could be provided to link the insurance with enhanced marketing. In due course, it could be possible to link CRI with innovative green finance, as described under output 2.1.2.

	Year 1	Year 2	Year 3	Year 4	Year 5
Modular approach on Climate Risk Integration	Integrating CRI and Savings - Savings and Insurance Layering (SAIL) Approach (SAIL is the minimum viable product)				
		Bundling agricultural inputs and CRI – through value chain and marketing			
			Innovative Green Finance and CRI		

Figure 3. Indicative diagram showing modular approach to climate risk insurance

The community participatory process did not generate sufficient reliable information on farmers' incomes, as participants were reluctant to disclose this. Thus ability to pay (ATP) of farmers has been estimated based on their capacity to save on a monthly basis, which ranges from USD 2.96 to USD 9.44. Based on this, and with additional information from secondary data, it is conservatively prescribed that the premium rate should not be higher than USD 10.00 annually. [133]

[133] The ATP has been calculated based on datasets provided by RENEW Micro Finance Private Limited concerning assessment of the ability to save of MFI clients who are mostly rural women, who were able to save USD 2.96 (Trashigang) to USD 9.44 (Dagana) per month.

The project may initially provide subsidy for a higher premium of USD 20, while working on enhancing farmers' income and savings, and generating more accurate information on actual ability to pay. Through the annual review process to revise the insurance product, the optimal amount of the premium will be determined to ensure ongoing sustainability of the product and affordability for farmers. The maximum payout for the insurance will be determined during product development, in the early months of project implementation.

Insurance providers: To provide the product, it is proposed that a coinsurance pool be created between the two local insurers, Royal Insurance Corporation of Bhutan (RICB) and Bhutan Insurance Limited (BIL), given their experience and interest to work together. This will facilitate the process of capacity strengthening of both insurance companies. The product will be designed with the support of a Technical Service Provider (TSP) with experience in the region and expertise in adopting innovative approaches particularly in terms of modelling WII. With the support of the TSP, reinsurance capacity will be provided considering the capacities of local insurers. It is advised to ensure a minimum 20 percent local retention from year 1, however this could be adapted depending on the position of local insurers.

Distribution channels: The feasibility study identified that microfinance institutions (MFIs) and banks are the most suitable distribution channels because of their presence in rural areas. The MFIs offer a compelling avenue for the distribution of insurance products due to their unique positioning – they cater to underserved populations and thrive in regions where traditional insurance companies lack a robust presence. For example, RMFPL has a customer base of 69,895 and their field staff visit the communities (gewog-level) once a month to process financial transactions and enhance financial literacy. Moreover, their mandate also includes the development of green loans. Tarayana Micro Finance Limited (TMFL) has a smaller reach: although it is present in 19 districts through the Tarayana Foundation, it only has 147 loan accounts and does not provide any savings accounts. The Bhutan Development Bank Limited (BDBL), which functions as a domestic development bank, provides widely utilized banking services. Clients can transact through the Gewog Community Centres established to provide essential services, including financial services. The community centres usually have one member of staff who covers all services in the centre, with additional assistance provided when necessary. Currently, they maintain 25,000 savings accounts and 51,000 loan accounts. CSI Bank has 8,000 loan accounts and is present in all 205 community centres but does not provide savings accounts.[134] Preliminary indications are that RMFPL and BDBL will be the preferable distribution channels to distribute the MVP. The exact roles and responsibilities will be negotiated and formalised in agreements during the project inception stage, after further discussions.

The index itself can be developed in under three months, during the early months of project implementation. The technical service providers (TSPs) that WFP works with to design the indexes have considerable experience in addressing any gaps in long-term weather data to ensure that the index developed is reliable. The TSP, who will design the trigger and also monitor weather information on an ongoing basis, will collect data from various sources (satellite and government databases, yield and productivity data from the DoA, international agencies, agricultural associations, local statistics agencies, etc.). They will design a trigger based on a combination of sources, conduct interviews with farmers on an ongoing basis to validate information, and continuously improve the index.[135]

As is preferable and usual for microfinance, the insurance policy cover will be group-based with the master policy issued to the distribution channel (microfinance institution or bank). The distribution channel will then issue a certificate of cover to each farmer upon start of the coverage.

Mechanisms to accommodate deviations of rainfall related to microclimate will be further explored with the technical service provider, in addition to covering this through the risk retention layer (SAIL). For example, WIBI could be combined with a semi-indemnity component supported through technology (crowdsourcing data apps) and the involvement of the Department's Disaster Management system.[136] This will not be part of the minimum viable product that the project will roll out.

The proposed graduation strategy, supported by the smart subsidy scheme and the integrated delivery of the project components, as key elements promoting the sustainability of the insurance scheme. In addition, the project will assess and implement where feasible innovative approaches that could promote the financial sustainability of the scheme, *inter alia* by ensuring its affordability. Such activities are included under Component 3, as part of the institutionalization of the project, and in **section II.M.**

The AF funding to support insurance premiums will only be applied to vulnerable smallholder farmers, as a central part of the project's strategy to assist them to graduate from purely subsistence to producing and marketing a surplus, to make their livelihoods more climate resilient. The insurance providers will also offer the appropriately structured insurance product to a mix of farmers from different economic levels, including those that are engaged in commercially viable crop production activities. To realise the RGoB's policy goal of increasing national food security, Bhutan's commercial farmers, who are also generally smallholders, also need crop insurance that is affordable and accessible

[134] However, CSI Bank has not upgraded its banking license to include savings and deposits in its list of services.

[135] Bhutan has 20 Class A stations in each of the 20 districts, with data available from 1996 to date. These stations record rainfall, surface air temperature, soil temperature, relative humidity, wind speed, wind direction, sunshine duration, evaporation and water temperature. The data is digitized, quality checked and stored in Climsoft database system. There are approximately 60 Class C stations used mostly for climatological studies, with data available from 1996 to date. These stations record rainfall, air temperature, and relative humidity. The data is digitized and stored in Climsoft database system. There are 150 Automatic Weather Stations (AWS) that record more than 30 variables, with most data available from 2016 to date; all of the data is digitized.

[136] In this case there would be a connection with the IR PREP project where WFP is participating – National Logistic Preparedness Working Group.

as they face the same climate risks as subsistence farmers. Offering the index-based insurance solutions to those smallholders that have already graduated from subsistence to commercial production will provide additional opportunities for scaling up, expansion, and insurance cross-selling because of their higher capacity to pay. This will contribute to the sustainability of the insurance product over time.

Outcome 2.1 Smallholder farmers adopt sustainable pathways for climate risk transfer and diversified livelihoods

Output 2.1.1. Risk transfer mechanism for smallholder farmers implemented and scaled up

Under Output 2.1.1, the risk transfer mechanism of microinsurance for smallholder farmers designed to focus on the low frequency / high impact years, to keep cost down, will be implemented and rolled out, targeting an estimated 10,000 farmers, of whom at least 7,000 will be women and female youth. This will be done in a systematic and sequential approach, building on WFP's considerable experience with index-based insurance as a climate risk transfer mechanism. In the first year (Y1) of the project's implementation, a prototype index designed specifically for the localised Bhutanese context will be validated in one or more districts, targeting 2,000 farmers, of whom at least 70 percent will be women.

The technical service provider (TSP) will design the index insurance product, and be responsible for the development of the monitoring and evaluation tool to ensure adequate product performance. Key partnerships at different levels will be finalised, with clear roles and responsibilities allocated to the insurers, the distribution channels, etc., and operational and technical capacities will be enhanced to begin rollout of MVP; to be extended in due course for integration of the insurance product with market access and value chains. The MVP roll-out will include insurance companies, distribution and delivery channels, aggregators, local governments, and farmers' groups; the test to link insurance with market access and value chains will include these SHs as well as buyers and international organisations.

A needs assessment will be conducted for the key stakeholders involved in the MVP roll-out. Based on this, their capacities and operational processes will be reinforced so that the insurance issuers, as well as the distribution and delivery channels, can support all the processes of the insurance scheme.

Project activities will concurrently enhance capacities and formalise key partnerships at different levels that will lead to the roll out of insurance – for example, with the insurance companies, the distribution channels, and with aggregators and farmers' groups. During Y2 – Y5, index-based microinsurance will be rolled out in all of the project localities, according to the pre-determined graduation strategy. It is anticipated to target a further 3,000 farmers in Y2, and an additional 5,000 in Y3, reaching the project's envisaged coverage of 10,000 smallholder farmers in Y3. Each farmer will receive three years of subsidised premium support (see **Table 3**).

Once the MVP is developed and distribution has commenced, capacity strengthening for the insurance sector, potential aggregators, distribution and delivery channels, and technical departments will proceed on an ongoing basis, to meet the identified needs of the distribution and delivery channels, including the MFIs, banks and/or telecommunications companies. Hands-on training will be provided to insurance companies to develop the index-based product independently in the future and to ensure its appropriate distribution and delivery. The technical departments including the DoA at different levels will similarly receive ongoing support to ensure the sustainability of the insurance scheme and associated project activities after completion of the project.

Project activities will support the reinforcement of formal and informal savings capacity of smallholder farmers, building on existing initiatives of the MFIs and banks in this regard. This is necessary so that savings can play a key role in climate risk management – through the risk layering approach. According to this, farmers will be incentivised to increase their savings and to use allocated savings to manage the non-catastrophic climate-related events that will not trigger an insurance payout but that nonetheless affect their production and their incomes. Financial (increased interest and savings bonuses) and non-financial incentives (participation in other project activities) will be provided. The current interest rate on savings offered by the MFIs in Bhutan is 5 percent and the project will aim to provide the same or a higher interest rate. In addition to an increased interest rate for savings, a savings bonus could be provided to those farmers who only use the allocated savings when there is a climate event of a lesser magnitude than that which would trigger an insurance payout. The interest rate and nature of the savings bonus will be determined by an incentivisation assessment to be performed during project implementation. Savings interest and bonuses motivate people to save because they offer immediate rewards, amplify returns on savings, reinforce positive behaviour, and provide a sense of accomplishment. These incentives can help individuals establish and maintain a habit of saving money, which is essential for increasing their resilience through achieving financial security and long-term financial goals.

Recurring community consultations will be conducted to share the results of the index, and to assess the accuracy of the product compared to the actual experience of farmers. During the stocktaking of climate services in the project areas under output 1.1.1, an assessment will be conducted of the extent to which climate observations will be densified under other already-funded programmes. Should the density of observation statins not be considered sufficient, the project will advocate for this to be increased in the project areas, to allow for enhanced data upon which to constantly improve the index. This could be in the form of installing manual rain gauges or more automated systems in project locality villages. In either case, lead farmers would be trained to monitor and keep records of the season's rainfall and provide daily rainfall data on a monthly basis during the season so that the performance of the index can be assessed and fine-

tuned. This is an important step for weather index-based products. Given the extent of current and pipeline investments into climate services in Bhutan, it would be duplication for the proposed project to also provide this investment; the DA has expressly requested the project development team to avoid this duplication.

The issue of basis risk – which is the difference between the claims pay-out and the actual loss of the farmer – will be addressed through a suite of management measures, to be determined during the full proposal development.[137] Having significant basis risk can affect the level of trust farmers have in the insurance product, because while they may expect to be paid a certain amount, the weather data may only trigger a lower amount. Once the appropriate management measures have been agreed, the TSP and insurer will coordinate to enhance the trigger and product design, continuously integrating changes based on the observed basis risk.

A Smart Subsidy Strategy will be developed to foster graduation based on the specific context, gradually allowing farmers to take on a growing portion of the insurance premium over time. After three years of premium subsidy, the farmers should be able to pay the premiums in full. An illustrative example of the smart subsidy scheme for a farmer who enrols in the project in 2024 (Y1) is presented in Table 3 below, to clarify how their contribution will increase over time as the project's contribution decreases. The same system would be used for farmers enrolling in Y2 and Y3 – that is, three years of premium subsidy support, with the farmers' contributions increasing each year.

Table 3. Illustrative smart subsidy strategy for insurance premiums for a farmer enrolling in the project in Y1

Year	% of subsidy by AF	% of farmers' contribution	Year	Amount of subsidy by AF	Amount of farmers' contribution
2024	100%	0%	2024	10	0
2025	80%	20%	2025	8	2
2026	50%	50%	2026	5	5
2027	0%	100%	2027	0	10
2028	0%	100%	2028	0	10

The Smart Subsidy Strategy will be developed so that premium support creates a pathway for beneficiaries to increase their income generating capacity; it will include ensuring that public and/or private involvement is in place to support the scheme financially. Activities will also support the development of a conditionality strategy that encourages adoption of climate resilient agricultural practices, savings capacity, income generating activities, innovative premium financing structures, etc. By increasing their savings capacity, beneficiaries reinforce their emergency funds but also have money to pay the premium.

Output 2.1.1 will also entail developing and implementing the feedback loop to continuously improve the insurance product, which will include *inter alia* feeding back the daily rainfall data on a monthly basis to the project management unit, as well as National Centre for Hydrology and Meteorology (NCHM) and the Department of Agriculture. An alternative complaint and dispute mechanism will be developed (**Annex 8**) to ensure that concerns and questions of farmers about the insurance and savings products and services are heard and addressed; and the farmers' customer journey defined and tracked – this is a set of processes to ensure that the experience of the consumer is problem-free. Experiences from the supply side – insurers and distributors – will also be tracked and documented. As these specific L&KM activities should be the main responsibility of the insurer, they are included here under Component 2, but will be included in the conceptualisation of the overall L,KM&C strategy under activity 1.2.3.1. The feedback loop will also incorporate learning from the supply side (insurance providers) to enable dispelling risk perceptions and to expand the scale of investors. Additional details on the L&KM strategy are contained in Part II.I.

The trust and confidence of farmers in insurance for climate risk management will ultimately be increased or decreased by the way they experience the product. Key elements of the customer journey are the distribution process and the payout process. The distribution process is the farmers' onboarding process, represented diagrammatically below.

[137] These could include : (1) establish a dispute resolution mechanism wherein the farmers can raise their issues on the pay-out and insurers will be able to assess if concerns are valid; (2) establish a basis risk fund – this fund can be used to compensate farmers who were severely impacted by a climate event yet the trigger did not reflect the same; (3) enhance product design in the following season.

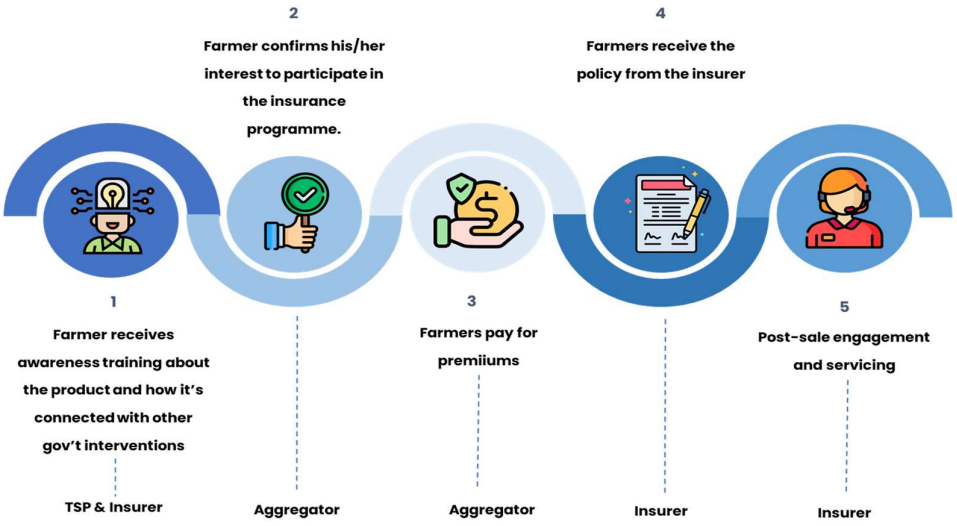


Figure 4. Insurance product distribution process

Through the pay-out process, represented below, the farmer can understand the value of insurance.

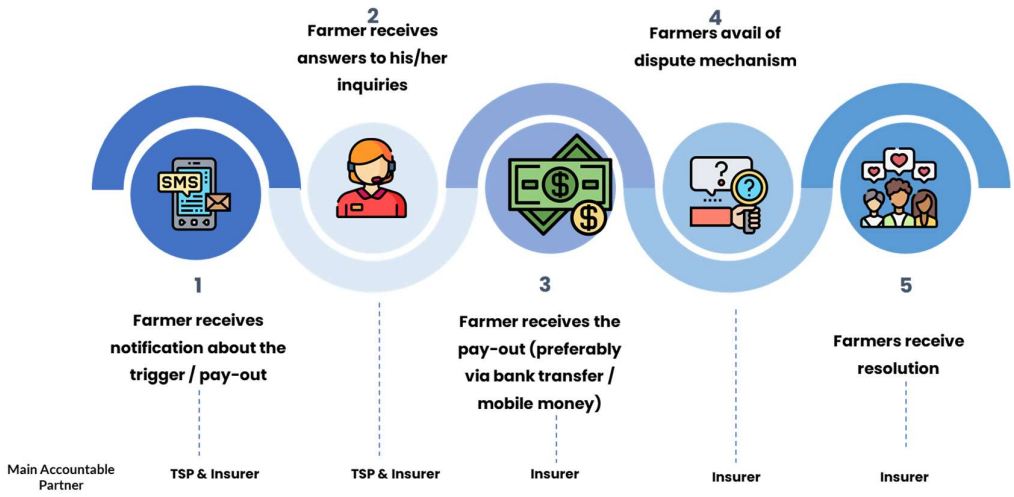


Figure 5. Insurance payout process

These figures provide a general outline of the customer journey with insurance, which will be customized to the Bhutanese context. Regarding the trigger and payout, an online platform will be developed through which farmers, insurance companies, the Department of Agriculture (DoA), WFP, and other relevant stakeholders can view the process and the results in a digestible and visually accessible manner. This will be elaborated during the insurance product design phase.

An important element of the project's overall strategy is to promote integration between agricultural and financial services, to enhance farmers' resilience and income. This is a key element of the sustainability strategy for the insurance scheme, as discussed further below. Key options for this identified during the consultations, via the insurance feasibility study, and through the innovation workshop are:

- Financial services innovations that could utilise the very high internet connectivity of the country;
- An alternative credit screening system to reduce high loan default rates;
- Plan to eventually develop green loans (output 2.1.2); and
- Build on existing digital platforms in Bhutan to enhance seamless process with farmers that integrates localised agro-met advisories, insurance, savings and green finance/loans (see activity 2.1.1.4 below).

Ideally, the digital platform/app to be developed under activity 2.1.1.4 will be able to support a range of other activities necessary for the insurance scheme, including enrolment, premium collection, payouts distribution, etc.

Activities under Output 2.1.1:

Activity 2.1.1.1 Design the microinsurance product for smallholder farmers, test prototype and refine index seasonally

Activity 2.1.1.2 Formalise key partnerships at different levels and enhance operational and technical capacities to begin rollout of MVP; extended in time for integration with market access and value chains

Activity 2.1.1.3 Develop a Smart Subsidy Strategy so premium support creates a pathway for increased beneficiary income, with public and/or private involvement to support the scheme financially

Activity 2.1.1.4 Build on existing digital platforms in Bhutan to enhance seamless process with farmers that integrates localised agro-met advisories, insurance, savings and green finance/loans

Activity 2.1.1.5 Develop and implement ongoing capacity strengthening programme for the insurance sector, potential aggregators, distribution and delivery channels, and technical departments

Activity 2.1.1.6 Support the reinforcement of formal and informal savings capacity of smallholder farmers

Output 2.1.2. Farmers have increased access to business development support and microfinance

Under this output, the project activities will assist smallholder farmers to be able to absorb smaller and more frequent risks without resorting to negative coping strategies. These activities will build on the advocacy and support provided to assist households to build monetary or in-kind savings (output 2.1.1) by facilitating linkages with existing savings products and micro finance service providers. Steps will be taken to raise awareness for women on accessing existing products and on reducing gender-based barriers to this. The project will facilitate linkages with the ADB / Bhutan Development Bank project and other programmes that have an 'access to finance' component. The ADB-funded project includes financial literacy training and business development support for rural cottage and small industries (CSIs), especially those owned by small and marginal farmers and women. The project will facilitate increased access to existing credit products, on a voluntary basis, and available business development support for rural CSIs, with a focus on those owned by women and small and marginal farmers. The project will support and enhance existing rural-women-targeted schemes that are focused on removing the biases against women to enhance their access to finance, such as under TMFL and RMFPL, in order to increase the adaptability and resilience to climate change of women smallholder farmers. The National CSI Development Bank Limited (NCSIDBL) is a further important source of existing credit to the agricultural sector. The NCSIDBL is a government undertaking non-deposit bank established as a dedicated state-owned enterprise (SOE) to promote the growth of cottage and small industries in the country. The bank has a mandate to narrow the gap in availing financial support for start-ups and entrepreneurs, which otherwise face difficulty in obtaining loans from other commercial banks as they lack collateral.

Activities under output 2.1.2 provide the opportunity to test the bundling of insurance with productive loans and green loans offered for instance by RMFPL[138] and Bhutan Development Bank Limited (BDBL)[139], where farmers wish to avail themselves of additional credit. It is proposed that in the initial years the insurance product is bundled with savings. As the project proceeds, the opportunity to integrate the climate risk insurance with productive loans promoting climate adaptation measures, and/or green loans,[140] will be pursued on a voluntary basis. Examples of integration include:

[138] RENEW MFI has a customer base of 69,895 and their field staff visit the communities once a month to process financial transactions and financial literacy. Moreover, their mandate also includes the development of Green Loans.
[139] BDBL is widely known, and its banking services are widely utilized. Clients can transact through the Gewog Community Centers established to provide essential services, including financial services. The community centers usually have one staff that is in-charged of all services in the centre, however, staff from BDBL would often provide assistance to clients.
[140] The innovative green microfinance products will need further development and market assessment.

- Loans can be structured to provide working capital at the beginning of planting seasons to cover expenses such as seeds, fertilizer, and labour;
- Loan repayments can be linked to weather indices, such as rainfall or temperature. If adverse weather conditions lead to reduced yields, farmers may receive payment relief on their loans;
- Loans can be bundled with climate risk insurance policies; in case of crop losses due to climate-related events, insurance coverage can help farmers repay their loans; and
- Farmers can finance their climate risk insurance premiums as part of their agricultural loans. This ensures that they maintain insurance coverage against climate-related risks without facing a significant financial burden.

Activities under Output 2.1.2:

Activity 2.1.2.1 Facilitate increased access to existing credit products and available business development support for rural SCIs

Activity 2.1.2.2 Support the development of and access to green finance products that can increase farmers' income, bundled with the insurance product

Output 2.1.3 Linkages facilitated to enhance diversified livelihoods through value chain and marketing support for climate-resilient value chains

Output 2.1.3 addresses many issues raised by both stakeholders and community members on the need for enhanced market access and livelihoods diversification, especially for women smallholders who will make up 70 percent of the project's beneficiaries. WFP's experience has shown the advisability of including some elements of post-harvest and value chain work on selected commodities when promoting microinsurance, so that the targeted farmers can gain increased income and diversified farming livelihoods through value addition and greater access to markets. Under the LIG, this will include providing additional technical assistance and small-scale inputs to reduce post-harvest losses, as well as value chain and market linkage work on selected climate-resilient commodities, both non-organic and organic in line with the two-pronged approach identified under Output 1.2.1. Where there is geographical overlap, the project will leverage off the relevant activities of existing and planned interventions, including CARLEP, BRECSA, and the National Organic Flagship Programme.

When identifying the climate-resilient value chains to be developed, the project will develop clear criteria and consider both those that are nutrition sensitive, as well as high-value commodities targeted at both the domestic and export markets, for sustainable increase in farmers' incomes. Bhutan's comparative advantages will also be factored in; for example, the country enjoys strong seasonal climatic advantages compared with its neighbour to the south, India, allowing it to produce temperate zone crops (typically fruits and vegetables) during the May to October monsoon period in India, when temperatures at lower latitudes are generally too high for these crops. Thus there is good potential for developing the (organic) value chain and marketing linkages for selected high-value fruits and/or vegetables, for export to India.

In line with the priorities of the DoA and other stakeholders, more traditional, climate-resilient and nutritious crops that are likely to have good export markets as well will be considered, such as millets and buckwheat, as well as quinoa that was introduced successfully in 2015, has been promoted in all 20 districts and has been targeted as a crop for upscaling to enhance household food and nutritional security as well as diversify farmers' cropping systems, as it will be climate-resilient going into the future.[141] Quinoa has been mainstreamed into the district 12th Five Year Plan (FYP) targets, resulting in the production of 77 MT in 2019.[142] Ginger, turmeric, adzuki beans, buckwheat and quinoa have been identified by the DoA as providing the main upscaling potential for organic production, particularly for export. There is also good potential for organic production of priority fruit, such as apples and cherries. The NCOA of the DoA is currently testing germplasm for cherries at its Yusipang research centre; cherries have also been included as a priority high-value tree under the recently inaugurated One Million Fruit Trees programme.

To strengthen value chains, the project will support collaboration with stakeholders who are key contributors to the value chain. The project will promote entrepreneurship and private sector participation in climate change responses, especially with respect to women, youth, and micro, small and medium enterprises (MSMEs), by working with women's groups, youth groups, and other aggregators in the livelihood diversification activities. The project's support will include basic entrepreneurial skills development, such as book keeping, financial literacy, in addition to marketing linkages. Promoting entrepreneurship will entail a complete package on business development, maintenance and skills development. In the course of supporting the climate-resilient and nutrition-sensitive value chain work and facilitating the marketing of

[141] RGoB and UNDP (2021) Assessment of climate risks on agriculture for National Adaptation Plan (NAP) formulation process for Bhutan.
[142] Ibid.

climate-resilient varieties and products, the project will also investigate building on the existing digital marketing platforms and other digital platforms in Bhutan to enhance integration of localised agro-met advisories.

Bhutan has locally developed organic standards and certification, and organic farming has been identified as an opportunity for expansion of agribusiness in the RNR Strategy 2040.[143] In those localities where the project will support organic production, it will work closely with the Bhutan Agriculture and Food Regulatory Authority (BAFRA), which is the certification body that is now accredited with the authorities in India and linked with the Sikkim Organic Mission. It will also partner with Brand Bhutan, which aims at diversifying the export market and is not just about selling products but remaining true to Bhutanese ideals and inherent values as expressed in the philosophy of Gross National Happiness. 'Bhutan Natural' is the branding for locally certified organic products from Bhutan that are not formally accredited, targeting EU and Japan. A local private sector partner has conducted an initial marketing study for buckwheat and adzuki beans; there is already a value chain for buckwheat. The NCOA has indicated that there is a need for additional development of the branding for organic and natural, which should include the elements of smallholder clean production in mountain environments. The project will support the further development of branding and marketing of smallholder organic products to reflect this ethos, in close partnership with the NOFP, the NCOA, and Brand Bhutan.

The local consultations process with district agricultural officials revealed a focus on high-yielding and high-value crops, facilitating efficient irrigation and resilient crop management practices, and market-led agriculture production in their strategies. Plans to develop commodities include: (i) In Lhuentse- high-value crops (2 cereals, 1 legume, 5 vegetables) and 12 fruit crops are planned, and adzuki beans are promoted; (ii) Dagana plans to promote new high-value crops like asparagus, kiwi, and avocado; (iii) Commercial plantation of avocado, kiwi, strawberries, and green gram is planned in Tsirang; and (iv) Quinoa is promoted as a new crop and gaining popularity in Bartsham and Shongphu gewogs of Trashigang.

While marketing continues to be a constraint, the MoAL has noted potential opportunities that organic agriculture can bring to Bhutan, which can be harnessed through a focused effort on commercialization of organic production. Although support is still needed on access to markets to ensure price premium, the recent (2022) export of organic broccoli and cauliflower from Tsirang to Singapore is promising and there si clear demand for increased export volumes. Other commodities can be and are being developed for export – such as organic pineapples, kiwi fruit, quinoa, spices, and vegetables.

Recognizing that entrepreneurship is the backbone of a country for creating job opportunities, promoting innovation, and improving the economy, the Bhutanese government has developed policy and launched various initiatives to encourage entrepreneurship in among youth, students, community groups, farmer groups, and women's groups besides creating opportunities and support for start-ups and business incubation centres. The project will take advantage of this enabling environment to promote entrepreneurship and private sector participation in climate change responses, especially with respect to women, youth, and micro, small and medium enterprises (MSMEs). The project will ensure that any entrepreneurship training or support provided will be based on market demand. Women and youth entrepreneurship will be supported to meet suitable gaps that are identified in the value chain analyses conducted for high-value commodities. This could take the form, for example, of supporting women farmers' groups to add value to selected commodities, through technical assistance and provision of the necessary equipment for drying or otherwise processing commodities; and supporting youth entrepreneurs to provide support to reduce post-harvest losses (PHL). The MFIs and other CSOs, together with the DoA, will play a strong role in facilitating these aspects, building on their existing experience in this regard.

The project will select 2 – 4 climate-resilient and high-value products for focused value chain and marketing support, building on existing initiatives. Where there are existing recent value chain analyses for suitable products, the project will not commission new value chain analyses but will enhance any identified gaps in the value chain analysis itself, as well as provide support to address any key barriers identified to unlock the value chain's potential for the target farmers. For example, it is likely that in Tsirang, the district that has overlap with the BRECSA project, relevant value chain analyses will have already been conducted – for example, on high value crops such as herbal, aromatic, medicinal and spices. The value chain analysis will include an investigation of the climate vulnerabilities of targeted commodities for aggregation, post-harvest and marketing support.

Where no suitable recent value chain analyses have been conducted on relevant commodities, the project will commission these and then implement the recommendations. The criteria for selection of the 2 – 4 value chains that the project will support include the following:

- Climate-resilient commodity
- Produced under sustainable agricultural or organic practices
- High value – to deliver increased income for farmers
- Presence of demonstrated market demand, nationally and/or export

[143] MoAF 2021, RNR Strategy 2040, Policy and Planning Division, Ministry of Agriculture and Forests, Thimphu, Bhutan.

- Ability to scale up supply in the short-term
- Rudimentary value chain already in place, that can be supported

The district and gewog-level agricultural extension officers will lead the process of value chain selection, with technical guidance by the ARDCs, the NOP, and the DAMC. Farmers' groups and aggregators will be strongly involved in the selection process, to ensure that this meets farmers' priorities and interests, so that support from the ground is ensured.

Upon mapping the value chain actors, from input suppliers to farmers, processors, distributors, and consumers, the project will also identify how climate risk insurance could be bundled with the services and produce involved. Through this, the project can establish a roadmap through which agricultural inputs are bundled with insurance protection to support farmers in managing risks associated with crop production. The coverage may include protection against crop yield losses, damage to inputs, or even fluctuations in market prices. This will also allow the project to explore insurance that could cover supply chain disruption to mitigate risks associated with transportation delays or supply shortages caused by extreme weather events.

Activities under Output 2.1.3:

Activity 2.1.3.1 Select 2 – 4 climate-resilient and high-value products for focused value chain and marketing support and conduct/enhance value chain analyses

Activity 2.1.3.2 Provide additional technical assistance and small-scale inputs to reduce post-harvest losses and enhance processing

Activity 2.1.3.3 Facilitate enhanced market access for selected climate-resilient commodities

Activity 2.1.3.4 Provide support to address any key barriers identified in the value chain analysis[144]

Component 3: Innovative climate risk management institutionalised for long-term sustainability

Under Component 3 the project will implement activities to institutionalise the innovative climate risk management approach of index-based microinsurance delivered in an integrated resilience building approach for long-term sustainability. Through these activities, the project will develop the enabling environment (regulatory and policy) and mechanisms to also promote the further scaling up of the activities beyond the project localities, with the aim of ultimately covering all 20 districts of Bhutan, as well as a broader range of livelihood systems and groups.

Outcome 3.1 Strengthened ecosystem for sustainable climate risk transfer through microinsurance

Output 3.1.1. Support stakeholders and develop enabling environment to institutionalise innovative climate risk management

This will include capacity strengthening of Government officials at different levels, as well as the key private sector stakeholders (insurance companies, banks, MFIs, potentially aggregators as well) so that the LIG's approach can be institutionalised for ongoing sustainability and wider impact. Enhanced capacities of the extension services for climate resilient agricultural technologies, as well as of a range of stakeholders for enhanced provision of localised and targeted climate services, will have already been developed under Component 1. Component 2 includes enhancing capacities and formalising key partnerships at different levels of the insurance ecosystem that will lead to the roll out of insurance for the project beneficiaries. Thus Output 3.1.1 will focus on the missing element of developing and ensuring ongoing support for the long-term effective functioning of the insurance ecosystem, as well as further developing the approach to multi-level climate risk management to enhance sustainability of the insurance scheme. In the early stages of the project's implementation, the key capacities that require further support will be identified according to the different stakeholder groups in the insurance ecosystem – for example, the insurance companies, the microfinance institutions, and the insurance regulator. Officials from the MoAL and aggregators will also be included in this more systemic form of capacity development, so that a comprehensive and shared understanding of the functioning of the integrated approach to climate risk management is developed.

The project will support the RGoB to enhance/develop policy on multi-level climate risk management focusing on the agricultural sector. However, at the country level, there is no need to revise the country risk framework developed by the Department of Local Government and Disaster Management.

These institutionalisation activities will include providing technical support so that the insurance scheme forms part of an integrated and multi-level climate risk financing approach where other financial instruments could be used by the Government to finance response in case of climate shocks. Advocacy and institutionalisation activities will focus on the need to ensure that all risk financing tools are aligned and layered to manage different risks of different severity and frequency. This will include for example discussions on the relationship between the insurance scheme and other more

[144] This could for example include support for further development of the existing branding for organic and natural, to include the elements of smallholder clean production in mountain environments – where this will directly enhance farmers' income in the value chains supported by the project.

ad hoc systems for compensation, such as district-level discretionary funds and the Kidu Fund; as well as on developing other insurance schemes to cover other perils, how the scheme would be connected to the indemnity insurance for HWC that will be developed under the BioFin project, and the linkages with any other relevant financial instruments.

The project will provide the necessary support to develop the policy and regulatory enabling environment for index-based microinsurance for smallholder and other farmers. While many stakeholders have confirmed that the policy environment is favourable towards microinsurance, in that it is a stated policy priority in numerous official documents, it is likely that new regulations will be required to further the institutionalisation and scaling up of the insurance products and approaches developed. Developing the enabling environment and the necessary regulations will involve strong engagement of the insurance regulator – the Royal Monetary Authority (RMA) of Bhutan, other relevant government agencies such as the Ministry of Finance, and the private sector (insurers, brokers, distribution channels, etc.) During project implementation, the project technical working group (TWG), supported by WFP and the project technical specialist in the PMU, will collaborate with the project steering committee to discuss possible regulatory changes. Structures for discussion of policy and regulatory changes will consist of representatives from various government policy and regulatory agencies, insurance industry associations, organization of microfinance institutions, and other concerned stakeholders. Resource persons and experts will also be invited to provide deeper context in the conversations.

The project will develop advocacy tools, including policy briefs, for institutionalising the approach of innovative climate risk management, for use within Bhutan and to share lessons from the project in the region and beyond. This will include evidence generation for example on cost-impact analysis, to influence the microinsurance policy environment. The project will adopt a multi-stakeholder approach in microinsurance advocacy. The insurance literacy campaigns will involve both the government and representatives from the insurance sector. Farmers will also be supported to advocate on their experiences to promote scaling up and development of a sustainable distribution strategy in Bhutan.

Evidence will be generated through rigorous studies to enable the roadmap for progressive development of the integrated climate risk management approach to enhance sustainability – this will involve strengthening of the SAIL, input and credit-insurance bundling, and exploration on how climate risk insurance can be integrated in the overall social protection system. Activities will include conducting a cost benefit analysis to demonstrate the return on investment (ROI) to justify partial subsidy of the insurance scheme and to leverage additional climate finance to expand the reach of the integrated scheme. A further possibility is to map the funding gap required to adopt the necessary adaptation responses for Bhutan and explore financial instruments to fund this – with a focus on green credit schemes, insurance and other potential instruments such as anticipatory action (AA) – pending discussions with the RGoB on their evolving priorities.

The RGoB will be assisted to integrate insurance within national programmes promoting value chains such as high value organic and export commodities. Connecting the insurance scheme with comprehensive programmes promoting climate resilient agriculture to improve productivity and access to markets will enhance food security at the national level, as well as assisting farmers to increase their own resilience and income from farming. During the policy support to the RGoB, there will be a special focus on how to institutionalise increasing access to credit and savings to adopt climate adaptation and mitigation (green finance). The project will also assist the RGoB to undertake readiness activities for scaling up the insurance scheme beyond the project districts and to leverage any additional necessary resources.

Activities under Output 3.1.1:

Activity 3.1.1.1 Support Government officials and private sector at different levels to enhance climate risk management in Bhutan

Activity 3.1.1.2 Develop and enable roadmap to scale out integrated climate risk management approach to enhance sustainability

Activity 3.1.1.3 Support regulatory authority to identify and develop additional regulations to facilitate sustainability of the scheme

Activity 3.1.1.4 Assist the RGoB to integrate insurance within national programmes promoting value chains such as high value organic and export commodities

B. New and innovative solutions to climate change

The main element of the project's innovation strategy is to roll out WFP's innovation of index-based microinsurance for vulnerable smallholder farmers delivered in an integrated climate risk management and resilience building approach – as described above and under Part II.C below. This is a tried-and-tested innovation in other parts of the world that is completely new to Bhutan. While the primary focus is on rolling out this mature innovation, opportunities have been identified during design of the project to promote the integration of secondary, local-level innovations that have demonstrated effectiveness in the project localities. This process of integration between the primary mature innovation of index-based microinsurance with secondary Bhutanese innovations will be carefully documented so that the new knowledge developed can be shared more broadly, and evidence generated to substantiate its effectiveness. Section

II.A describes a range of possible secondary innovations relating to enhanced climate-resilient agricultural technologies and methods that can be integrated with the primary innovation, with the process through which this integration will be enabled set out under output 1.2.1.

This innovation process will include building on traditional and cultural knowledge and practices, for example to strengthen dissemination of targeted and localised climate services. The sensitisation of farmers on the benefits of index-based microinsurance will also be designed to build on traditional and cultural knowledge and practices in Bhutan, to represent an additional innovative element in the process of rolling out the microinsurance. This sensitisation can be delivered working through WFP's Social and Behaviour Change Communication (SBCC) approach, tailored to suit the Bhutanese context. The project prioritised the inclusion of female farmers in the consultations for the detailed insurance feasibility assessment and will ensure that at least 70 percent of the participants in the prototype testing of the Insurance Index are women, to ensure that their voices and concerns are heard and shape the development of the innovation.

In collaboration with the National Centre for Organic Agriculture (NCOA) and the National Organic Flagship Programme of the DoA, the project will use the risk transfer factor of insurance to stimulate the more formal transition to organic agriculture in some of the project localities. This represents a further secondary innovative element designed to contextualise the mature innovation of index-based insurance to the Bhutanese situation – as in general organic production has not been used as a conditionality for delivering index-based insurance in other parts of the world.

A further area for secondary innovation in the project concerns the integration of digital technologies and applied tools into the insurance roll-out process. Thus, under Component 2 the project will investigate building on the existing digital marketing platforms and other relevant digital platforms in Bhutan to enhance integration of localised agro-met advisories, to provide a more seamless applied tool to assist project beneficiaries to develop more climate resilient livelihoods. Moreover, the DoA has advised that the Agriculture Machinery Centre[145] in Paro will be transformed into an Agricultural Innovation Centre, to develop innovative technologies, including automation. The 'Agriculture 4.0' transformation in Bhutan is envisaged to bring in hydroponics, soil-less cultivation, smart irrigation, etc. These kinds of technologies can be combined with agricultural marketing and are especially likely to attract youth to agriculture. During full proposal development, a range of potential secondary innovations have been identified through community and stakeholder participation as well as relevant secondary material (see discussion under Component 2 above); once the project localities (gewogs) have been identified during the inception stage, the most suitable secondary innovations under the 'Agriculture 4.0' approach will be integrated into the project's innovation strategy.

C. Rolling out / scaling up innovative adaptation solutions

The project will roll out WFP's successful integrated approach of delivering index-based microinsurance for smallholder farmers, which has been tried and tested over more than a decade in sub-Saharan Africa, Latin America and the Caribbean, and increasingly in recent years in Asia. As index-based microinsurance has not been implemented in Bhutan, it represents a primary innovation in the Bhutanese context that will also generate valuable lessons for the Asia-Pacific region as a whole. From a coverage of zero percent in the project localities, the proposed LIG project will roll out microinsurance to a target of 10,000 smallholder farmers, or roughly 60 percent of the agricultural holdings in the project districts, using a graduation strategy to enable farmers to assume full payment of the premium by the end of the project's lifespan.

The index-based microinsurance for smallholder farmers in Bhutan will be rolled out using WFP's proven integrated resilience building approach. Since 2011, WFP has worked with Governments and private sector partners to insured 2.7 million people in 19 countries; insurance products have disbursed USD 4.7 million in payouts to 576,000 people. Under WFP's approach, insurance is not only a protection mechanism to respond rapidly to shocks, but by protecting investments, it allows farmers to increase production and incomes in good years, enabling them to transition from subsistence farming to producing a surplus for selling to markets. This will gradually allow farmers to access insurance commercially and contribute to the overall sustainability of the initiative. However, while insurance can promote risk taking by households, it requires complementary actions such as business advisory services, predictable market access and improved access to financial services. Therefore, it is important that the right partners are identified for these actions.

In this regard, the process to roll out insurance within the integrated resilience building approach will build strong multi-stakeholder partnerships and harness multiple perspectives on innovation to further contextualise and optimise the primary tested innovation for the Bhutanese context. A strong element of the innovation strategy will be capacity development through partnerships. Most insurance companies, not only in Bhutan but also globally, lack the expertise and capacity to develop and provide index-based insurance product. Therefore, a key partner is the Technical Service Provider (TSP), which is a specialised company, and appropriate distribution channels to implement the programme effectively. The TSP will lead the design of the insurance product and monitor the weather information; however, the insurer will be deeply involved since all features and benefits should be approved by them. This will enable the insurers in Bhutan to learn how to design index insurance products and will capacitate them to sustain it. The TSPs that WFP

[145] http://www.amc.gov.bt last accessed 25/07/22.

has worked with have also developed technological platforms that can enable seamless enrolment and registration processes which the insurers can adopt in their operations. WFP's involvement will also be critical. The WFP Climate Risk Insurance (CRI) team and their involvement in the global R4 programme accumulates significant know-how on providing index-based insurance programmes; the necessary skill set will be transferred to the implementation partners. The agreement between WFP and the insurer will ensure that a member of the insurance company's management team and a Programme Manager will be assigned to the project and a cross-functional support team will be available to support product design input, rollout and capacity development. Implementation arrangements are specified in the part III of this FP.

Partnerships with research and innovation groups will be leveraged – for example, with WFP's Innovation Accelerator[146] to source and qualify additional innovative solutions to enhance specific elements of WFP's microinsurance process, such as monitoring systems for insurance products and indexes to increase the transparency of the end-to-end process for all stakeholders; and will be fostered – for example, between Bhutanese research and academic institutions and smallholder farmers, in order to identify and leverage existing secondary innovations that are already being deployed by community members to enhance their climate resilience, and by research and extension services to develop and disseminate simple and effective adaptation technologies and tools for smallholder farmers. The effectiveness and sustainability of the microinsurance depends upon solid partnerships between banks and microfinance institutions (MFIs), index insurance technical service providers, insurance companies, distribution channels and aggregators, and between all of these members of the insurance ecosystem and the community members who will be the primary beneficiaries of this project. Through actively fostering these and other multi-stakeholder partnerships the project will support the creative power of innovators in Bhutan to expand their impact on building adaptive capacity and reducing vulnerability in Bhutan's rural areas. The DoA and its research and extension centres will be primary project executing agencies, in close collaboration with the district and block administrations, which would provide the necessary legal, regulatory and facilitation support to this project. The insurance companies and their branch offices in the districts would be primary stakeholders and would execute their roles in close collaboration with the DoA. The MFIs would collaborate in assisting households to build monetary or in-kind savings by facilitating linkages with existing savings products and micro finance service providers and are likely to be the insurance dissemination channels. The local community leaders, farmer groups, and cooperatives would be important stakeholders in implementation and monitoring of the microinsurance and capacity strengthening activities. Further details of the implementation arrangements are specified in section III.

The roll-out process will also include integration of relevant innovations developed under the small innovation grant of USD 250,000 received from the AF through the NIE, Bhutan Trust Fund for Environmental Conservation (BTFEC), entitled 'Building Adaptive Capacity through Innovative Management of Pests/Disease and Invasive Alien Species (IAS) in Bhutan to Enhance Sustainable Agro-Biodiversity and Livelihoods'. This is directly relevant for the project and will be an essential input into the stocktaking activity of climate-resilient agricultural practices conducted under output 1.2.1. Relevant BTFEC staff and key researchers involved in this grant will be invited to participate in the stock-taking activity. The intention is that relevant innovative pest management approaches supported by the AF small innovation grant will be included as secondary innovations in the proposed project.

A further opportunity to maximise partnerships for innovation is through the recently launched National Innovation Platform (NIP) of Bhutan, 'Naykap Gokab', which seeks to harness the creative talents of anyone – from farmers to students, entrepreneurs to policymakers, and grassroots innovators to tech innovators – who can share their innovative ideas, problems and solutions on the platform.[147] By participating in this platform, the project can help to strengthen the innovation ecosystem to transform the country's economy and improve the lives of Bhutanese with innovation-driven development. Relevant innovations include a community seedbank built out of mud (at prototype stage) and an improvised water sprinkler (tested and proven).[148] The project will also collaborate with a range of other innovation platforms and initiatives, including the Bhutan Climate Futures Lab. The Lab's event held in July 2023, FAB23 Bhutan, focused on five challenges—climate adaptive agriculture, water conservation, human wildlife conflict, cultural preservation, and assistive technology – indicating its relevance to the project's focus.

D. Economic, social, and environmental benefits

Economic benefits

Increased income from increased and more climate resilient production, reduced post-harvest losses and more resilient and diversified livelihoods: enhanced provision of climate-resilient agricultural technologies and more consistent technical support and recurring training activities, including for organic production, as well as provision of inputs such as drought-tolerant, early maturing, and/or organic varieties, will result in surplus production for income generation. A

[146] The WFP Innovation Accelerator sources, supports and scales bold new solutions to disrupt global hunger and achieve the Sustainable Development Goals (SDGs). Since 2015, the WFP Innovation Accelerator has supported more than 100 projects, with 16 innovations scaling up to achieve significant impact. These projects have impacted 9 million lives in 2021 alone and will continue to do so, in support of WFP's humanitarian field operations. https://innovation.wfp.org last accessed 11/07/22.
[147] The platform is an initiative of an initiative of the Ministry of Industry, Commerce and Employment (MoICE), DHI InnoTech and UNDP.
[148] https://naykapgokab.bt accessed 11 July 2023.

similar set of integrated interventions in Mongar district, eastern Bhutan, including crop diversification, plant protection, and soil fertility management contributed to significant yield increases and income: for example, the mean income from cereal increased from Nu.63 to Nu 974 per HH, and the mean income from fruits increased from Nu.672 to Nu 1,525 per household.[149] High levels of post-harvest losses (PHL) in the project localities have dramatically reduced household economies and prevented farmers from selling produce when there is no glut in the market, and mitigate against sustainable levels of income and expenditure. Project activities to reduce PHL will result in increased surplus, which can be sold during favourable market conditions, thus increasing income of women and men farmers. A recent assessment of the activities to reduce PHL of the CARLEP project in eastern Bhutan found that after attending PHL trainings farmers were able to manage the postharvest losses and double their income earned differed significantly: before training Nu. 12,349.25 or approx. USD 149 to Nu. 25,595.90 or approx. USD 308 after attending training.[150] Furthermore, as production is enhanced and diversified into more climate-resilient varieties, the project will support the development of climate-resilient value chains for high-value commodities, including support to reduce post-harvest losses (PHL), to enhance processing, and to increase access to markets, including for organic produce. This will result in strengthened and diversified livelihoods, as well as increased income streams for smallholder farmers. The project will in this way support the shift from subsistence to sustainable livelihoods in Bhutan's rural areas. A related indirect national benefit of increased purchasing of national produce, rather than of foreign imports, and of the reduction in imported chemicals due to organic production, is the contribution towards reducing national debt.

Reduced crop losses and increased income through provision of targeted climate and agricultural advisories: Under Output 1.1.1, the project will facilitate linkages to existing climate services for smallholder farmers and will enhance their gender-responsive dissemination, including through digitalised means. Thus smallholder farmers, especially women, will be able to plan and manage climate variability and risk benefit better, informed by timely climate information. The resulting economic benefits will accrue through avoidance of lost investments through crop failure, as well as maximised production under suitable conditions. A conservative estimate from the region is that farmers who adapt their agricultural practices based on weather advisories will increase their annual income by 50 percent.[151] Assuming two good years of harvest in the 5-year period of the project, and based on an estimated 50 percent of the project's total direct beneficiaries of 10,000 households achieving a 40 percent increase in annual income, with an average annual household income for the targeted smallholder farmers of USD 5,520,[152] this translates into an average increase per household of roughly USD 4,416 over 5 years for 5,000 households, or an increase in income of approximately USD 22,080,000 for the project as a whole. Actual figures might be higher as a result of the cumulative positive effects of the range of risk reduction and adaptation activities of the project, which will be greater than the effects of enhanced access to climate services alone; it is also likely that more than 50 percent of the targeted households will achieve this benefit.

Providing access to savings and microfinance: through this, households will be better able to manage smaller and more frequent shocks through building risk reserves, and access microcredit to facilitate their productive activities and livelihoods. Combined with the insurance, this will allow individuals to become more resilient to both smaller and larger shocks, whilst also being able to contribute towards the payment of their insurance premium over time. Savings have acted as a buffer for smaller shocks, and women participants in microinsurance in different countries have doubled their savings capacities. It is conservatively estimated that the amount of additional savings made by participants in the project's financial inclusion initiatives would be at least USD 600,000[153], which would not only increase participants' resilience to smaller shocks, but would also have a significant stimulating role in local economies as well as in the financial viability of financial services providers. Microinsurance also plays a key role in unlocking access to financial services, acting as collateral to access loans. The number of participants accessing credit has doubled in Malawi after three years of WFP's microinsurance intervention, while farmers in Ethiopia have managed to borrow amounts five times higher than non- participants after five years. This has enabled participants to improve productive capacities with agricultural inputs, tools, and livestock. It is estimated that the project will result in at least a 50 percent increase in the number of targeted women farmers accessing credit.

The value proposition of the proposed insurance scheme for the RGoB, farmers, insurers, financial institutions, offtakers, input providers, and other stakeholders interested in promoting the resilience and productivity of farmers is summarised in the diagram below.

[149] CARLEP project report 'Impacts of Climate Smart Agriculture (CSA) Interventions on Livelihoods and Climate Resilience – The Case of Ngarpontang Climate Smart Village (CSV), Mongar Bhutan'. Available at https://carlep.gov.bt/resources/reports/ accessed 31 July 2023.

[150] Samdrup, Y. (2019) Impact of Post-Harvest Training on Farmers in Lhuntse, Mongar, Trashigang and Trashiyangtse Dzongkhags. Thesis submitted in partial fulfilment of the requirements of Masters in Development Practice, College of Natural Resources, Royal University of Bhutan.

[151] This is based on studies in India.

[152] This is based on the findings of the income and expenditure exercises conducted during full proposal development, of an estimated average monthly household income for the 12 gewogs of USD 460.

[153] This has been conservatively calculated based on 60% of participants (6,000 people) saving an additional USD50 per year, calculated for 2 years (assuming that participants would need some time and support to increase their savings), which translates into 6,000 x 50 x 2 = USD600,000 additional own savings for the project participants.

Figure 6. Value proposition of the proposed insurance scheme for the different stakeholders

Key activities through which youth are expected to benefit economically from the project activities are through support to youth groups cultivating state land with a land use certificate (LUC) for the production of high-value organic crops; through support to entrepreneurial activities such as development of organic fertilisers; and potentially through supply of technologically-enabled approaches such as smart automation for drip irrigation systems. While it is not possible to provide hard figures for these potential benefits, due to their innovative nature in Bhutan, it is clear that production of high-value organic crops for export such as pineapples and other fruit, as is currently underway in Trashigang district with youth groups, is expected to deliver a price premium. The export price of pineapples that are not organically certified from Bhutan has seen a steady increase over the past five years, from USD 2.45 per kilogram in 2019 to USD 2.90 in 2022, and a projected USD 3.20 in 2024.[154]

Social benefits

Targeting of women farmers will improve agricultural output and improve nutritional outcomes: FAO has estimated that if women farmers had the same access to resources as men, agricultural output in developing countries would rise by an estimated average of up to four percent and reduce the number of undernourished people in these countries by as much as 17 percent, translating to up to 150 million fewer hungry people.[155] Given that the project will target at least 70 percent female beneficiaries and ensure their equitable access to resources needed to enhance their production, the project will deliver this social benefit in Bhutan.

Improved food self-sufficiency: the integrated package of climate-resilient interventions is expected to improve household food self-sufficiency and reduce food shortages. This expectation is based on evidence from a similar integrated set of interventions in Mongar district, eastern Bhutan, through which promotion and adoption of climate-resilient technologies have reduced food shortages by almost 100 percent.[156]

Reduced resorting to negative coping strategies through integrated approach to roll-out of microinsurance: When insurance is provided together with other risk management approaches, such as access to natural capital, information and finance, the synergies created by the different components lead to increased resilience capacity of participants. In Malawi, after 3 years of programme implementation, the percentage of participants with acceptable food consumption has increased from 56 percent to 89 percent. The percentage of households not resorting to negative coping strategies after a shock has increased from 40 percent to 72 percent.[157] It is estimated that the percentage of beneficiary households not resorting to negative coping strategies after a shock could be increased by at least 30 percent above baseline through the project's activities.

Enhanced gender equity and benefits for women and youth, including a strong role in the innovation process: A key thrust of the project will be economic empowerment of women and youth, to address the inequalities identified. At least 70 percent of the total beneficiaries will be female, and the project will adopt a number of actions to achieve gender empowerment and benefits, guided by the gender assessment findings. During the value chain assessment, gendered (and nutrition) analysis will be conducted to understand barriers women and other groups face in participating in value chains, and sustainable solutions will be developed to overcome them. The adaptation planning processes will be refined and/or implemented to ensure equitable participation of women and men in decision making on adaptation decisions. The project will support the development of women and youth climate champions and will take specific steps to remove

[154] https://www.selinawamucii.com/insights/prices/bhutan/pineapples/ accessed 21 August 2023.
[155] As cited in Yeshey, K. (2022) Gender Assessment Report for the Bhutan AF Larges Innovation Grant project. Report submitted to WFP Bhutan.
[156] CARLEP project report 'Impacts of Climate Smart Agriculture (CSA) Interventions on Livelihoods and Climate Resilience – The Case of Ngarpontang Climate Smart Village (CSV), Mongar Bhutan'. Available at https://carlep.gov.bt/resources/reports/ accessed 31 July 2023.
[157] WFP (2021) Does Climate Insurance Work? Evidence from WFP-supported microinsurance programmes.

barriers for women to attend awareness raising/training sessions like providing free child care. Under output 1.2.2, the project will empower a range of advocates, including lead farmers and youth agricultural entrepreneurs, for further uptake and scaling out of the prioritised innovation of index insurance, as well as the integrated resilience building approach through which the insurance will be delivered.

Positive social impacts and increased income from reduced time demands: In Ngarpontang village, 97 percent of respondents in a survey reported not losing their crops to wildlife after electric fencing was installed. Farmers no longer have to spend their nights out in the fields guarding them against animals, and so they have more time to spend with their families, caring for their children, and in communal social interactions that build social capital. As a positive side-effect, off-farm income increased from Nu. 37,112 to Nu. 50,710 after the project intervention because the time spent previously in crop guarding or fire wood collection or collecting water can now be used for off farm works.[158] While the project will not provide access to electric fencing under the initial rollout of the MVP (insurance + savings), it will facilitate increased access to credit which farmers could use to reduce their own exposure to HWC, if they wish.

The project will have a strong focus on encouraging women and youth to play a substantive role in the design, testing, learning and adoption of innovative solutions. The project's targeting of at least 70 percent women (including female youth) and a strong focus on youth will encourage women and youth from the outset to play a substantive role in the design, testing, learning and adoption of innovative solutions, as they will not have to compete with men for inclusion in the project and for project benefits on what would otherwise have been an unlevel playing field. By empowering youth and increasing the revenues from agriculture the project could attract more Bhutanese to work in the agriculture sector thus providing more options for better income than migration. During the FP development, the project aimed to target at least 70 percent women participation in the community consultations and focus group discussions (FGDs) held for the insurance feasibility study and to ensure equitable youth participation; the final result was a total of 194 community members with 105 females (54.1%) and 90 males (46.39%). These participatory meetings were conducted to facilitate the effective participation of women farmers, by timing them as much as possible to not take women farmers away from the field at critical. Project capacity development activities, as well as activities for testing and learning on innovative solutions, will follow a similar approach, and will aim to provide free childcare for the duration of any consultations and meetings; workshop budgets have been developed to allow for this. The project team held discussions with the National Commission for Women and Children (NCWM) and the Youth Development Fund (YDF), as well as with MFIs and CSOs that focus on women's empowerment, and agricultural extension officers working with youth cooperatives, who provided additional guidance on how best to encourage women and youth to play a substantive role in the design, testing, learning and adoption of innovative solutions.

Environmental benefits

Reduced soil erosion and enhanced soil fertility through SLM, conservation agriculture, good agricultural practices, and organic production: Farming in Bhutan is often carried out without any sustainable agriculture practices leading to annual soil loss of 3-21 ton per hectare.[159] The loss of topsoil poses a serious threat to food security as it significantly reduces the inherent soil fertility, soil organic matter and water retention capacity resulting in poor land productivity and crop yield. Loss of topsoil also exacerbates the risks of landslides associated with increased heavy rainfall events. Conservation agriculture, good agricultural practices, and organic production have been shown to increase soil fertility and soil moisture retention as well as reduce soil erosion in many contexts. Implementation of SLM interventions in Bhutan has been found to be effective; for example, contour grass hedgerows on sloping agriculture land were found to reduce soil erosion by 50 percent compared to traditional farming practices[160]. In addition to the environmental benefits, reducing soil erosion, enhancing soil fertility and increasing soil moisture retention are positively correlated with increased productivity and increased incomes for farmers.

Enhanced natural resources, biodiversity and ecosystem services in project target areas: The conditionalities for farmers to access insurance, such as conservation agriculture, GAPs and organic production, will improve the natural resource base upon which livelihoods depend. In addition to the reduced soil erosion and enhanced soil fertility benefits mentioned above, the sustainable agro-ecological technologies supported by the project will prevent biodiversity loss through injudicious application of chemicals.

Reduced pressure on the natural environment: The project's resilience building and risk reduction activities will contribute to the transformation from subsistence to sustainable livelihoods for vulnerable people by (i) reducing pressure on landscapes and the natural environment (e.g. avoiding negative coping strategies such as deforestation); (ii) gradually increasing adaptive capacity through training, creation and management of climate adaptation assets; and (iii) improving productivity and building economic protection from shocks, thereby preventing relapse into poverty and renewed pressure on the natural environment. The increase in income and livelihood diversification, as well as risk transfer activities under Component 2, will serve to reduce the pressure on ecosystem goods and services derived from forests and rivers that are used by rural Bhutanese in the project target areas to supplement their livelihoods. These

[158] CARLEP project report 'Impacts of Climate Smart Agriculture (CSA) Interventions on Livelihoods and Climate Resilience – The Case of Ngarpontang Climate Smart Village (CSV), Mongar Bhutan'. Available at https://carlep.gov.bt/resources/reports/ accessed 31 July 2023.
[159] Soil Erosion Report, 2010, National Soil Services Centre, DoA, MoAF
[160] Soil Erosion Report 2010, National Soil Services Centre, DoA, MoAF.

ecosystem goods and services themselves are being negatively impacted by climate change, currently largely due to the effects of heavy rainfall and landslides, as well as drying effects that result from increased temperature, and reduced and/or erratic rainfall.

In addition to the above social and environmental benefits, the project has been designed to avoid or mitigate negative impacts and is in accordance with national standards and safeguards. Further detailed consultations with relevant ministries, stakeholders and community members will be carried out during full proposal development to shape activity design to enhance economic, social and environmental benefits and additional consultations will be carried out during implementation under the project's participatory approach; in addition, technical support from experts in the field, especially in relation to sensitive or specialized services, including gender and protection issues as well as climate-resilient agricultural technologies, organic farming and environmental management, will be sought and integrated into further design, and will continue to be integrated into project activities during implementation. Further, the initial quantified estimates provided above will have further positive knock-on effects which cannot be estimated or quantified at the moment, given that the project localities within the identified districts and exact climate-resilient value chains will only be determined in the early months of project implementation. The project will track the quantified benefits during implementation through the M&E system; additionally, a cost-benefit analysis will be conducted to generate evidence for the return on investment of the insurance scheme.

E. Cost-effectiveness of the proposed project

The cost effectiveness of the project has been assessed and is evident when compared with the status quo. Regarding the alternative of no project, the recent climate change-related impacts experienced in Bhutan and the strongly negative effects these are having on rural livelihoods and social cohesion linked to ongoing migration, constitute large costs for the state. These are incurred as the RGoB is attempting to steer the country back onto a steady economic path after the COVID-19 pandemic. The project will contribute to addressing the root causes of the exodus from the rural areas, which is fundamentally more cost effective than addressing the symptoms of rural and agricultural decline.

Concerning Component 1, the cost effectiveness and economic rationale for enhanced access to climate services has been demonstrated through global and regional studies. For example, in India, it is estimated that investment on generating reliable weather forecasts yielded a benefit of 50 times the initial investment in a year, with expected increased benefits in the next few years.[161] Farmers who adapted their agricultural practices based on weather advisories in India increased their annual income by up to 53 percent. A number of studies have provided evidence for the cost effectiveness of NRM-related risk reduction measures and resilience-building activities – for example, a DfID-funded study found the costs of building resilience are offset against the benefits, in benefit-to-cost ratios ranging from 2.3:1 to 13.2:1, depending on the country.[162] Assuming a fairly low benefit to cost ratio of 2.9:1, this would mean for every USD 1 spent on resilience, USD 2.9 of benefit (avoided aid and animal losses, development benefits) are gained.

Concerning Component 2, an alternative to index-based microinsurance that was considered in order to help adapt and build resilience for smallholder farmers in the geographic regions to be targeted was to support and extend the existing approach to crop insurance in Bhutan through the Priority Sector Lending (PSL) scheme (see **Annex 6**). However, it is well-known that index insurance has low operational and transaction costs compared to more conventional indemnity insurance. Index insurance requires limited individual underwriting (client assessment), and can be distributed, and claims can be settled, at a relatively lower cost. Individual inspections of loss are not required for index insurance, which greatly increases its cost effectiveness. A number of studies have pointed to the cost effectiveness of index-based microinsurance. A recent review[163] found a positive relationship between index insurance and uptake of more profitable production technologies and practices; it also noted that while social protection contributed resilience to climate shocks among Kenyan pastoralists, index-based insurance had a similar effect at lower cost. A cost benefit analysis to demonstrate the return on investment (ROI) of the insurance scheme, to be conducted under output 3.1.1, will provide further evidence of the cost effectiveness of the integrated scheme.

Concerning Component 3, a relatively small budget envelope will be needed to institutionalise the system of integrated provision of index-based microinsurance in Bhutan. This is likely to be highly cost effective as compared to the no-go option for this component, as failure to implement and institutionalise effective climate risk transfer mechanisms is resulting in extremely high costs for vulnerable smallholder farmers and mitigating against the transformation of the agricultural sector and Bhutan's food systems post-COVID.

[161] National Council of Applied Economic Research (2020) Estimating the economic benefits of Investment in Monsoon Mission and High Performance Computing facilities. Ministry of Earth Sciences, Government of India.
[162] Economics of Early Response and Disaster Resilience Study: lessons from Kenya and Ethiopia (2012); available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/67330/Econ-Ear-Rec-Res-Full-Report_20.pdf
[163] Hansen et al (2019) Climate risk management and rural poverty reduction. *Agricultural Systems*, Vol. 172, 28-46.

F. Consistency with national or sub-national sustainable development strategies

The implementation of the proposed LIG will be governed by a range of national laws, policies, regulations and guidelines in Bhutan, including the overarching prescriptions emanating from the Constitution, and the sustainable development and environmental management legislative and policy frameworks. The proposed project is consistent with the policy priorities of the RGoB, including the GNH philosophy, the 12th Five Year Plan (FYP) (2018-2023), the Long-term Plan and 13th Five Year Plan under development[164], as well as the UN Sustainable Development Cooperation Framework that is aligned with the 13th FYP, the 21st Century Economic Roadmap, and the National Climate Change Policy (2020). The project will contribute to the goals of the 13th FYP on increasing income for farmers, enhancing climate resilience, promoting high-value agriculture, and ensuring that Bhutan has an operational shock- responsive, inclusive, and comprehensive social protection system. The Bhutan LIG is designed to further the goal of sustainable transformation of the agricultural sector, as part of Bhutan's post-Covid recovery, to "Build Back Better" in ways that contribute to economic and social recovery while also meeting the Country's UNFCCC Nationally Determined Contributions.[165] The project aligns well Bhutan's 13th FYP which focuses on poverty eradication, reducing inequality and addressing the needs of vulnerable groups. The project will contribute to achieving the Economic Development Strategic Objective that 'Bhutan is a high income country driven by innovation and sustainability'; as well as several of the National Key Performance Indicators (KPIs), such as KPI #4 under 'Prosperity', namely 'By 2030, income of the bottom 40% quadrupled'; as well as Output #4 stating 'Ecological services utilised and climate resilience strengthened', and Output #5 stating 'Export and market access enhanced'.

The need for crop insurance is one of the priorities identified in the Third National Communication to the UNFCCC, in Bhutan's Country Programme under the GCF[166], in the National Adaptation Plan (NAP) currently under development, as confirmed by the National Environment Commission, and in the national Food Systems Pathways developed in 2021. During the development of the FP, a further discussion was held with the coordinators of the NAP process in Bhutan; the project remains highly relevant and addresses a specific need identified in the NAP that farmers need crop insurance and that policy is needed to bring in all farmers under crop insurance and credit facilities to protect them from uncertainties.[167] The project will continue to monitor NAP discussions and synergise further where possible. Bhutan's First Biennial Update Report (BUR) to the UNFCCC is currently under development[168], as is the Long-Term Low Greenhouse Gas Emission and Climate Resilient Development Strategy (LTS).[169] Alignment with these policy statements is expected as the project directly addresses priority actions in other national climate change policy and strategy documents. Index-based climate insurance is specifically identified as a technology need for the agriculture sector through Bhutan's Technology Needs Assessment (TNA). The project is aligned with Bhutan's Adaptation Technology Action Plan (TAP) for the Agriculture Sector – Action Plan for Drought and Pest Resistant Varieties of Crops, as it will provide an incentive for the uptake of climate-resilient crop varieties through the modality of index insurance.

The project directly addresses post-COVID-19 challenges and priorities identified in key policies developed in 2021, namely Bhutan's Renewable Natural Resources (RNR) Strategy 2040 and the RNR Market Strategy (2021), as well as the food self-sufficiency policy priorities, the 2021 Pathways for Transformation developed for Bhutan's Food Systems, and the Low Emission Development Strategy for Food Security (2021). The LIG proposal is consistent with the RNR Sector Adaptation Plan of Action (SAPA) 2016. Through promotion of organic production and marketing, the project will further the aims of the National Strategy for Sustainable Socio-economic Development through the Commercialization of Organic Farming (2019) and the National Organic Flagship Programme (NOFP). The project is aligned with the priorities identified in the 2022 State of Environment Report, including the need to enhance knowledge generation on the impacts of climate change.

The gender-responsive approach of the project and the anticipated contribution to women's economic empowerment are consistent with the Gender Responsive Nationally Determined Contribution (NDC) Implementation in Bhutan, and the proposed scope of the project is aligned with the priorities of the National Commission on Women and Children, which is the nodal government agency for the protection and promotion of the rights of women and children in Bhutan, as governed by the National Gender Equality Policy 2020. The project will contribute to generating productive and gainful rural employment opportunities, in accordance with the 12th Five Year Plan, 2018-2023. The project design and all project activities will comply with Bhutan's Environmental Assessment (EA) process as an integral part of the development planning process, through enforcement of EA Act 2000.

At the sub-national level, the project will make linkages with and leverage off existing village- and gewog-level adaptation plans in which the project beneficiaries have already participated – for example, the district and sub-district level agricultural resilience plans to be developed by the BRECSA project, and the district-level local adaptation investment plans developed under the LoCAL project. With respect to global goals, the project will contribute to the achievement of the following SDGs: SDG 5: Gender Equality; SDG 13: Climate Action. The project is also cognisant of the Least

[164] As summarized in the presentation 'Long-Term Plan & 13th FYP Strategic Objectives, Outcomes and Outputs' made to development partners on 03 May 2023.
[165] Ministry of Agriculture and Forests (MOAF), Policy and Planning Division private communication, as stated in the GAFSP proposal developed in 2021.
[166] GNHC (2019). *Bhutan's Country Work Program for Green Climate Fund*. Gross National Happiness Commission, Royal Government of Bhutan, Thimphu.
[167] NAP Assessment of Climate Risks on Agriculture.
[168] http://www.nec.gov.bt/projects/details/bhutans-first-biennial-update-report-bur-to-the-unfccc last accessed 10/06/22.
[169] The proposed LTS will enhance the existing National Strategy and Action Plan 2012 taking into consideration socio-economic development, updated information and new international mechanisms to develop strategies and recommendations up to 2050. It will also encompass the vulnerability of the country to climate change and propose adaptation interventions to enhance resilience.

Developed Countries (LDC) Initiative for Effective Adaptation and Resilience (LIFE-AR); evidence of the effectiveness of microinsurance in enabling smallholder farmer adaptation generated through the project could be used to leverage for additional funding via LIFE-AR[170], as well as through evolving international Loss and Damage (L&D) discussions and financing mechanisms.

G. Compliance with national technical standards

The project will comply with the national Environment Assessment guidelines as well as the relevant Environment Codes of Practice. Overall, the project activities will be within the context of requirements of National Environment Protection Act 2007. Insurance and microfinance activities fall under the ambit of the national regulator, Bhutan Monetary Authority. The project will comply with all existing regulations and will assist the regulator to develop additional guidelines and standards on microinsurance that may be required. The project will comply with the relevant national technical standards for all the adaptation activities under Component 2, which will include demonstration of climate-resilient agricultural technologies and provision of climate-resilient varieties, good agricultural practices (GAPS), conservation agriculture, and processing and livelihood diversification activities. The relevant national technical standards in Bhutan for these activities include the following standards which fall under the Bhutan Food and Drug Authority (BFDA), then Bhutan Agriculture and Food Regulatory Authority: (i) Minimum Seeds Standard of 2019; (ii) the Bhutan Technical Regulation for Maize and Maize Products; (iii) the General Standard for Food Hygiene; and (iv) the Guidelines for Field and Seed Inspection. Activities for the promotion of climate smart agricultural practices and improvement of water governance shall further be aligned with the Land Act 2007, Bhutan Water Policy 2008, Water Act of Bhutan 2011, and the Agriculture and Land Development Guideline 2017.

The organic production and marketing activities will comply with Bhutan's locally developed organic standards and certification, Bhutan Organic Standard BOS 01:2019, which fall under the authority of BFDA as the certification body, in collaboration with the National Organic Programme (NOP), Agriculture Research and Development Centre (ARDC), Yusipang, under Department of Agriculture, MoAL. These standards will help maintain a threshold of quality assurance that will be important in setting the eligibility of the insurance as well as ensuring that farmers have access to the specified quality of inputs. No further relevant standards were identified determined during FP development. The exact steps to ensure compliance with the national technical standards identified above are set out in the table below, with key responsibilities; further detailed responsibilities for this will be allocated during the project's Inception Phase. Primary responsibility for ensuring that the relevant national technical standards are complied with will rest with the Technical Working Group, consisting of the range of technical partners involved in project execution, under the oversight of the Project Steering Committee.

Table 4. Responsibilities and steps for ensuring compliance with national technical standards.

National technical standard	Responsible agency	Relevant output	Steps to ensure compliance
Minimum Seeds Standard of 2019 and Guidelines for Field and Seed Inspection[171]	BFDA	Output 1.2.1 Output 2.1.1	The standard practices, based on the Minimum Seed Standards of 2019, include nursery registration, application for seed/seedling certification, and the issuance of certificates. BFDA will conduct field inspections and monitor the registered crops, after which certificates will be issued. Laboratory testing will be performed as needed.
Bhutan Technical Regulation for Maize and Maize Products	BFDA	Output 1.2.1 Output 2.1.1	Inspection and sample testing of the product will be carried out by BFDA, Packaging and labelling are mandatory on the maize products.
General Standard for Food Hygiene	BFDA	Output 2.1.3	Through inspection and monitoring, BFDA ensure food hygiene requirements from primary production till consumption and set out the necessary hygiene conditions for producing food that is safe and suitable for human consumption. The food processors and handlers get registered with BFDA for licence for food hygiene compliance.

[170] http://www.nec.gov.bt/projects/details/least-developed-countries-ldc-initiative-for-effective-adaptation-and-resilience-life-ar last accessed 10/06/22.
[171] These standards and guidelines complement each other and will implemented in conjunction with each other, as is the usual procedure in Bhutan.

			Basic food handling training will be provided by BFDA. BFDA carry out the feasibility, preliminary, factory, follow up and surveillance inspection. Laboratory testing of the foods is mandatory.
Bhutan Organic Standard BOS 01:2019	BFDA and NOP	Output 1.2.1 Output 2.1.1 Output 2.1.3	Interested growers would register with BFDA, and based on their proposal, the technical review team at BFDA will conduct the study. After meeting the organic standards, BFDA will grant certification and facilitate the signing of a legally enforceable agreement between the growers and BFDA. Once the certificate is granted, BFDA will conduct annual surveillance. This certificate remains valid for three years.

The project will comply with the above and any other relevant national standards further identified during project inception and implementation, but will also adopt best practice international guidelines, for reducing vulnerability and promoting sustainable development while addressing climate change impacts. In this regard, the AF's environmental and social standards are invaluable and will be adhered to, as is further indicated in Section II.N, and as is set out in the project environmental and social management plan (ESMP) (**Annex 7**).

H. Avoiding duplication with other funding sources

There is no index-based microinsurance for smallholder farmers in the country; thus, the project will not duplicate any other funding sources in terms of the roll-out of this adaptation financing innovation in Bhutan. In order to implement index-based microinsurance at scale under the LIG through an integrated approach to rural resilience, the project will actively build upon and synergise with existing and planned interventions in the project localities. This approach will leverage and strengthen existing and planned interventions of the RGoB and development partners, thus promoting efficiency and sustainability for the LIG as well as for the relevant interventions. The main relevant initiatives, all of which are executed by the RGoB, are (i) the RGoB/IFAD/WFP BRECSA project, funded by the GAFSP. Where the project shares geographical targeting with BRECSA in the district of Tsirang, it will build upon BRECSA's climate-resilient production, value chain and marketing activities; (ii) the Commercial Agriculture and Resilient Livelihoods Enhancement Programme (CARLEP), with which the project will have synergies in Lhuentse and Trashigang; and (iii) the AF-funded Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan, with which the project will have synergies in Dagana and Tsirang.

Project Title Amount	Funding / Accredited and Implementing institutions	Timeframe / locations	Strategy / activities	Complementarity with proposed Bhutan WFP AF Large Innovation Grant project
ONGOING				
Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscape and Community Livelihoods in Bhutan Amount: US$ 13.9 million	Funding Agency: Global Environment Facility (GEF)- LDCF Accredited Entity: United Nations Development Programme (UNDP) Executing Agency: Gross National Happiness Commission (GNHC)	2017-2023	Enhance institutional capacity for integrated landscape management (ILM) and climate change resilience; Biological corridor system governance and management system at pilot corridors; Provide climate resilient livelihood options for communities through diversification, SLM and CSA and livestock management supported by enhanced infrastructure; Knowledge Management and lesson sharing	The LDCF project will invest in a range of adaptation measures, including climate-resilient irrigation and road design, crop diversification; creation of biodiversity and conservation-oriented jobs, enhanced markets and market accessibility, and SLM, which will generate valuable lessons, potentially to be integrated into the final design of the AF LIG. Study was carried out on compensation insurance in 2016 for crops (climate-related and wildlife), which has been used in the insurance pre-feasibility study of the LIG'.
The Food Security and Agriculture Productivity Project (FSAPP) Amount: US$ 8 million	Funding Agency: Global Agriculture & Food Security Program (GAFSP) Supervising Entity: World Bank Executing Agency: DoA	2019 - 2025 SW Districts: Chukha, Dagana, Haa, Samtse & Sarpang and in 24 of the total 58 Gewogs in the 5 Districts[172]	To increase agricultural productivity and enhance access to markets for farmers in selected gewogs in south-west Bhutan.	The geographical overlap with the FSAPP project is in Dagana district; however, the FSAPP is not present in each of the gewogs of Dagana and the exact localities for the AF project are not yet decided. Where there are overlapping localities, the project will build on and not duplicate the agricultural productivity and enhanced access to markets activities of the FSAPP.
Supporting Climate Resilience and Transformational Change in the Agriculture Sector in Bhutan Amount: US$ 58 million	Funding Agency: Green Climate Fund Accredited Entity: UNDP Executing Agency: GNHC	2020 - 2025 8 target Districts: Dagana, Punakha, Trongsa, Tsirang, Sarpang, Samtse, Wangdue Phodrang and Zhemgang	Aims to enhance the resilience of smallholder farmers through integrated climate-resilient agriculture. Includes adaptation of irrigation, soil and water management; community seed production and multiplication and cultivation of climate-resilient crop alternatives; scaling up of sustainable land management (SLM) technologies to support soil and slope stabilization; climate resilient roads for market access.	Where there is a geographical overlay of implementation localities in Dagana and Tsirang districts, the project will facilitate linkages with the climate services developed under activity 1.2 of the GCF project, which is "Tailored climate information and related training to local government and farmers to interpret and apply climate risk data to local and household level agriculture planning" and includes developing climate services. The project will not duplicate any of the activities of the GCF project, but rather will leverage off them, and provide resources to enhance their effectiveness – for example in terms of gender-

[172] Chukha: 5 Gewogs: Bongo, Doongna, Getana, Maedtabkha and Samphelling; Dagana: 5 Gewogs: Drukjeygang, Karna, Karmaling, Lhamoi Dzingkha and Nichula; Haa: 4 Gewogs: Gakiling, Uesu, Samar, Sangbay; Samtse: 5 Gewogs: Dophuchen, Norbooganag, Sang- Ngag-Chhoeling, Tading and Tendruk; Sarpang: 5 Gewogs: Gakiling, Shompangkha, Dekiling, Samtenling and Tareythang.

Project Title Amount	Funding / Accredited and Implementing institutions	Timeframe / locations	Strategy / activities	Complementarity with proposed Bhutan WFP AF Large Innovation Grant project
				responsive digital dissemination – where required.
Bhutan for Life Amount: US$ 118.3 million	Funding Agency: Green Climate Fund Accredited Entity: WWF Executing Agency: MoAF	2017 - 2032	To support improved management of the country's Protected Areas, providing time and resources for the government to secure long-term revenues to maintain the improvements.	There is no overlap with the proposed project.
Strengthening Risk Information for Resilience Amount: US$ 3.51 million	Funding Agency: World Bank, Japan, EU Executing Agency: Department of Disaster Management; Department of Agriculture; National Center for Hydrology and Meteorology; Ministry of Works and Human Settlement	2022 – 2025 MHR-DSS: nationwide coverage 11 gewogs for agro-met advisories:	Will generate nationwide multi-hazard risk assessment, focusing on high-risk hazards (earthquakes, floods and landslides); and develop web-based & mobile applications on climate/disaster risks. Will provide agro-met advisories to 5,140 households in 11 gewogs, by increasing the Agromet Decision Support System's weather forecast range from 3 days to 10 days, to enhance pest advisories and disease forecasting. Includes Climate Field Schools for farmers; and using drones to undertake a detailed survey of landslide hotspots along road networks.[173]	The scope of the AF project will go beyond that of the WB/Japan/EU-funded project, to include a wide range of risks facing smallholder farmers and may include increased heat and heatwaves. Drought, heavy rainfall, flooding, hailstorms, heavy winds, etc. The AF project will build on and strengthen the DS for MHR, and, where there is geographical convergence, will leverage and strengthen where necessary the system of agro-met advisories developed.
Strategic Program for Climate Resilience (SPCR) Amount: US$ 1.5 m (PPG)	Funding Agency: Climate Investment Fund (CIF) Accredited Entity: GNHC Executing Agency: GNHC		Water security focus. Preparedness to risk posed by GLOFs and climate induced disasters including flash flood-assessment of flood hazards Hydro met modernization, 4 long term studies & curriculum development	No duplication with the proposed project.

[173] https://www.worldbank.org/en/news/press-release/2021/12/10/world-bank-supports-bhutan-to-strengthen-climate-and-disaster-resilience

Project Title Amount	Funding / Accredited and Implementing institutions	Timeframe / locations	Strategy / activities	Complementarity with proposed Bhutan WFP AF Large Innovation Grant project
Commercial Agriculture and Resilient Livelihoods Enhancement Programme (CARLEP)	IFAD	2015 – 2025 Six eastern districts, plus four districts in the central and southwest	Focuses on marketing and climate resilient farming practices. Included a home-grown school feeding approach.	The AF LIG will not duplicate but will build on the marketing and climate resilient farming practices of CARLEP where there is geographical overlap, as described under Component 1 and Component 2 of the proposed project.
Building Resilient Commercial Smallholder Agriculture (BRECSA) Amount: US$ 13 million + US$ 8 = US$ 21	Funding Agency: GAFSP and IFAD Executing Agency: Ministry of Agriculture and Livestock (MoAL) Supervising entities: IFAD and WFP	2023 – 2027 Central and central-south districts: Zhemgang, Trongsa, Tsirang, and Sarpang	Commercialisation of agricultural value chains toward resilient food systems and post-COVID economic recovery in Bhutan. Includes capacity building and investment support to small-holder farmers on production, marketing, and better access to services (technical, financial, and business) for engaging in profitable value chains as vegetables, dairy, livestock, poultry and high value crops (herbal, aromatic, medicinal and spices). SLM / GAPS technologies include permaculture. Will enhance production of nutri-cereals for food diversity (wheat, buckwheat, millets and quinoa); and includes actions to manage human-wildlife conflict. Will develop multistakeholder district and sub-district level agriculture resilience plans. Creation of youth farmer network. Market access infrastructure and linkages.	The proposed project will leverage on BRECSA's support to production and climate-resilient and nutritious value chain development and marketing, and thus geographical convergence will be developed. Where the LIG's microinsurance activities are implemented in Tsirang, which is one of the BRECSA districts, this will provide a risk transfer mechanism that enables integrated resilience building. The specific entry points and modalities will be further developed during full proposal development and project inception phase. BRECSA will include WFP's Consolidated Livelihood Exercise for Analysing Resilience (CLEAR); as this will cover the entire country, and is expected to be completed before the proposed project begins, the LIG will make use of the disaggregated livelihoods and climate risk information in the project inception stag,; as well as in local level planning and implementation of the LIG. BRECSA includes extending the reach of digital financial products and services to women; this will be directly leveraged through geographical convergence with the LIG implementation districts.
Adaptation to Climate-induced Water Stresses through Integrated	Funding Agency: Adaptation Fund Accredited Entity: Bhutan Trust Fund for	2023 – 2027 FP approved in Oct 2022	Watershed Management, Irrigation and Drinking Water Supply project (infrastructural developments for water accessibility). Will *inter alia* support the upscaling of PES schemes in project districts. Output 3.2 will	The climate services activities planned under Output 3.2 of the BTFEC project will be leveraged and the system of agro-met advisories to be developed will be strengthened if necessary, where there is

Project Title Amount	Funding / Accredited and Implementing institutions	Timeframe / locations	Strategy / activities	Complementarity with proposed Bhutan WFP AF Large Innovation Grant project
Landscape Management in Bhutan Amount: US$ 9,998,955 million	Environmental Conservation Executing Agency: DLG, National Soil Center, MoWHS, MoAL	13 gewogs in 3 districts (Dagana, Tsirang and Paro)	"support the roadmap of agro-met services in Bhutan for better climate informed digital advisory services", with CS packaged end-to-end with other project activities. Output 2.3 includes 'Innovative technologies for tapping water adopted', which includes small earthen check dams and ponds. The project will also establish climate- and disaster-resilient irrigation infrastructure under Output 2.2.	geographical convergence with the proposed project in Dagana and Tsirang districts. The project can also benefit from the development of 8 crop suitability and feasibility maps under the BTFEC project. The project will build on SLM activities in vulnerable and degraded areas under Output 3.1 of the BTFEC project.
Local Climate Adaptative Living Facility (LoCAL) Amount: US$ XX million	Funding Agency: UN Capital Development Fund (UNCDF); EU Executing Agency: Department of Local Governance; with the Ministry of Finance	Since 2011. 3rd phase: 2022 - 2026 Covers 100 of the 205 Gewogs across 16 of the 20 Districts	Support to Local Governments in Bhutan to enhance community resilience and adaptive capacity for climate change through a system of performance-based climate resilience grants (PBCRGs). Activities include renovation of irrigation channels and farm roads, protecting rural water sources, SLM activities such as slope stabilisation and integrated soil management, and introduction and promotion of more resilient crop varieties and agricultural technologies.	Under Component 1, the proposed project will build on the local adaptation planning processes and capabilities developed under LoCAL, and enhance the integration of climate services and climate risk management into existing local level adaptation planning and development processes.
Bhutan: Rural Finance Development Project Amount: US$ 20 m concessional loan + TA	Funding Agency: ADB Executing Agency: Department of Macroeconomic Affairs, Ministry of Finance	2020 – 2025 Nationwide	Focus is on enhancing access to finance for rural cottage and small industries (CSIs), to increase rural employment and promote economic development, by (i) expanding collateral-based rural CSI financing through Bhutan Development Bank (BDB), Bhutan's key rural finance intermediary; (ii) extending, through BDB, non-collateral-based group loans to rural CSIs that lack assets; (iii) strengthening BDB's institutional capacity, including enhancement for rural CSI financing operations; and (iv) providing financial literacy training and business development support to rural CSIs, in particular CSIs owned by small and marginal farmers and women.	The proposed project will leverage off the activities of the ADB-funded project, to promote access to rural finance opportunities for the LIG project beneficiaries. Linkages will be facilitated for project beneficiaries to the financial literacy training and the appropriate rural financial products.
UNDER PREPARATION				

Project Title Amount	Funding / Accredited and Implementing institutions	Timeframe / locations	Strategy / activities	Complementarity with proposed Bhutan WFP AF Large Innovation Grant project
Advancing Climate Resilience of Water Sector in Bhutan (ACREWAS)[174] Amount:	Funding Agency: GEF- LDCF Accredited Entity: UNDP Executing Agency: Ministry of Works and Human Settlement	At preparation stage Gasa, Punakha, Wangduephodrang, Tsirang	Primarily concerned with water governance, nature- based solutions for sustainable and climate- resilient watersheds,and climate-proofing water supply infrastructure.	No expected duplication with any proposed proposed project activities. This will be confirmed once the project concept is available/
Enhancing Climate Resilience of Water Sources in Bhutan Amount: US$ 20 m	Funding Agency: GCF Accredited Entity: FAO Executing Agency: MoAL	At preparation stage 6 districts: Haa, Bumthang, Trashiyangtse, Lhuntse, Sarpang, Chhukha	Primary focus: irrigation and drinking water, emphasising springs and spring sheds. Will collabourate with NCHM on improving weather data for Impact-based forecasting on pests etc. Will also work on improving yields and post-harvest loss at HH level.	Should there be a geographical overlap, the LIG will leverage off the climate services activities of the GCF project and provide additional resources to enhance these e.g. with respect to gender-responsive digitalisation. Synergies will be sought with the production and PHL activities.
Biodiversity Finance Initiative (BIOFIN) Amount: US$? m	Funding Agency: EU and various donors Executing Agency: UNDP; Ministry of Finance; Dept. of Tourism; Dept. of Forests & Parks; MoAL; MoENR	2nd phase 2023 – 2030 Under design – concept note for Solution 4 has been developed. Implementation expected to start in 2024.	BIOFIN aims to increase resources for biodiversity conservation, through 4 solutions: - Enhancing Results Based Budgeting Implementation through Ecological Fiscal Transfers - Mainstreaming Biodiversity Finance and Finance Solutions into Local Govt Plans - Increased Revenues from Eco-Tourism Fees in Parks and Conservation Areas - Redesigning Human-Wildlife Conflict (HWC) Scheme	Solution 4 on HWC is relevant as this entails designing an insurance scheme for HWC. This will be piloted in 10 villages in Trongsa and Zhemgang. A gap assessment is being conducted and a white paper would be developed in July 2023. Conceived as a smart subsidy approach with different layers – which is consistent with the proposed project approach to microinsurance. Although there is no geographical overlap, it is important that complementarities are identified and harnessed so that the proposed project microinsurance to cover climate risks and the BIOFIN HWC insurance are synergistically designed, as both would ultimately have nationwide coverage. Bhutan is a small market and any products to be developed that target smallholder farmers must not duplicate but work together to create a package of protection for farmers. Ongoing discussions with the project design team in this regard will continue into the project inception stage.

[174] https://www.thegef.org/project/advancing-climate-resilience-water-sector-bhutan-acrewas

I. Learning and knowledge management

Learning and knowledge management in the project will be tailored to support innovation substantiated through evidence generation, in partnership with research institutions. To promote systematic learning and dissemination of this, the project will develop and implement a learning, knowledge management, and communication (L,KM&C) strategy. This will draw on lessons learned from the ongoing CARLEP project; the CARLEP Knowledge Management officer will be invited to the planning sessions to develop the L&KM strategy in the early stages of implementation.

Guided by the L,KM&C strategy, the project will develop targeted knowledge and use this to enable and scale up an evidence-based approach to institutionalising the project's innovative approach to climate risk management. Output 1.2.3 will focus on developing the project's L,KM&C strategy and on designing a feedback loop for learning from a range of activities that take place on the ground. This will include the feedback loop to continuously improve the insurance product, which will include *inter alia* feeding back the daily rainfall data on a monthly basis to the project management unit, as well as National Centre for Hydrology and Meteorology (NCHM) and the Department of Agriculture. Lessons learned from the insurance customer journey study will also be consolidated and appropriately disseminated under the L&KM strategy (Output 1.2.3). The L,KM&C strategy will include appropriate knowledge products to be developed where necessary – for example, policy briefs that describe the process of rolling out the microinsurance in Bhutan, and on the role of multistakeholder partnerships in enabling the creativity of Bhutan's innovators to have a greater impact on rural resilience and adaptation to climate change.

As noted under Part II.B, rolling out the primary innovation of microinsurance will be carried out in a way that promotes integration of secondary, local-level innovations that have demonstrated effectiveness in the project localities, thus leading to new knowledge and practice on innovation for rural resilience in Bhutan. This process of integration between the primary mature innovation of index-based microinsurance with secondary Bhutanese innovations will be carefully documented so that the new knowledge developed can be shared more broadly, and evidence generated to substantiate its effectiveness. This innovation process will include building on traditional and cultural knowledge and practices, for example to strengthen dissemination of targeted and localised climate services. These elements will also be carefully documented for further dissemination.

Research institutions such as the ARDCs, the CNR and the College of Science and Technology (CST), will play an important part in evidence generation for the project, so that the impact of innovative project activities is regularly analysed and documented, for policy advocacy within Bhutan and to share lessons regionally and globally. The project will document the experience with and impact of the integration of secondary innovations with the primary innovation of index-based microinsurance, as well as conduct key studies necessary to promote the institutionalisation of the project's approach and the sustainability of the insurance scheme, as further detailed under Component 3.

The project will include activities to support dialogues on innovation between research organisations and climate-vulnerable communities to engender action as well as a sense of hopefulness in rural areas with empty households and high youth unemployment (output 1.2.3). Through specialised services provided by research institutions such as the College of Natural Resources (CNR), a regular series of dialogues will be carried out within and between the project districts, to promote farmer-to-farmer learning, farmer/researcher/extensionist learning, and cross-district learning involving all these stakeholder groups, as well as the agricultural system at different levels.

When the customer journey is tracked and documented (output 2.1.1) , this will include learning from the supply side – the insurers and the distribution channels – so that their experiences and learnings are also documented. The continual process of adaptive management that will take place during the project, as the product and the performance of the index are formally discussed on an annual basis, will similarly be documented. Amongst other results, this is expected to help with dispelling risk perceptions about the index insurance approach and hopefully also to expand the scale of investors in climate risk insurance in the future, both within and beyond Bhutan.

Finally, the project will ensure that good practices and lessons learnt from promoting gender equality evidenced through the project are shared effectively and continuously amongst stakeholders, and that these inform policy/decisions at national and local levels. Within Bhutan, the project will make use of existing innovation platforms and events to share good practices and learn from other initiatives, including the recently launched National Innovation Platform (NIP) of Bhutan, 'Naykap Gokab', and the Bhutan

Climate Futures Lab[175]. Under the new Japan/UNDP project "Promoting Technologically Enabled Agriculture for the Vulnerable Farming Population in Bhutan", activity 3.2 aims to support the creation of an Innovation Lab that will organise open innovation challenges and scaling of viable innovative digital solutions in agriculture such as precision farming. No further details on this 1.5 year project were available at the time of finalising this proposal; the project team will ascertain during the inception period whether this Innovation Lab has been established and will constitute a further suitable platform for learning and sharing on agricultural innovation.

The project will also disseminate knowledge gained and enhance its own learning process through selected relevant regional and international structures and processes, such as the #ClimateShot Action Agenda for Innovation in Agriculture launched at COP26[176]. The most appropriate international structures and processes will be identified during the development of the project's L,M&C.

Thus the project's L,M&C strategy will be implemented through the activities developed under specific outputs (primarily outputs 1.2.3, 2.1.1, and 3.1.1); appropriate L&KM targets have been set in the project results framework.

J. Consultative process

The project team adopted a participatory approach to the development of the Concept Note and the Full Proposal. For the CN, this included four national-level stakeholder consultation workshops, a series of bilateral consultations with a range of stakeholder groupings, six community consultations meetings held in three districts, and a final focused validation workshop. For the FP, a multi-stakeholder Task Force was established to oversee the project development, which comprised representatives of the Department of Macro-Fiscal and Development Finance (DMFDF) of the Ministry of Finance (MoF), in which the Designated Authority (DA) of the AF for Bhutan is located; the Policy and Planning Division, Ministry of Agriculture and Livestock (MoAL); the Department of Agriculture (DoA); the microfinance institutions: RENEW and Taryana); insurance companies: Royal Insurance Corporation of Bhutan (RICB) and Bhutan Insurance Limited (BIL); the National Commission for Women and Children (NCWC); and the Youth Development Forum (YDF). The Task Force met on a regular basis, with additional stakeholders invited when appropriate. In addition to the Task Force meetings, a series of bilateral consultations with a range of different stakeholders was conducted from January to September 2023, and local and community consultations were held in 12 localities in the four project districts (three per district) to develop the full proposal.

The consultations aimed to understand the key policy priorities and programmes of the RGoB in responding to climate change, key climate risks facing smallholder farmers in Bhutan, their coping responses and adaptation needs, their experience with and ability/willingness to pay for agricultural insurance, the available services for enhancing the resilience of smallholder farmers and gaps in these services, as well as the opportunities and challenges facing the insurance ecosystem in the country. The findings of the consultations have been used to shape the outcomes, outputs and activities of the FP, in order to overcome identified barriers. They directly address key priorities raised by community members and national stakeholders, and indeed the entire project has been structured around the need for affordable insurance for smallholders, which, together with associated risk reduction, livelihoods diversification, access to markets and savings, will help them to make their livelihoods more climate resilient. In addition, a multi-stakeholder validation process was convened by the-then GNHC to validate the final draft of the CN prior to submission to the AF; and the MoAL convened a multi-stakeholder validation process to approve the final draft of the FP prior to submission to the AF.

Five national-level stakeholder consultation workshops were held at important stages in the development of the Concept Note: (i) An initial multi stakeholder consultation was held in Punakha between September 28 – 29, 2021 led by the former Gross National Happiness Commission (GNHC), as the previously Designated Authority to the AF of the RGoB for the Large Innovation Grant (LIG). The objectives of the workshop were to (i) provide background on the proposed proposed project; (ii) discuss and agree on the focus for the LIG project; and (iii) agree on the stakeholder and community consultations process for the LIG. The workshop generated 11 possible innovation focus areas to consider, including both local innovations and those from other countries/regions. Additional analysis after this workshop resulted in the prioritisation of climate risk management through index-based microinsurance for smallholder farmers as

[175] https://www.weforum.org/projects/bhutan-climate-futures accessed 31 July 2023.
[176] https://www.climateshot.earth, accessed 31 Jul 2023

the preferred innovation, as described in Part II.K below. (ii) A second multi-stakeholder consultation was held in Thimphu on 29 October 2021 to investigate in more detail the status of crop insurance in Bhutan, including challenges faced by farmers and those attempting to institute insurance schemes. The objectives of the workshop were to: (i) better understand the needs of crop insurance in Bhutan and; (ii) present WFP's integrated approach to weather-index insurance as a potential solution to Bhutan's challenges. This workshop was mainly focused on the agriculture sector. (iii) A third multi-stakeholder consultation was held in Thimphu on 15 June 2022 to present the framework of the proposed project and to agree the project components, outcomes and outputs. In addition, WFP provided a recap of the AF criteria, the process undertaken to date to develop the CN, and next steps. There was general consensus from participants that the project goal and objectives were correct and are in line with the policy priorities of the RGoB and with the needs of vulnerable farmers on the ground. The participants also agreed on the project outcomes and outputs as presented. (iv) A fourth multi-stakeholder workshop, mainly focused on the insurance sector, was held in Thimphu on 23 June 2022 to present and discuss (i) a summary of findings from the various consultations held with communities, relevant agencies of the RGoB, insurance companies, banks and rural microfinance institutions; and (ii) types of insurance available in the market, key characteristics and their suitability for Bhutan's context. (v) A multi-stakeholder validation workshop was held in Thimphu on 20 July 2022, to validate the draft CN prior to its submission to the AF. This was attended by participants from the RGOB, insurance companies, micro-finance institutions, the NIE for the AF (Bhutan Trust Fund for Environmental Conservation), and WFP.

During the development of the full proposal, the project team held a number of focused multi-stakeholder workshops with the task force. These were: (i) meeting of the task force on 9 May 2023 (9 participants) to present and discuss the vulnerability assessment and initial climate-risk based crop suitability assessment and provide emerging details on the insurance feasibility study, at which the task force recommended that the community consultations be conducted in the four pre-identified districts of Trashigang, Lhuentse, Tsirang and Dagana to ground ground-truth the findings of the multi-criteria analysis (MCA); (ii) meeting of the task force on 9 June 2023, with 8 participants, to provide an update and discuss the findings of the community consultations based on two gewogs in Trashigang, and to discuss initial findings of the insurance feasibility study; (iii) presentation of the findings of the insurance feasibility study to the task force (13 participants) on 2 August 2023; and (iv) meeting of the task force on 10 August, attended by 13 participants, to provide a progress update, discuss the project implementation arrangements, and present and discuss the proposed insurance model. The task force provided valuable inputs to refine the project outputs and activities on each of these occasions and validated key deliverables.

Please see **Annex 4** for further details on these workshops, including the participating stakeholders.

In addition to the stakeholder workshops, a range of bilateral consultations was conducted throughout the CN and FP development process to better understand the ongoing programmes and projects, roles and needs and priorities of agencies relevant to index-based microinsurance and climate risk management for smallholder farmers. These agencies included government agencies: DoA, the former Gross National Happiness Commission (GNHC), which is now the the Department of Macro-Fiscal and Development Finance (DMDF) of the Ministry of Finance (MoF), National Centre for Hydrology and Meteorology (NCHM), National Commission for Women and Children (NCWC), National Environment Commission (NEC); Royal University of Bhutan (RUB) (College of Natural Resources (CNR), development partners: Bhutan Trust Fund for Environmental Conservation (BTFEC), United Nations Development Programme (UNDP), WWF Bhutan, and Food and Agriculture Organization (FAO); banks and corporations: Royal Insurance Corporation of Bhutan (RICB), Bhutan Development Bank Ltd. (BDBL), National Development Cottage and Small Industry (CSI) Bank Ltd), Bhutan Insurance Limited; civil society organizations: Youth Development Fund (YDF); cooperatives: Agro-Logistics Marketing Cooperative; and private sector/ microfinance: RENEW (Respect, Educate, Nurture and Empower Women) Microfinance Private Limited and Tarayana Microfinance Limited.

Some key points raised by stakeholders for consideration in the project design were: (i) There are high levels of interest in crop insurance as a potential solution for reducing the risks faced by the farmers, it is a policy priority of the RGoB but an earlier attempt to initiate this with RICB was not implemented due to technical considerations and the unaffordability of a government subsidy of the premium, exacerbated by the decline in the economy related to the COVID-19 pandemic; (ii) post-harvest loss, irrigation, shortage of labour, and wildlife damage to crops are highly significant issues; (iii) there are concerns about the continually reducing number of people engaging in agriculture; (iv) there are challenges with providing accurate localised agro-meteorology services due to Bhutan's terrain and multitude of micro climates; (v) organic production is a policy priority and certification of organic farms started in 2018 by Bhutan Agriculture and Food Regulatory Authority (BAFRA), a challenge is the availability of bio-fertilizers and bio-pesticides;

(vi) the DoA's recommendation was to focus on commercial crops such as potatoes, vegetables, chillies, tomatoes, oranges and apples, cardamom, organic cherry, strawberries, quinoa, etc.; while rice is the most important part of Bhutanese diet, it is not highly commercial; (vii) while a number of initiatives have supported this, the understanding of climate smart agricultural technologies on the part of farmers and even extension officers is quite shallow and the project could play a valuable role in enabling the DoA to consolidate and enhance the reach of this; (viii) climate suitability maps were developed with CIAT for major commodities, including quinoa; this was done several years ago but there is very little discussion or focus on this, however, the process to develop the National Adaptation Plan (NAP) conducted four sectoral assessments and a gewog-level vulnerability assessment which should be the basis for the project's own vulnerability assessment (ix) the main climate change-related risks are: excess rain/incessant rain, flash floods, landslides triggered by rain, windstorms, tropical storms, glacial lake outburst floods, drought and dry spells, and outbreaks of new pests and diseases; (x) affordability of crop insurance is a major concern; it will be important to include far-flung rural areas as they are significant affected by climate risks as well as human-wild life conflict; (xi) economy of scale is a challenge in Bhutan considering its small population; (xii) there is a need for insurance in the eastern parts of the country which are very dry, increasingly prone to erratic rainfall and windstorms, and lack development interventions.

The meetings with the National Commission for Women and Children (NCWC) and the Youth Development Fund (YDF) were particularly important as women and youth have been identified as two of the more vulnerable groups to the impacts of climate change in Bhutan. Some specific issues raised by these two organisations were: (i) there is a strong linkage between emerging challenges with climate change and disasters and increase in poverty which is directly affecting women and children, and there is not much in place to address these challenges – thus, innovative ideas are required; (ii) financial literacy trainings and awareness programmes are required, the illiterate portion of the population should not be left behind with the push to digitalization leading to a digital divide; (iii) projects should also be child responsive - with increasing responsibilities of women in agriculture, children are exposed to higher risks e.g. harsh weather and higher risk of child abuse; (iv) strong need to set up child care facilities when trainings are conducted so that women can participate comfortably; (v) when prioritizing crops, in addition to the commercial values, nutritional values should be considered as well to ensure economic benefits come without compromising on health benefits; (vi) a key challenge with engaging youth in farming is the need for continuous funding and training and technical support for longer periods, and there are good examples e.g. the Panbang Youth Cooperative for farming; (vii) the YDF has established the My Gakidh Village, the first of its kind in Bhutan with the goal of curbing rural-urban youth migration by providing sustainable livelihood skills and opportunities, and includes a natural (organic) farming youth cooperative in Toebesa village, Punakha district, among others; under a rehabilitation program, YDF has established Young Farmers Groups in 18 gewogs.

The national and bilateral stakeholder consultations included a total of 77 people, of which 20 were women. **Annex 3** contains a list of all stakeholders consulted at the national level.

Six sets of community consultations were carried out between April and June 2022 in six gewogs (blocks), two gewogs each in Paro, Punakha, and Dagana districts. Please see Annex 5 for a summary of the community consultations carried out to develop the Concept Note.

For the Full Proposal, a total of 12 community consultations were conducted, one in each of 12 gewogs, three per districts of Trashigang, Lhuentse, Tsirang, and Dagana. There were 194 people with 105 women (54.1 percent) and 90 men (46.39 percent), of whom 21 were youths (11 women and 10 men). Only 1 woman self-identified as a person with disability. Parallel with the community consultations, 133 local stakeholders, primarily from district and local government as well as business people, were consulted, consisting of 27 women (20.3 percent) and 106 men (79.7 percent).

Table 5. Participants in the community consultations to develop the full proposal

Community Consultation	Date	Gewog	Number of people (men/women/age)	Youth (15-24 years)	Disability
Trashigang					
Community consultation 1	3rd June 2023	Radhi	9 men (43-78 years) 2 women (43-74 years)	No youth	No disability
Community consultation 2	5th June 2023	Bidung	6 men (27-62 years) 10 women (25-56 years)	No youth	No disability
Community consultation 3	7th June 2023	Phonmey	8 men (23-53 years) 7 women (20-49 years	1 men 1 women	1 women
Lhuentse					

Community consultation 4	9th June 2023	Kurtoed	2 men (36-38 years) 5 women (32-68 years)	No youth	No disability
Community consultation 5	10th June 2023	Minjey	7 men (21-66 years) 4 women (21-55 years)	1 men 1 women	No disability
Community consultation 6	12th June 2023	Tsenkhar	2 men (25-56 years) 9 women (18-47 years)	3 women	No disability
Tsirang					
Community consultation 7	19th June 2023	Sergithang	12 men (21-74 years) 7 women (25-49 yeras	3 men	No disability
Community consultation 8	20th June 2023	Tsirangtoed	9 men (30-65 years) 15 women (19-70 years)	1 women	No disability
Community consultation 9	21st June 2023	Barshong	13 men (23-69 years) 7 women (27-63 years)	2 men	No disability
Dagana					
Community consultation 10	23rd June 2023	Larjab	14 men (21-49 years) 1 women (32 years)	2 men	No disability
Community consultation 11	24th June 2023	Khebisa	5 men (21-55 years) 17 women (20-48 years)	1 men 2 women	No disability
Community consultation 12	26th June 2023	Dorona	3 men (25-56 years) 21 women (19-65 years)	3 women	No disability

The main climate change-related risks faced by farmers in these gewogs are erratic rainfall, heavy rainfall, high temperatures, drought, hailstones, windstorms, flooding and landslides, heavy or no snow fall, and increased outbreaks of pests and diseases; other risks to smallholders which may have climate-related causes are damages to crops from wild animals, birds and rodents, or human-wildlife conflict (HWC). The most common climate risks across all districts were erratic rainfall and extreme heat, while forest fires were mentioned as a lesser risk (only in Kurtoed gewog, Lhuentse). In addition to direct climate risks such as erratic rainfall, increasing temperatures, windstorms, flooding and landslides, and drought, significant challenges for farmers as revealed in the community consultation are conflicts with wildlife, a lack of irrigation water, labour shortages, and post-harvest losses. Many farmers remember changes in rainfall patterns from more than a decade ago. The main support for agriculture advisories comes from the Extension Officers of the Ministry of Agriculture and Livestock, while additional support is sought from elder farmers. While farmers, both women and men, were forthcoming during the consultations process and indicated their willingness to continue farming and to participate in the project, they noted that labour shortages, financial resources, and availability of appropriate inputs at an affordable price were key barriers.

Financial services are provided in the form of credit from financial institutions mainly Bhutan Development Bank Limited followed by other banks such as Bank of Bhutan, and Bhutan National Bank. Informally, communities prefer to borrow money from their family members, friends, and business people in the community. Business people lend money on an interest basis that is slightly higher than bank rates, but easier to access. Most of the participants maintain their savings with banks (BDBL, BOB, and BNB), but these are short-term savings as they use the money as and when needed for daily expenses. They use their savings to purchase agriculture and livestock inputs, while women also purchase jewellery items or weaving materials.

Among the 12 Gewogs the overall monthly income is Nu 37,629.96 (approx. US$ 460) and the monthly expenditure is Nu 38,374 (approx. US$ 470). The income may be understated as participants were not willing to share their true income, while they did not hesitate to share their expenses. Major sources of income include the sale of agriculture and livestock products and off-farm incomes including remittances received through bank transfers from family members working abroad or in towns (mainly Thimphu). Major types of expenditure include the purchase of food items, clothing, schooling expenses, religious rituals, utilities, etc. Major expenses, as expected, were for education for children, household essentials like food and other groceries, and for the religious rituals and local festivals that happened either once annually, or 2-3 times a year.

Preparatory and coping mechanisms include the installation of electric fences against wild animals, using traditional varieties of seeds which are more resilient and drought tolerant, use of homemade remedies such as ash and cow's urine as well as chemical sprays (to a lesser extent) to protect from pests and diseases, use of mulching for soil moisture conservation, changing cropping times as per the weather and seasonal changes, increasing water use efficiency through water harvesting, and protected agriculture. Both women and men place considerable emphasis on rituals and prayers for rainfall at the right time and

for a good harvest. While the last point cannot be considered an adaptation action *per se*, as this is more a form of a local preparation and/or coping strategy, it was the prevalent response of farmers across the districts when asked about their agricultural adaptations.

Some of the issues raised during the community consultations were: (i) farmers are aware of increased frequency of extreme weather events, but they do not have data or are unable to quantify impacts and the losses they experience; (ii) farmers have issues with marketing supply chain that makes it difficult to sell products even in good years; (iii) farmers highlighted how weather forecasts are not always reliable, some use the daily forecasts for short term decisions but there is clearly a need for reliable, longer-term weather forecasts to support better planning of farm activities; (iv) there is awareness of insurance and interest in better understanding how weather index insurance would work, and an expressed demand for better crop insurance; (v) human-wildlife conflict is a significant challenge faced by famers.

Programmes implemented to help farmers to manage these risks include: (i) Support with climate resilient agriculture production materials/ interventions like electric fencing, water harvesting, efficient irrigation techniques like drip irrigation, promotion of climate resilient crops – drought tolerant and best adapted native varieties.; (ii) Verbal communication of daily weather forecasts and alerts via the gewog AEOs and gewog leadership, through which farmers are also made aware of possible disease outbreaks owing to weather conditions; and (iii) Demonstrations of climate resilient crop production technologies and GAPs.

The types of inputs and support provided to farmers include seeds, planting materials, fertilizers, plant protection inputs, greenhouses, HDPE pipes for irrigation, fencing poles and materials, inputs to support sustainable land management, land development on a cost sharing basis of 80:20, with farmers paying 20 percent. The costs of transportation of inputs are subsidized. Farm machinery is provided at a 50 percent subsidy. The community consultations provided important baseline information on gender-disaggregated income and expenditure for the insurance feasibility study, allowing a better understanding of ability to pay. In general, men were found to have a higher income than women across the four districts, validating the project's focus on 70 percent women beneficiaries.

The issues and priorities raised during the local and community consultations have been used to develop the project activities, as is explained in the narrative in section II.A and elsewhere in this proposal. Please see **Annex 5** for further details and findings of the local and community consultations.

A gender assessment was conducted in March 2022 to provide an overview of gender issues in Bhutan in the legal and socio-cultural context, highlight differentiated gender impacts of climate change specific to agriculture and smallholder farmers in Bhutan, and to provide gender-specific recommendations for how the project could address these identified risks and increase the resilience and adaptive capacity of women and all groups in an equitable and effective fashion.[177] This was updated in June-July 2023 to supplement and validate it with primary information collected during the local and community consultations held in June 2023. Additional gender perspectives obtained from the field are summarised in the following paragraph.

Women and men share the work on the farm in Bhutan. In addition, women are involved in household chores, weeding, collection of leaf litters, manure application, post-harvest and marketing. Crop guarding is done by both men and women. Normally, most manual tough works like digging, ploughing, and transportation are done by men. Men lead the farm works and women are also engaged in weaving and knitting. Women tend to do more of the light manual work (weeding, transplantation) whereas men do more of heavier work (ploughing). While women and men may work equal time, women tend to be paid less, and have other obligations such managing households and families. The women-headed households have no choice but to carry out the more demanding farm work like digging, guarding crops, land preparation, harvesting, transportation and marketing. Regarding livestock, in Dagana and Tsirang both men and women are involved in farm establishment, cleaning, feeding, milking, processing (milk products, chicken and pork) and marketing. Some women are involved in transporting livestock products or selling products in a market outlet. Men specifically do the slaughtering of animals for meat purpose. In Lhuentse, major livestock activities are undertaken by woman, as most of the time men are out of the home for off-farm activities. A key issue related to the available livestock insurance is that the premium is too high.

In general, risk mitigation strategies are the same for women and men. Both women and men access credit and savings accounts with the banks, BDBL, BOB, BNB, and life insurance is covered through the Gewog offices. Women have access to RMFPL microfinance schemes, if this is present in the gewog. In Tsirang

[177] Collection of primary information and data in the field was not possible in March 2022 due to the stringent lockdown and travel restrictions imposed by the RGoB after the Omicron outbreak of the COVID-19 pandemic. Thus, information and data were gathered extensively from secondary sources and studies conducted on the gender-climate-agriculture nexus in the Bhutanese context by National Commission for Women and Children (women's machinery in the country) and international organizations.

and Dagana, the women's group of Khebisa were very positively oriented towards insurance. Women are actively involved in farmers' groups, with several farmers' groups across the four districts formed by women. However, in general, women are less involved in the marketing of agricultural products.

The findings of the Gender Assessment have been integrated into the design of the FP, as have the key recommendations, which can be summarised as: (i) Recognize and support **women's under-valued contributions** to household and community livelihoods which is an important strategic element to build household and community resilience; (ii) Support **empowerment and leadership-building of rural women**, and facilitate rural men to support women's empowerment, leadership, voice and participation; (iii) Project to **target more women than men (60:40); especially female-headed households** that are more food insecure; (iv) Promote **inclusive, active and meaningful participation of female farmers** in all activities, **including during the insurance feasibility assessment** and prototype testing of the index insurance, so that they are equally and effectively consulted; (v) NRM / climate-smart agriculture activities should be gender-inclusive and **designed to reduce or at least not increase women's** workload; (vi) Ensure **rural women's equitable access to index-based microinsurance** since limited access to credit and finance is one of the major challenges constraining rural women; and (vii) include a **gender-specialist** with adequate gender knowledge in the local context throughout project implementation. Please see **Annex 1** for a more detailed summary of the Gender Assessment.

K. Multiple perspectives on innovation

Multiple perspectives on innovation were first canvased at the initial stakeholder workshop held on 28 - 29 September 2021, in Punakha, Bhutan, as described in Part II.J. The workshop brought together a diverse range of relevant stakeholders, including the GNHC, MoAL, District Agricultural officers, and planning officers from the districts. Through a two-step participatory process, the participants identified a long list of 11 possible innovation focus areas to consider for the LIG, which included both local innovations as well as innovations from other countries / regions.

A systematic approach was adopted for a preliminary screening of the 11 identified options, using criteria that included the climate risks addressed by the innovation; the proposed project innovation criteria; RGoB policy priorities; WFP comparative advantage; and whether the proposed intervention would duplicate existing or pipeline programmes/projects. Five of the 11 proposed focus areas definitively did not meet the proposed project criteria and four were not deemed to be sufficiently innovative or clearly duplicated other existing and planned interventions. Further discussions between key stakeholders, including the then GNHC, MoAL, and WFP resulted in the prioritisation of climate risk management through index-based microinsurance for smallholder farmers as the preferred innovation. This innovation focus was further discussed and validated through discussions with a broader range of stakeholders, including through the community consultations process and interrogated in the findings of the gender assessment. These further discussions to seek additional points of view and validate and fine-tune the identified innovation priority resulted in valuable additional perspectives on innovation being integrated into the project concept, including that the project should be designed to embrace the integration of secondary innovations from the grassroots level and from innovative extension practices, as described in Part II.B.

During FP development, an Innovation Workshop was held on 8th August 2023 in Thimphu. It was attended by 15 participants and identified a range of secondary innovations to accompany the primary innovation of climate risk insurance for smallholder farmers. A robust landscape of secondary innovations on climate-resilient agricultural technologies and inputs was identified, with good inputs from the DoA, ARDCs, and the CNR, as well as representatives from farmers' organisations. Participants identified a limited set of financial services secondary innovations; these have been complemented by the inputs from the CRI team at HQ. The secondary innovations identified have been consolidated and set out in this proposal.

The project team additionally received inputs from the WFP Innovation Accelerator (IA), which sources, supports and scales high-potential solutions to end hunger worldwide, regarding potential support in the roll-out of the project's innovation strategy. The IA can provide added value through scaling up of the innovation of index insurance, by sourcing, qualifying and scaling up the best available technology-based solutions to accelerate for example the payout process, as well as the transparency the microinsurance, and was actively seeking innovative solutions through the WFP Innovation Challenge 2022 to enhance specific elements of WFP's microinsurance process, such as monitoring systems for insurance products and indexes to increase transparency of the end-to-end process for all stakeholders.[178] Additional

[178] https://innovation.wfp.org/apply last accessed 04/07/22.

discussions will be held with the IA during project inception in terms of sourcing, qualifying, and scaling up tech-based solutions for enhancing and scaling up microinsurance delivery in Bhutan.

Discussions were held during the CN and FP development with Bhutan Trust Fund for Environmental Conservation (BTFEC), which is accredited as a national implementing entity of the AF and has recently received a grant of USD 250,000 from the AF Small Innovation Grant facility. This is being used to conduct a study on the innovation of bio-pesticides for Giant African Snails, over a five year period. The study will validate trapping systems and develop strategies to eradicate this pest and raise awareness of the farmers. During project implementation, the LIG will ensure that all synergies are captured between the innovation process carried out under this small grant and the LIG activities.

Additional fruitful discussions on enhancing the primary innovation were held with research and academia, in the form of the Research and Extension Division of the DoA, including the NCOA of the DoA, and the College of Natural Resources (CNR) of the Royal University of Bhutan (RUB). The CNR recently completed a study on progressive farmers in Bhutan that highlights additional lessons and innovations that have been integrated into the full project design, which also includes activities to support dialogues on innovation between research organisations and climate-vulnerable communities to engender action as well as a sense of hopefulness in rural areas with empty households and high youth unemployment.

Finally, the project team has had discussions with Tarayana Micro Finance Limited (TMFL), which was recognized as one of the winners in the Climate Innovation Challenge organized by the Asian Disaster Preparedness Center (ADPC) in 2021. This challenge aimed to crowdsource innovative and disruptive technology solutions from around the world for resilience in South Asia. Through this challenge, TMFL developed an in-house application for loan appraisal in collaboration with Gasa District which cuts down the appraisal time by 50 percent. This innovation is expected to be incorporated into the roll out of microinsurance under the project.

L. Full cost of adaptation reasoning

Component 1

Baseline scenario: Bhutanese smallholder farmers, who are increasingly women, face a range of challenges and barriers in increasing their agricultural production and incomes, and diversifying their livelihoods so that they are more climate resilient. Smallholder farmers who rely mainly on rain-fed agriculture are already affected by unpredictability in the timing of monsoons, and localised water shortages and prolonged drought in some areas.[179] At the same time, farmers, especially women who predominate in the agricultural sector, lack a credible risk transfer mechanism such as affordable crop insurance that could prevent them from resorting to negative coping strategies, and have insufficient access to the climate-resilient agricultural approaches, technologies and finance that they could harness to enhance the resilience of their agriculture-based livelihoods and address the climate impacts already experienced, and prepare for the future climate risks. Under the baseline scenario, it is likely that the increasing trend of migration out of rural areas and of 'empty households' will continue, with negative effects on household and national food security, as well as on social and cultural wellbeing.

Additionality: Under the project, smallholder farmers of whom at least 70 percent will be women will gain increased understanding of current and future climate risks and be able to address these through enhanced access to climate-resilient agricultural approaches and technologies targeted to their livelihoods, such as GAPs, conservation agriculture and organic production. They will be sensitised on the benefits of index insurance and supported and incentivised to adopt this through coverage of the premium on a decreasing scale through the project's graduation strategy. Smallholder farmers will be supported to take more climate risk informed decisions through enhanced access to more targeted climate services and participation in coherent adaptation planning processes, informed by WFP's CLEAR, which is a robust spatial and temporal climate vulnerability and risk assessment. Climate champions (lead farmers, farmer groups, and youth entrepreneurs), the majority of whom will be women, with a focus as well on youth, will be empowered to serve as advocates for further uptake and scaling out of the prioritised innovation of index insurance, as well as the integrated resilience building approach through which the insurance will be delivered. All of these activities will deliver social, economic and environmental benefits as set out in Part II.D and contribute to the revitalisation and increasing climate resilience of Bhutan's rural areas and agricultural economy.

Component 2

[179] RGoB and World Bank (2015) Modernizing Weather, Water and Climate Services: A Road Map for Bhutan.

Baseline scenario: There is currently no index-based microinsurance programme for smallholder farmers in Bhutan. In the context of increasingly frequent climate shocks such as heavy rainfall events and droughts, smallholder farmers' risks for total crop failure are increasing, resulting in them having to sell productive assets to cope. Such negative coping strategies are leading to loss of land in some cases and to the situation of 'empty households' and 'empty fields' in the rural areas. The increasingly difficult situation in the rural areas, in which the productivity of smallholder agriculture is declining due to climatic changes and the lack of adaptation support, is also fuelling migration into the urban areas, especially of men and youth. This is leading to labour shortages, the increasing feminization of agriculture in Bhutan, reduced social cohesion of the rural areas, and lower human capacity to re-energise rural economies. Access to affordable credit for agriculture-related activities continues to be a challenge for the rural community, and for women in particular; thus even those people who are remaining in rural areas are not able to access credit to fund their own adaptation activities. Even if they have been supported by a climate change project, as soon as the project ends, they fall back on negative coping strategies. Furthermore, there are few incentives to energise and encourage rural youth and women to excel as resilient rural entrepreneurs and continue investing in their areas and serving as champions and change agents for climate response options.

Additionality: With support from the AF, risk transfer will be enabled through rolling out index-based microinsurance layered with savings in the targeted project areas, with the poorest farmers receiving insurance premium support through the conditionality of sustainable agricultural practices, such as conservation agriculture, GAPs and organic production. At the same time, farmers will be incentivised to increase their savings to cover the more frequent and less severe shocks. Rapid compensation for the more severe weather-related losses will build resilience, as farmers can avoid selling productive assets and recover faster from climate shocks such as floods and droughts. Furthermore, helping farmers to access micro credit and savings allows for ongoing and sustainable livelihood diversification, as an adaptation strategy, and helps farmers to build up their risk reserves. Increasing savings and access to micro finance means that poor smallholder farmers will be empowered to invest in their own chosen actions for post-harvest storage and processing, and thus be able to move up the value chain. Support for value chain development and marketing of high-value commodities, linked to the insurance, will play an important role in increasing farmers' incomes so that they can pay their own insurance premiums and enhance the returns from their livelihoods. Assisted by the project, vulnerable farming households will continue to develop their income generating activities and livelihoods diversification, thus building their adaptive capacity and enabling ongoing adaptation actions on their part.

Component 3

Baseline scenario: In the absence of the dedicated activities to institutionalise the project's innovative approach to climate risk management through rolling out index-based microinsurance, the impact of the project will be limited to the targeted localities and beneficiary groups. Without these additional actions, the insurance ecosystem may not receive sufficient support to be robust and sustainable going into the future.

Additionality: Through the activities under Component 3, the project will develop capacities and mechanisms to promote the further scaling up of the activities beyond the project localities, with the aim of ultimately covering all 20 districts of Bhutan, as well as a broader range of livelihood systems and groups. The RGoB and the insurance ecosystem in Bhutan will be supported to develop and institutionalise an ongoing and multi-level climate risk management system for Bhutan, which will enhance the sustainability of the insurance scheme and provide the RGoB and stakeholders at different levels with a range of financial instruments for managing climate risk more effectively. This will result in a greater impact for the project's actions and greater benefits for more smallholder farmers across Bhutan from risk transfer through microinsurance, as well as a strengthened and better supported insurance ecosystem.

The project does not expect co-financing and has been designed to deliver its outcomes and outputs regardless of the success of other project(s). In the interests of good development and climate adaptation practice, the project will optimise synergies with relevant existing and pipeline interventions in Bhutan, as set out in the CN. This is important to prevent inefficient demands on government staff and other project stakeholders, but it does not prevent the proposed AF project from being a fully standalone project.

M. Sustainability

A key theme running through the project logic is for evidence-based and systematic approaches that build systems for sustainability and further scaling out.[180] The approach to rolling out the primary innovation of index-based microinsurance, which is through an integrated risk management and resilience building approach, is fundamentally designed to promote sustainability – and has been demonstrated to promote that, through numerous similar WFP-supported programmes.

The insurance graduation strategy is an important element in the project's sustainability strategy. For sustainability, the initiative incentivises participants to register for microinsurance through risk reduction conditionalities (e.g. climate resilient agricultural technologies, GAPs, organic production) and simultaneously enhances participant's saving capacity and access to loans while gradually enabling farmers to pay for a portion of the insurance premium. The inclusion of increased access to micro-finance and savings, as well as value chain development and market access, is designed to help smallholders create a sustainable source of income they can use to pay for their own premiums for weather index based insurance before the end of the project. The graduation strategy gradually enables farmers to pay for an increasing portion of the insurance premium, through the integrated approach and Smart Subsidy scheme set out in section II.A above. During the first year of implementation, the premiums are subsidized completely by the project, with the subsidy for each farmer being reduced over the years until the farmers 'graduate' – i.e., they are able to take over payment of the full premium. The intent is to fully commercialize the insurance programme. This will be possible once the farmers, MFIs and realize its value. To make this viable, there are success factors: (i) while the AF funding will be used to pay the premiums for the poorer and more vulnerable farmers, the insurance scheme will be available to both commercial and subsistence farmers. Having a good mix of farmers from different economic levels will have an impact in both scaling up, expansion, and sustainability; and (ii) the product should be value adding yet affordable.

A critical part of the sustainability strategy is the development of an effective distribution strategy, to ensure farmers can access insurance when they wish. This entails establishing an insurance ecosystem for accessible, affordable and beneficial microinsurance. An important risk for project sustainability is that actuarial soundness of the index insurance could be undermined by an unexpected weather cycle that may change the probability of insured events. Considering the uncertainty of a changing climate, the historical loss data that catastrophe models rely on may be less useful for future loss projections. However, this is the TSP's role, to ensure that advanced analytics is employed to help the insurer integrate additional assumptions that can improve risk underwriting. Upon existence of a significant variance between actual loss and pay-out triggered, the programme may employ a dispute mechanism, a basis risk fund, and/or a regular product enhancement activity. The index and trigger upon which the insurance payouts are based will be improved on an annual basis by the TSP, so that changing climatic conditions and impacts experienced on the ground by farmers are continually integrated into the calculations, ensuring the product's continued reliability and effectiveness. The insurance feasibility study included a consideration of key risks for the insurance scheme and project activities have been accordingly designed to reduce this risk. The project's overall risk assessment (Table 7 in Part III.B) has been conducted to identify and develop mitigation strategies for the full range of risks that the project could encounter.

Due to current financial constraints, the RGoB is not in a position to provide any subsidies to this insurance scheme, and WFP's experience indicates that with the correct enabling environment, the project can still be structured to be sustainable. The proposed project will be an opportunity to gain the confidence of Bhutan's farmers, the insurance institutions, and the RGoB with an enhanced understanding of the benefits of index based crop insurance. The detailed insurance feasibility study conducted during FP development has provided further substantiation for the sustainability of the proposed insurance scheme – see **Annex 10** and **Annex 3** for further details. It is positive and critical for sustainability that the RGoB is pro-farmer and is keen to develop and support sustainable strategies such as index-based microinsurance.

During the five years of the project, innovative approaches that could promote the financial sustainability of the scheme, *inter alia* by ensuring its affordability, will be assessed and a clear roadmap developed to ensure scaling up and sustainability of the scheme. These approaches, to be considered in the implementation of output 3.1.1, include:

- The feasibility of premium discounts related to the adoption of adaptation measures by smallholder farmers, and how to ensure its implementation in the mid and long term;

[180] The project will also ensure that it avoids an ad hoc approach and supports the building of long-term institutional systems and programmes in Bhutan, including with respect to implementing the 12th Five Year Plan, the 21st Century Economic Roadmap, the National Climate Change Policy, the National Adaptation plan (NAP) under development, etc.

- Payment of insurance premium through carbon credit scheme to be explored with financial institutions and Government;
- Payment of insurance premium through extra revenue when organic farming has extra benefits in terms of income for farmers;
- Integration of subsidy by Government of a certain percentage;
- Integration of subsidies by other stakeholders participating in value chains that are promoted;
- Payment through ecosystem service models connecting with ecotourism and hydropower sector (potential integration of India in model as it purchases energy from hydropower); and
- Potential interlinkages with remittances.

The climate risk informed approach to selecting project districts has identified the vulnerable parts of Bhutan in which the project will be implemented. Further identification of the project gewogs and appropriate value chains for output 2.1.3 will similarly be climate risk informed, so that localised impacts of climate change can inform the adaptation measures suitable for particular locations. This is crucial for avoiding maladaptation and facilitating the sustainability of the diversified livelihoods the project will promote. In order to implement index-based microinsurance at scale under the LIG through an integrated approach to rural resilience, the project will actively build upon and synergise with existing and planned interventions in the project localities. This approach will leverage and strengthen existing and planned interventions of the RGoB and development partners, thus promoting efficiency and sustainability for the LIG as well as for the relevant interventions.

A further central component of the project's exit strategy is the multi-pronged gender mainstreaming approach to advance gender equality for sustained results and climate resilience. The key components of the project's gender strategy, namely equitable participation in benefits and in decision making of women and female youth; and targeting specific activities to benefit women and female youth equitably, will contribute to sustainability by building their social and economic empowerment, the lack of which is still a constraint to development in Bhutan. Key steps will include: (i) designing activities and initiatives to be gender-inclusive and designed as to reduce or at best not increase the workload of already over-burdened and time-deprived rural women; (ii) since one of the major gender issues impacting women is the prevalence of GBV, the project in collaboration with the NCWC and/or RMFIL should include awareness and sensitization program on GBV and its impacts for women; (iii) the project includes obtaining the regular services of a gender-specialist with adequate gender knowledge in the local context to provide advice within the project and ensure gender equality and responsiveness throughout; budget for this is included under the relevant components (iv) the project's progress, impacts, and benefits will be monitored and assessed using gender-disaggregated data and gender specific indicators; (v) gender transformation will be measured during/after the project, using WFP and RGoB indicators to track women's empowerment, so that changes associated with the root causes of gender inequality in agriculture can be tracked.

Annex 10 provides a summary of the sustainability provisions for all concrete outputs, livelihood diversification activities, savings schemes, partnerships to be established, policies and governance arrangements to be developed and implemented, knowledge to be generated, management and other capacity to be improved, etc. from economic, social, environmental, institutional, and financial perspectives.

N. Environmental and social impacts and risks

The entire project was screened for environmental and social risks against the 15 principles outlined in the AF's Environmental and Social Policy, as set out in the table below. In addition to the AF's ESP, the Environmental and Social Safeguards tools and instruments applied and developed for this project complement and are aligned with WFP's Environmental and Social Sustainability Framework (ESSF) to promote no harm to the environment and the people. The project is not expected to generate any significant environmental/social impacts or risks. Component 1 of the project entails facilitating linkages to climate services and enhancing access to climate resilient agricultural technologies such as conservation agriculture and organic production, supported by GAPs, as well as sensitising stakeholders on index insurance and climate risk management, and empowering women and youth climate champions. Component 2 activities will develop financial incentives and risk transfer mechanisms for sustainable resilience building and adaptive capacity developing, while Component 3 activities will institutionalize the innovative approach to climate risk management through index-based microinsurance. These are intrinsically risk-averse with respect to social and environmental impacts. The project contains unidentified sub-projects (USPs) because the exact localities to be covered under the insurance have not yet been

identified. Until this happens, the exact recipients, secondary innovations identified at the community level, and exact nature of livelihood activities cannot be fully specified. The project districts have been identified based on the outcomes of the in-depth vulnerability assessment and climate risk-based crop suitability assessment, as well as the detailed insurance feasibility study conducted during FP development.

The specific crops to be promoted through the climate-resilient value chain development and marketing support (output 2.1.3) will be identified during implementation once the project gewogs (localities) have been selected, informed by the best available crop suitability assessments under the changing climate, as well as WFP's CLEAR tool. The risk level of this project is identified as Category B, primarily because Component 2 of the project includes USPs that are not fully defined yet. Prior to implementation, the environmental and social risk screening of the USPs will be conducted to ensure the overall project risk category B is not exceeded and applicable ESS instruments to mitigate/mimise/control the risks are in place. Nevertheless, all potential activities under Component 2 are small in scale (managed at household level or community level) and activities such as organic production and conservation agriculture are likely to enhance environmental and social conditions; their potential negative impacts are very limited and can be readily mitigated.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law		**Low/no risk**: The FP has been developed to comply with the legal frameworks of Bhutan. Relevant national, regional and district authorities have been consulted during FP development and will continue to be consulted during project implementation to ensure compliance with all relevant laws.
Access and Equity		**Low/moderate risk:** The project is designed to promote the equitable access to activities and assets by women and youth in project areas. Project activities will not lead to changes in tenure arrangements. The RGoB has addressed issues related to youth's access to land for farming through the formation of youth groups who access state land through land User Certificates (LUCs). However, economic benefits from the project could potentially put groups or individuals at a disadvantage or lead to disagreements and minor conflicts. Project activities to enhance access to microinsurance and microfinance will result in enhanced livelihoods diversification for the most vulnerable HHs. The project will put in place adequate measures to ensure equitable access to activities and assets by women, youth and vulnerable groups in project areas. Further in-depth consultations with communities and stakeholders have been conducted throughout FP development and will be conducted during implementation to ensure that any barriers to access and equity can be overcome in line with the AF's ESP.
Marginalized and Vulnerable Groups		**Low/no risk**: There are no displaced people or official refugees in the country. The project targeting approach ensured that marginalised and vulnerable groups, identified as women farmers, households headed by women, and rural youth, were afforded due consultation during the project design phase and will do the same during implementation. The activities to be implemented under all components (particularly under Component 2) aim at: i) empowering vulnerable groups to make informed adaptation decisions, thus decreasing vulnerability to climate-related impacts while taking into consideration their traditional and local knowledge; ii) increasing availability, quality of and access to resources of marginalized groups. Concrete adaptation and value chain activities will be supported in which both women and men can participate, as well as female and male youth. The project will also implement climate resilient and nutrition-sensitive value chain support targeted to improve the nutritional status of poor people and vulnerable groups. Further guided by the Gender Assessment, the ESMP sets out key measures in this regard. No additional disproportionate distribution of adverse impacts is expected for the marginalized and vulnerable subgroups in this project.
Human Rights		**Low/no risk**: The IE and its partners affirm the fundamental human rights of all people. The project and its intended activities do not risk violating any pillar of human rights.
Gender Equality and Women's Empowerment		**Low risk:** The project prioritises women, who form the majority of smallholder farmers in Bhutan, as the primary beneficiaries and will further mainstream gender as set out in Part II.M. The project will ensure that women, men, and female and male youth can equitably engage in and benefit from project activities such as provision of microinsurance and climate-resilient value chain development. The project's gender mainstreaming strategy is a central element of the exit strategy, and is set out in Part II.M, and will be further

		elaborated during project inception. A gender assessment has been conducted and women and women's groups have been consulted during the community and stakeholder consultations, and will continue to be consulted during the implementation of the project. During full proposal development, more detailed information on the differentiated impacts between women and men at the target district level was gathered through community consultations and the project activities have been developed based on this. The Gender Assessment recommendations have been integrated into the FP and will inform the implementation phase. Factors influencing the discrimination against women in terms of land ownership are not expected to pose any risks in Bhutan, in view of the migration out of the rural areas and as women's ownership of land is relatively equitable in many parts of the country.
Core Labour Rights		**Low/no risk:** The IE and its partners respect international and national labour laws and codes, as stated in WFP's policies. In particular, WFP has a zero-tolerance policy for child labour of children below 14 years. Child labour is not common in the targeted areas. Avoidance measures: - Zero tolerance for child labour of children below 14 years; - Promote school attendance.
Indigenous Peoples	X	**No risk:** Although Bhutan is populated by different ethnic groups, these are not specifically associated with a territory on which they depend exclusively, and there is generally minimum inter-group friction. The project districts were selected during FP development, while the targeted communities at the gewog-level will be identified during project inception. The Monpa people, believed to be the oldest original inhabitants of Bhutan[181], do not reside in the project districts and will not be affected by the project activities. The project will not target the highland gewogs of Merak and Sakteng, where the special interest Brokpa communities in Trashigang reside, as it will focus on the mid- and lower altitude areas. The project will not discriminate against any group and will ensure the widest participation from all different groups during implementation.
Involuntary Resettlement	X	**No risk:** The project is not expected to lead to involuntary resettlement, neither in physical nor economic terms.
Protection of Natural Habitats		**Low/no risk**: By implementing conservation agriculture and organic production, as well as GAPs, the project will ensure the protection of natural habitats. The activities of Component 1 are designed to enhance knowledge and awareness on climate change and to implement climate-resilient agricultural technologies and promote either low-external input or organic production. The activities of Component 2 will build financial incentives and risk transfer mechanisms for sustainable resilience building and adaptive capacity. As a result, the project's activities are not expected to have any adverse impact on the environment or natural habitats. Some activities of Component 1, such as those related to agricultural practices, could potentially have adverse impacts on natural habitats, but they will be designed in such a way that their environmental impact is minimal (building upon features of the environment that are already present, without introducing new elements or alien crop/plant species). Moreover, these activities are of small-scale (managed at individual, household, or farmer group level) and any residual impact on the environment or habitats would be negligible and readily remediable. **Avoidance measures**: - No introduction of alien crop/plant species; - No activity in conservation areas and/or natural reserves
Conservation of Biological Diversity		**Low/moderate risk**: Some activities of Component 1, such as the promotion of new crop varieties, could potentially have adverse impacts on biodiversity, leading to a deterioration of biological diversity if species are not correctly selected (e.g. inadvertent introduction of invasive species) and diversified. To ensure this risk is addressed, the project will prioritize local species and multi-species planting and avoid the use of non-native and invasive species. These activities will be designed in close collaboration with the NCOA of the DoA and other agricultural research institutes. As a result, the project is not expected to have any adverse impact on the environment or biodiversity. The project is indeed designed to enhance biodiversity through the promotion of organic production and GAPs.
Climate Change		**Low risk**: The entire project is designed to reduce beneficiaries' exposure and vulnerability to the effects of climate change and increase their resilience. The project will not generate any significant emissions of greenhouse gases or reduce the capacity of carbon sinks. Many project activities will be designed to be low-emissions, as well as adaptive – e.g. the promotion of conservation agriculture and organic production. As the project area is highly vulnerable to the impacts of climate change, all project components and activities will be designed to contribute to increasing local capacities to sustainably face climate change in the long-term, and climate variability in the short -and medium-term. The promotion of i)

[181] Wangchuck, A.D.W. (2018) *Treasures of the Thunder Dragon.* Page 187. Penguin Books, India.

		good agronomic practices for better management of soil and water resources; ii) organic production and Integrated pest management techniques coupled with the use of organic fertilizers and pesticides; and iii) the increase of carbon sinks' potential through conservation agriculture, are expected to reduce the emissions deriving from agricultural activities. Plants and crops will be selected to ensure a better adaptability to the current and projected climatic conditions.
Pollution Prevention and Resource Efficiency	x	**No risk**: None of the activities in the project will release pollutants into the air, soil or water. Under the project's approach to enhancing agricultural production through GAPs, conservation agriculture and organic production, chemical inputs will be replaced by locally made biofertilizer and pesticides, use of liquid fertilizer for example from manure will be promoted, and the project will encourage integrated pest management. The project will not provide any agro-chemicals to participants. None of the activities will generate waste, either hazardous or non-hazardous. None of the activities in the project involves high resource use, as energy efficiency, minimization of material resource use, and minimization of the production of wastes has been embedded into project design.
Public Health		**Low/no risk**: The project will not have any detrimental effect on public health. It is designed to be nutrition sensitive, and thus will contribute to tackling the underlying causes of malnutrition through increasing agricultural production and processing, promoting sustainable natural resource management and supporting nutritious value chains.
Physical and Cultural Heritage		**Low/no risk**: The project will ensure that the cultural capital and traditional knowledge of the smallholder farmers will be valued and integrated into the provision of enhanced localised climate services. The project will identify secondary adaptation innovations to be integrated into the rollout of the primary innovation of index-based microinsurance, which will include resilient traditional varieties, as well as enhancing traditional agricultural approaches by integrating these with scientifically proven approaches. Sensitisation activities under Component 1 will be designed to build on cultural practices in a respectful manner. The project's learning and knowledge management activities (under Component 1) will document and share lessons from the integration of culture and traditional knowledge into the project activities. Consultations and engagement with stakeholders and communities during implementation will ensure that any physical cultural heritage present on project sites is identified and potential negative impacts are avoided through project design.
Lands and Soil Conservation		**Low/no risk**: Project activities will not pose risks to land and soil conservation, but rather will be specifically designed to address land degradation and promote sustainable land management and erosion control. Conservation agriculture and organic production activities will additionally support protection and enhancement of lands and soil fertility and soil structure. All activities are of small-scale (managed at individual, household, or community level) and any possible residual impact would be negligible and readily remediable.

The risks identified in the table above have been further analysed during the environmental and social risks screening that is included in **Annex 7**. This includes a further consideration of indirect, transboundary and cumulative risks. Mitigation measures have been identified and are included in the Environmental and Social Management and Monitoring Plan (**Annex 7**).

Once the USPs of Component 2 are defined during project implementation, environmental and social risk screening will be carried out at community level and in consultation with the beneficiaries. Coordination with departmental environmental authorities will be duly sought by the implementers (see **Annex 7**). Activities with a medium or high risk will not be considered for implementation under Component 2. There will be no project locations with the presence of Indigenous peoples. The project will include a Grievance Mechanism for the beneficiaries and affected populations, which is described in **Annex 8**.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Project implementation arrangements

A.1. Arrangements for Project Management

The project will be executed by the Royal Government of Bhutan (RGoB) under the overall supervision of the Ministry of Finance, Department of Macro-fiscal and Development Finance (DMDF) which is the Designated Authority (DA) of the Adaptation Fund. The Department of Agriculture, Ministry of Agriculture

and Livestock (MoAL) will be the Executing Entity (EE), with responsibility for the project execution. Given the importance of financial services institutions for the successful execution of the project, the MoAL will collaborate strongly with the Royal Monetary Authority (RMA), Royal Insurance Corporation of Bhutan (RICB), Bhutan Insurance Limited (BIL), Bhutan Development Bank Limited (BDBL), RENEW Micro Finance Private Limited (RMFPL), and Tarayana Micro Finance Limited (TMFL), for the execution of the project; as well as with the National Centre for Hydrology and Meteorology (NCHM). The NCHM, RICBL, BIL, BDBL, RMFPL, TMFL, and the project district administrations are the responsible partners (RP). Solid operational coordination between the responsible partners will be assured through the Technical Working Group (see below), as well as the activities of the Project Management Unit (PMU).

WFP, as a Multilateral Implementing Entity (MIE) of the AF, will act as the fund custodian, with the WFP Representative and Country Director of the Bhutan Country Office acting as the Fund Manager. WFP will assume financial oversight of the project and report to and be accountable to the Adaptation Fund Board, to ensure that the project measures and achieves expected results, fulfils all reporting functions, and meets WFP and AF rules and regulations. The WFP Bhutan Country Office will oversee and coordinate the overall project management, as well as coordinate the processes of monitoring, evaluation, and knowledge management. WFP will provide technical backstopping, fiduciary and managerial support throughout all stages of project implementation, as well as capacity strengthening of the government.

The MoAL will have overall responsibility for the procurement of goods and services required for the execution of the project activities. The RGoB procurement processes have been assessed and found to be consistent with WFP's international standards and prescribed procedures to reduce mismanagement of funds. However, WFP will take responsibility for the recruitment of the Technical Service Provider (TSP) who will undertake the technical design of the insurance product. Furthermore, the Project Management Unit (PMU) may seek approval from the PSC to request WFP to procure certain goods and services which are not included in the WFP technical assistance, should this be deemed to be more effective to be managed by WFP directly.

Gender mainstreaming: WFP will provide the necessary support to the PMU and implementing partners to ensure that gender, protection, and accountability to beneficiaries are maintained throughout the project lifecycle. This will be facilitated by the Gender and Protection (G&P) team of the WFP Regional Bureau Bangkok (RBB), led by the Regional Gender Advisor, as well as the Gender Focal Point of the WFP Bhutan CO and the Gender Focal Point of the Department of Agriculture (DoA), who will coordinate gender mainstreaming for InAF-Bhutan during planning, implementation, M&E and reporting; as well as into the complaints and feedback mechanisms. The WFP G&P team will (i) attend the project's inception and work planning meetings to ensure that the gender and protection lens is applied in all project processes from the outset; (ii) provide mainstreaming support in annual/quarterly review meetings, operational plans, reviewing of annual/ quarterly reports; and (iii) facilitate workshops and training, with their operational costs being covered by existing WFP funds and workshop funds within the project budget. The WFP G&P Team's salaries will be covered by other project budgets of the WFP RBB and CO. In addition, the project will commission a gender expert for regular short-term consultancy services to *inter alia* (i) provide gender and protection awareness training and inputs to DoA extension workers and executing partners to strengthen capacities of key project staff, who will in turn sensitize and train community members; (ii) develop project-tailored gender SOPs so the PMU/ executing partners can ensure appropriate standards across project activities; and (iii) facilitate any additional gender-related workshops and training where this is identified as necessary. To further strengthen gender mainstreaming, the recruitment process for certain PMU staff – the M&E Officer and the Project Technical Specialist (PTS) – will specify that they have experience in this regard. Oversight/support roles and responsibilities for gender mainstreaming will be specified in the relevant staff ToRs. The WFP Regional Gender Advisor will support the staff recruitment process to ensure the ToRs adequately reflect these roles.

Project Management Unit

The Project Management Unit (PMU), under the overall leadership of the Director of the DoA, will be responsible for the day-to-day activities of the project, providing implementation oversight, including support to recruitment and performance management of the project staff, in close consultation with the Technical Working Group (TWG) and WFP. The PMU will recruit a full-time Project Manager (PM), a full-time national Project Technical Specialist (PTS), and a full-time Monitoring & Evaluation, Knowledge Management and Communication Officer (M&E/KM Officer). The government will provide a Project Accountant and a Procurement Officer as part of its co-financing arrangement.

Considering the technically complex nature of the project's integrated agricultural insurance and financial services activities, the PMU will include a full-time national Project Technical Specialist (PTS). This position

will be jointly recruited by the PMU and WFP with the oversight of the WFP Climate Risk Insurance team at HQ. This approach will facilitate hands-on capacity strengthening to the government entities and support timely delivery of project activities for the communities. The PTS will be a national expert assigned for the specific purpose of providing technical support to the project. See **Annex 9** for key elements to include in a ToR for this position.

WFP will support the PMU to develop the M&E plan and ensure its implementation and provide technical assistance on specific project activities such as the integrated delivery of insurance with a range of project activities, through its staff in the Country Office and in the Climate Risk Insurance team at HQ. Consequently, the climate risk insurance project activities will be executed with WFP support and informed by WFP approaches and procedures, which will be adapted and institutionalized into the government planning and implementation frameworks. Nonetheless, all WFP supported and executed activities shall be reported through the established project coordination structures.

The PMU staff will coordinate the implementation of the project activities, manage project funds, and achieve the project outputs as specified in the project proposal. Specifically, the roles and responsibilities of the PMU include the following:

1. Project coordination, strategic planning, and review;
2. Liaise with Responsible Partners on the timely; effective, and gender-sensitive implementation of activities;
3. Recruit specific short-term consultants on a needs basis to carry out specific project activities;
4. Monitor physical and financial progress of the activities;
5. Provide technical support to the Responsible Partners;
6. Prepare quarterly progress reports and submit these to the PSC; and
7. Consolidate physical/technical and financial reports for submission to DA and MIE.

Responsible Partners

The Responsible Partners (RPs) for this project will be the Project Implementing Units (PIUs) located in each of the four district administrations and the NCHM, insurance companies, banks, and the MFIs, who will be responsible for the technical execution of selected activities.

In general, the roles and responsibilities of the RPs are as follows, but not limited to:

1. Implement the project activities in a timely, effective and gender-sensitive manner;
2. Ensure effective and efficient utilization of resources;
3. Prepare and submit physical/technical and financial progress reports to the PMU; and
4. Liaise with the PMU and the TWG on project implementation.

The specific roles, responsibilities and deliverables of each of the RPs will be agreed during project inception and set out in letters of agreement with the RGoB during project inception. Please see **Table 6** for a description of responsibilities of the RPs and other stakeholders with respect to the implementation of the project activities per project output.

Table 6. Project execution plan – mapping of stakeholder engagement per output

Component 1. Strengthened climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers

Output	Stakeholder	Type	Role in project
Output 1.1.1. Linkages facilitated with existing climate services and support to gender-responsive digitalised dissemination	National Centre for Hydrology and Meteorology	Government agency	Facilitation and implementation of the activities foreseen for the output; development of enhanced climate services; coordination with various relevant agencies; technical guidance and backstopping.
	Department of Agriculture	Government agency	Executing entity (EE) and lead partner at district level; assist with facilitating linkages to existing / planned DoA initiatives that will invest in enhancing climate services for smallholder farmers; key role in generating agro-met advisories.
	District and Gewog administrations	Government agency	Mobilization of local participation. Coordination of implementation of field activities in the identified areas.
	WFP	UN agency	Technical assistance on last mile climate services (LMCS) and developing more targeted and effective agro-met advisories
	Local communities	Individuals / community groups	Participate in dissemination of enhanced gender-responsive climate services; receive and use climate services
Output 1.1.2. Sensitisation of targeted smallholder farmers on the benefits of index-based microinsurance as part of a package to manage climate risks	Department of Agriculture	Government agency	Lead role in the facilitation and implementation of the activities foreseen for the output; coordination with various relevant agencies; technical guidance and backstopping; ARDCs and extension officials have role in implementing insurance sensitisation strategy
	WFP	UN agency	Technical assistance in developing sensitisation strategy and guidance on materials development
	Project staff and Project Technical Specialist	Government agency	Technical guidance and backstopping; leads on sensitisation of policy makers; train (ToTT) aggregators, distribution and delivery channels , as well as ARDCs, extension officials, research institutions, community leaders and influencers on implementing insurance sensitisation strategy
	Insurance companies and MFIs	Private sector	Implement insurance sensitisation strategy
	Community leaders and influencers	Individuals	Implement insurance sensitisation strategy
	Community members and groups	Individuals/groups	Participate in insurance sensitisation process
Output 1.1.3 Leverage ongoing local	Project Technical Specialist and DoA	Government agency	Lead role in developing and implementing training strategy and materials for participatory local adaptation planning

adaptation planning to assist smallholder farmers to plan their adaptation responses	WFP	UN agency	Technical assistance on participatory local adaptation planning and implementation support
	District and Gewog administrations	Government agency	Convene participatory local adaptation planning workshops
	Community members and groups	Individuals/groups	Participate in local adaptation planning
Output 1.2.1. Consolidate existing climate-resilient agricultural support and develop and implement recurring training strategy to fill identified gaps	ARDCs of the DoA	Government agency	Lead role for activities in this output; develops localized strategy for enhanced climate-resilient and/or organic agricultural support
	Project Technical Specialist and DoA	Government agency	Assists in coordination and implementation
	Extension officers of the DoA	Government agency	Participate in enhanced and recurring training strategy (ToTT)
	Community members and groups	Individuals/groups	Receive ongoing targeted training on climate-resilient and organic agricultural approaches and technologies
Output 1.2.2. Identify and empower climate champions for effective peer-to-peer learning and project outreach	Research institutions – CNR	Research institution	Key role for activities in this output; ToTT on empowering lead farmers and youth agricultural entrepreneurs to be climate advocates, including risk layering approach
	ARDCs and Extension Services	Government agency	ToTT on empowering lead farmers and youth agricultural entrepreneurs to be climate advocates, including risk layering approach
	MFIs	Private sector	ToTT on empowering lead farmers and youth agricultural entrepreneurs to be climate advocates, including risk layering approach
	Project technical specialist, PMU	Government agency	Technical backstopping and guidance and coordination
Output 1.2.3 Develop and implement learning, knowledge management and communication strategy and feedback loop for learning from activities on the ground	Research institutions – CNR	Research institution	Lead role for activities in this output; technical guidance and ongoing support to PMU; conducts evidence generation studies; convenes dialogues on innovation
	L, KM&M&E Officer in PMU	Government agency	Assist CNR in thus output; conducts evidence generation studies; convenes dialogues on innovation.
	Department of Agriculture	Government agency	Ongoing monitoring role
	District and Gewog administrations	Government agency	Ongoing monitoring role

Component 2. Innovative climate risk transfer mechanism rolled out and smallholder farmers' resilience built through integrated approach

Output	**Stakeholder**	**Type**	**Role in project**
Output 2.1.1. Risk transfer mechanism for	Royal Insurance Corporation of Bhutan Limited and/or Bhutan Insurance Limited	Public and private sector - Insurance company	Provides climate risk insurance coverage to the participating farmers.

smallholder farmers implemented and scaled up			Co-design insurance products, assessing and managing risks, determining premium rates, processing claims immediately in case of weather-related losses.
	RENEW Microinsurance, Tarayana Microinsurance and/or Bhutan Development Bank Limited	Private sector - distribution channel, deposit-taking and loan provision	Serves as the distribution channel for insurance products, deposit-taking and loan provision. Integrates insurance with other products. Enrols farmers in the insurance scheme, collects premiums, promotes financial literacy and inclusion, assists with pay-outs, provides customer service.
	To be determined (ex. Blue Marble, Pula, etc.)	Private sector - Technical service provider	Offers accurate weather forecasts and data to assess potential risks. Helps the insurer design the climate risk insurance product and set the climate triggers. Provides timely and accurate weather information, collaborating with insurers to determine triggers for payouts, and supporting the development of risk models.
	World Food Programme	UN agency	Provides technical assistance and support to initiate or sustain the programme. Offers financial resources, technical expertise, and guidance to ensure the program's success and sustainability. Provides literacy modules and customizes them based on country context.
Output 2.1.2. Farmers have increased access to business development support and microfinance	RENEW Microinsurance, Tarayana Microinsurance and/or Bhutan Development Bank Limited	Private sector - distribution channel, deposit-taking and loan provision	Serves as the distribution channel for insurance products. Provides financial services to farmers, including loans and savings options. Disburses loans, manages savings accounts, collects loan payments, assesses creditworthiness of farmers, promotes financial literacy and inclusion.
	World Food Programme	UN agency	Technical expertise, and guidance to ensure the programme's success and sustainability.
Output 2.1.3 Linkages facilitated to enhance diversified livelihoods through value chain and marketing support for climate-resilient value chains	RENEW Microinsurance, Tarayana Microinsurance and/or Bhutan Development Bank Limited	Private sector - distribution channel	Promotes green finance, value chain development and market access. They will also support input-bundling approach with credit and insurance.
	World Food Programme	UN agency	Provides technical assistance and support, helps with programme management to ensure success and sustainability.
	Department of Agriculture	Government agency	Technical execution of output. Collaborates with stakeholders to ensure programme alignment with agricultural objectives.

Component 3. Innovative climate risk management institutionalised for long-term sustainability

Output	Stakeholder	Type	Role in project

Output 3.1.1. Support stakeholders to institutionalise innovative climate risk management	World Food Programme	UN agency	Provides technical assistance and support for creating a roadmap of a sustainable innovative climate risk management approach. Identifies various opportunities for partnership, integration with other projects/programmes and further product and service development.
	Department of Agriculture	Government agency	Assists in developing roadmap of a sustainable innovative climate risk management approach. Collaborates with stakeholders to ensure programme alignment with agricultural objectives, including bundling of insurance with inputs, climate smart agriculture and green finance initiatives.
	Department of Finance and Royal Monetary Authority	Government agency	MoF is government department responsible for financial policy and regulation and managing the funding provided by the donor. Royal Monetary Authority is regulatory authority for insurance industry. Creates a conducive regulatory environment for insurance and financial services, potentially subsidizing premiums or providing incentives to insurers, overseeing financial stability and consumer protection. Integrates insurance, savings and loans as part of a wider risk management scheme.
Output 3.1.2. Develop enabling environment and advocate for institutionalising of innovative climate risk management	World Food Programme	UN agency	Provides technical expertise on the development of government regulatory framework on microinsurance. Supports the establishment of technical working groups/committees. Mobilizes various stakeholders to ensure climate risk insurance is part of a wider risk management scheme.
	Department of Agriculture	Government agency	Participates in developing regulatory framework on microinsurance. Collaborates with stakeholders to ensure programme alignment with agricultural objectives, including bundling of insurance with inputs, climate smart agriculture and green finance initiatives.
	Department of Finance	Government agency	Government department responsible for financial policy and regulation and managing the funding provided by the donor. Creates a conducive regulatory environment for insurance and financial services, potentially subsidizing premiums or providing incentives to insurers, overseeing financial stability and consumer protection. Integrates insurance, savings and loans as part of a wider risk management scheme.

Technical Working Group

A Technical Working Group (TWG) will be established to coordinate the implementation of project activities within and across the project districts. The TWG will be instrumental in reviewing and validating technical deliverables, such as the design and delivery of specific sub-activities, as well as the technical specifications of products to be delivered by the project. Their input will help to ensure the quality and accuracy of the project's technical components – both process- and product-related.

The TWG will consist of technical staff of the RPs, namely:

- Dzongkhag DAOs
- National Centre for Hydrology and Meteorology (NCHM)
- Royal Insurance Corporation of Bhutan (RICB)
- Bhutan Insurance Limited (BIL)
- Bhutan Development Bank Limited (BDBL)
- RENEW Micro Finance Private Limited (RMFPL)
- Tarayana Micro Finance Limited (TMFL)
- Department of Agriculture
- WFP Bhutan country office

The specific representatives of the TWG will be agreed at the project inception workshop. Roles and responsibilities of the TWG will include:

1. Review and validate technical deliverables, such as design and delivery of specific sub-activities, as well as the technical specifications of products;
2. Coordinate the implementation of project activities within and across the project districts;
3. Prepare Annual Work Plan and Budget (AWPB);
4. Review and endorse project activities for each executing partner;
5. Review and endorse quarterly progress reports;
6. Report to the PSC on project progress and monitoring;
7. Provide technical expertise and knowledge related to the project; and
8. Identify and propose solutions for potential technical risks and challenges that might arise during the project.

Project organogram

The project structure is depicted in the following diagram:

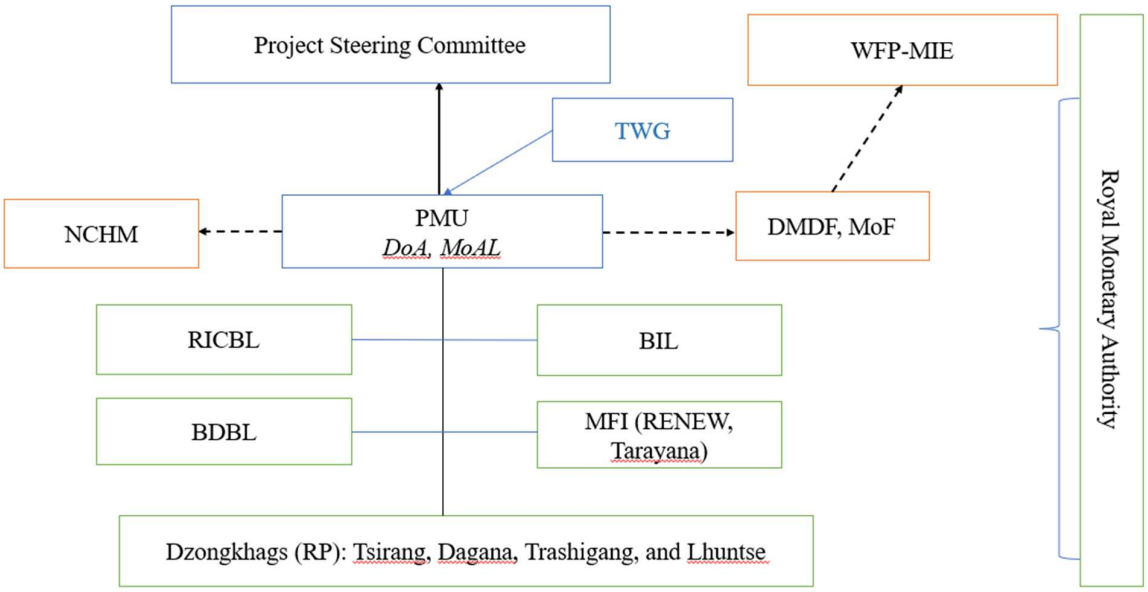


Figure 7. Project organogram

Financial flows

The project will follow the standard RGoB fund flow system, as depicted below. In addition to the technical assistance which will be provided by WFP staff throughout project implementation, any funds required for WFP to execute the agreed direct project services shall be retained by WFP, according to the letter of agreement to be developed between RGoB and WFP.

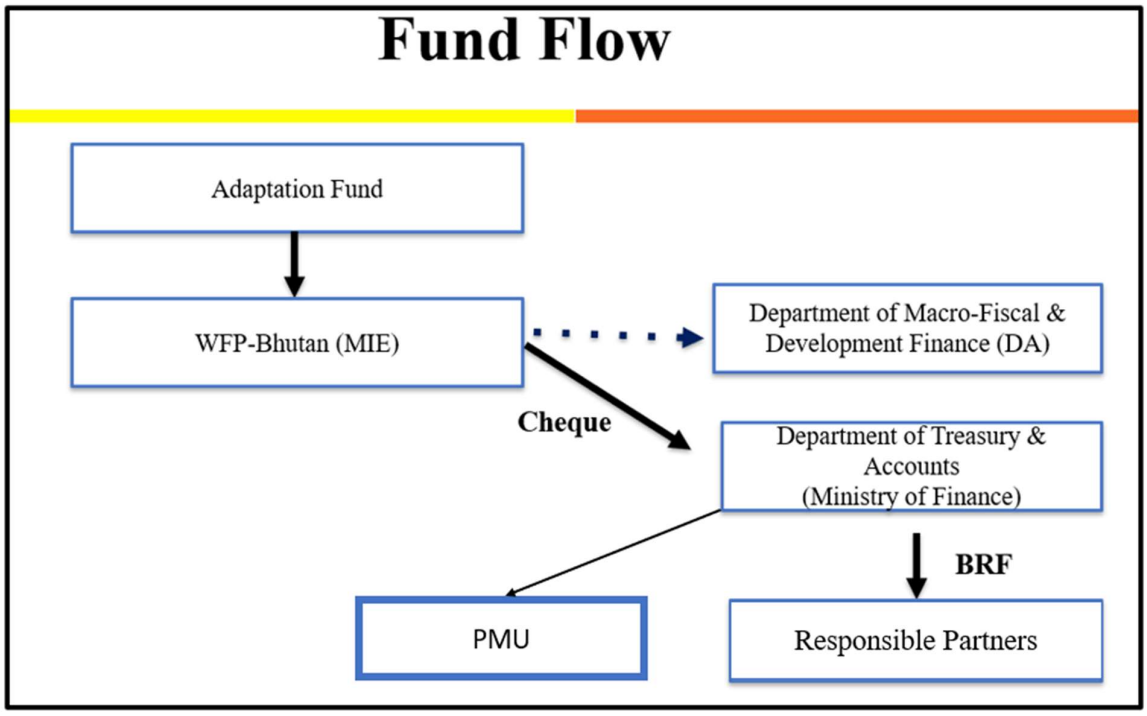


Figure 8. Financial flows for the project

Periodic Progress Reporting

The respective executing entities, using the prescribed reporting formats of the MIE, shall submit periodic progress reports (both technical and financial) to the PMU. The MIE with endorsement from the DA shall submit reports to the Adaptation Fund Secretariat. The grant agreements to be signed with the RGoB (DMDF on behalf of executing entities) shall specify all terms and conditions fulfilling all reporting standards.

A.2. Project governance structure

The MoAL shall establish a Project Steering Committee (PSC) that will be the highest decision-making entity of the project, providing policy and strategic direction for the overall implementation of the project, including approval of annual workplans and budgets, annual reports and financial accounts. The PSC will be chaired by the Secretary of the MoAL. The Project Manager will be an ex-officio member of the PSC and will serve as the Secretary to the PSC. The PSC will be comprised of senior representatives of the key executing partners, namely:

- Director, Department of Marco-fiscal and Development Finance, MoF
- Director, Department of Agriculture, MoAL
- Director, Department of Local Governance and Disaster Management, MoHA
- Director, National Centre for Hydrology and Meteorology (NCHM)
- CEO, RICBL
- CEO, BIL
- Director, RMA
- CEO, RMFPL
- CEO, TMFPL
- Dzongdas of Tsirang, Dagana, Trasigang, and Lhuntse
- CD, WFP Bhutan

Bhutan Trust Fund for Environmental Conservation (BTFEC), which is accredited as a national implementing entity of the AF and has recently received a grant of USD 250,000 from the AF Small Innovation Grant facility, will be invited to attend relevant meetings of the TWG, ensure optimal coordination between activities under the small innovation grant as well as the AF-funded Water Flagship project.

The PSC will meet at least twice per year and extraordinarily if called for by the chair. The Project Technical Specialist will participate in the PSC meetings as a technical advisor and will be invited to report issues relevant to the project progress and monitoring.

Roles and Responsibilities of Project Steering Committee

The roles and responsibilities of the PSC shall be to:

1. Provide strategic directives in line with national policies and programmes;
2. Supervise all aspects of project implementation and disbursement of funds to the executing partner;
3. Review and approve annual workplans and budgets, annual reports and financial accounts;
4. Review and approve project activities for each executing partner;
5. Review project and project status reports to ensure that activities are implemented as planned and that expected outcomes are achieved;
6. Provide guidance on effective and efficient utilization of resources; and
7. Liaise with the RGoB on project implementation and seek policy guidance where needed.

B. Financial and project risk management

Financial and project risk management measures will be assessed throughout the project design and implementation. Potential risks related to project implementation and response measures are described in **Table 7**.

Table 7. Financial and Project Risks and Response Measures

Risk	Ranking	Explanation and response measures
Economic environment	Medium	While the economy has started to grow again, it has not yet recovered from the stringent COVID-19 pandemic containment measures, including two prolonged nationwide lockdowns that immensely slowed economic activity across sectors. Foreign exchange holdings are at a record low. While these conditions create a difficult economic environment for business and for citizens, the project activities will assist in this regard by enhancing economic activities in the project areas by increasing the income of farmers and helping the MFIs and banks to improve their financial situations through enhanced efficiencies. The project will not need to procure any large equipment or large volumes of inputs using foreign exchange.
Political risk	Low	Bhutan is a politically stable country in which the risk of political volatility and civil unrest interrupting the project is extremely low. Other political risks could include a lack of national government commitment to the project, as a different Parliament will be in place after the national elections in November 2023. This is unlikely as the project responds directly to key RGoB policy priorities that are not expected to be changed with the presence of a new Cabinet. The project will be implemented through strong operational partnerships with a range of responsible partners, comprising government, research, private sector and civil society at different levels. Frequent interactions between the PMU, the TWG and the PSC, described in section III.A, will ensure a sentiment of full ownership amongst government and other stakeholders. There is a risk that the RGoB may not fully appreciate the need for sustained capacity development as an integral part of the project's sustainability strategy. Furthermore, there is the risk that more *ad hoc* compensation funds for climate shocks, such as the Kidu Fund and district-level discretionary funds could unintentionally end up undermining the insurance scheme. To address these risks, the project will include advocacy to Parliament and senior government officials on the importance of adopting an integrated approach to climate risk management that includes insurance; as well as the need to ensure that all risk-financing tools are aligned and layered to manage different risks of different severity and frequency. In addition, the project will deepen its ongoing capacity strengthening role to support key executing partners to deploy adaptive management in the event of any disruptive political risk.
COVID-19 pandemic	Low - Medium	In May 2023 the WHO declared the end of the Covid-19 pandemic as a global health emergency. However, the virus is still causing a significant number of deaths globally[182] and the risk remains of new variants emerging that cause new surges in cases and deaths. Should such a variant emerge, there is a chance that that borders could be temporarily closed and domestic movement restricted to reduce the risk of transmission, as happened with previous waves of the pandemic. This could cause delays in project meetings, community awareness raising and training sessions, and delivery of many of the project's activities. This risk will be mitigated by ensuring that appropriate local partnerships are managed for efficient implementation, and employing e-working when possible with staff or consultants. WFP's existing procurement practices will ensure materials and equipment are successfully and safely brought into the country. The decentralised mechanisms for implementation specified in Part III.A will reduce any disruptions to implementation, should there be restrictions on domestic movement.
Financial management	Low	Delays in the release of funds can result in the late start of the project as well as delays during the implementation period. Financial management structures and processes at Government level could cause inefficiency in project management and implementation. Procurement processes could be delayed, thus delaying recruitment of project staff and good needed for technical assistance packages to smallholder farmers. The RGoB procurement processes have been assessed and found to be consistent with WFP's international standards and prescribed procedures to reduce mismanagement of funds. Mandatory checks and quality assurances will also ensure implementation quality is maintained. At the community level, project activities will result in increased financial literacy as well as increased access to funds that can be used by vulnerable communities to implement their selected adaptation options and climate resilient livelihood strategies. Thus it can be expected that the project will improve household-level financial management, as well as that of farmers' groups or other small groups involved in adaptation activities, thereby reducing risks related to household – and group- level financial management.

[182] https://news.un.org/en/story/2023/05/1136367 accessed 22 August 2023.

Lack of understanding of insurance and integrated climate risk management	Medium	The local consultations process has revealed low levels of literacy on the part of smallholder farmers on insurance and a layered approach to climate risk management. Other stakeholders, including the Government, insurance companies and MFIs, likewise do not yet have a full understanding of parametric insurance and the need for this to form part of a multi-level climate risk financing approach, for effectiveness and sustainability. While this is a crucial area and thus potentially a risk to the sustainability of the insurance scheme and to the achievement of the project goal, it is also a common situation to that in many countries in which WFP has successfully assisted stakeholders to with similar activities. The project includes robust activities to be implemented on a recurring basis to build awareness and understanding of the benefits of climate risk insurance and of adopting a multi-level approach to this, as household and at the national level. Bhutan does not yet have a risk financing strategy that recognises a portfolio of instruments that can complement one other, which places unrealistic expectations on the insurance scheme. To mitigate this risk, activities have been included under Component 3 to assist the RGoB to enhance/develop policy on multi-level climate risk management focusing on the agricultural sector. A roadmap will be developed and implemented to scale out the integrated climate risk management approach of the project to enhance sustainability. The specific activities will include a study to map the funding gap required to adopt adaptation responses and explore financial instruments to fund this – with a focus on green credit schemes, insurance and other potential instruments such as anticipatory action.
Low capacities in the insurance ecosystem	Low	The insurance feasibility study has identified low levels of capacity amongst the MFIs and the insurance companies to develop and distribute index-based microinsurance. However, the study also identified many positive conditions in Bhutan for the further development of insurance, including a supportive enabling environment, the presence of MFIs and banks with deep reach across the country, and many financial products that can be integrated into the scheme, including savings and loan accounts. The MFIs and insurance companies have been involved in the development of the CN and FP, and have expressed willingness to participate in the project. The project will develop a coherent and ongoing programme of support to the financial institutions, to enhance capacities at different levels, so that they are capable of running the scheme without external support after the project lifespan. The PMU will include a Project Technical Specialist who will be available for day-to-day technical support, and the WFP CRI team at HQ will provide technical backstopping and oversight on the rollout of the insurance product throughout the project.
Lack of critical data to develop the weather index insurance product	Low	The insurance feasibility study identified a lack of data of different types that would be needed to develop the insurance product. Regarding a lack of long-term weather data, the situation in Bhutan is not different to that in other countries in which WIBI has been successfully deployed. The TSPs that WFP works with to design the indexes have considerable experience in addressing any gaps in long-term weather data to ensure that the index developed is reliable. The TSP, who will design the trigger and also monitor weather information on an ongoing basis, will collect data from various sources (satellite and government databases, yield and productivity data from the DoA, international agencies, agricultural associations, local statistics agencies, etc.). They will design a trigger based on a combination of sources, conduct interviews with farmers on an ongoing basis to validate information, and continuously improve the index. A further data gap relates to insufficient data on the losses that farmers experience as a result of climate impacts. This would be essential to design a reliable AYII scheme; however, the proposal is for a 'business interruption' WIBI product in which the insurable interest will be agricultural income. The sum insured will depend on several factors (ability to pay which has been conservatively assessed as a maximum of USD 10 per year but will be revisited during the ongoing product development and review process, quantifiable risks, costs of inputs. etc.). Different considerations will be employed and the sum insured will eventually be computed by the TSP and approved by the DoA.
Implementation Risks	Medium	A range of implementation risks could lead to not meeting the timeline of activities and could jeopardise the effectiveness and sustainability of the project activities. Insufficient supply of and quality of climate-resilient varieties – such as quality seeds – is a risk that will be addressed through strong involvement of the NSC and the ARDCs and that have been developing climate-resilient and organic seeds and varieties. The project will support outscaling of the research institutes' activities, and thus strengthen the government and research systems for provision of greater quantities of high-quality climate-resilient varieties. By building the capabilities of the extension officers and other district- and gewog-level service providers, the project will support the development of experienced officials at district and village level to implement the activities in a timely and effective manner.

		An implementation risk that has hampered previous projects has been the lack of credible data, with many actions to address climate change being based largely on assumptions. By introducing and disseminating localized LMCS based on improved forecasting that is targeted to different livelihoods and localities, and by leveraging targeted technical assistance and capacity strengthening, the project will be able to significantly reduce this risk; by institutionalizing the multi-level systems for LMCS within each of the countries, the project will help to reduce the risks for interventions in other localities and in the future.
Governance and staffing	Low	There is a risk that low levels of efficiency in implementation due to difficulties in decision-making or to a lack of formal authority could delay or otherwise negatively impact the project implementation. While the execution of the components is spear-headed by mandated government agencies with established structures of institutional human resources and capacity, there is currently a risk related to the numerous vacancies within key government departments. The DoA has recently recruited more extension officers so that there is a full complement at the gewog-level. However, these officials, while adequately qualified, lack experience. It is expected that this issue will be partially resolved by the time project implementation begins. The emphasis of the project activities on developing and implementing a coherent and recurring capacity strengthening programme for climate-resilient agricultural support will help to offset this potential risk. The capacity strengthening programme is intended to be institutionalised within the DoA. Staff vacancies are not expected to be a problem for the MFIs, banks and insurance companies, as these currently have full staffing levels and are able to recruit new staff where vacancies occur.
Out-migration from Bhutan's rural areas		While there is an increasing trend of out-migration from Bhutan's rural areas, the local and community consultations revealed at the same time the desire of many people to remain in their rural areas and continue to participate in agriculture, if they can make a living. This is true for youth too, as long as agriculture can deliver reasonable income and drudgery can be reduced. The project's activities will result in increased income and risk reduction/transfer for smallholder farmers and for rural entrepreneurs. The emphasis on technology-enabled financial-agricultural support and increased incomes through value chain and marketing support to high-value commodities has been designed to appeal to youth, to provide them with viable opportunities to remain in the rural areas. There is strong policy support in Bhutan for agricultural development, which will similarly underpin and strengthen the impact of the project's activities.
Natural hazards / environmental risk	Medium	There is a risk that increased occurrence of extreme weather events will impact end users before sustainable mechanisms for mitigation are developed by the project. The project has been designed to reduce from the first full year of operations the climate-related risks to smallholder farmers that accrue through more erratic rainfall. This includes reducing the risk of more frequent droughts and localised flooding, through the development and dissemination of targeted climate services that will inform community level adaptation planning, as well as by the main focus of the project on rolling out climate risk insurance to provide a form of risk transfer for less frequent and more serious climate impacts. As the insurance MVP includes a savings layer, this will assist farmers to further mitigate climate risks to their livelihoods by enhancing their ability to absorb risks without resorting to negative coping mechanisms. The project will provide enhanced technical assistance to farmers to address key climate risks, including through the provision of more resilient seeds and varieties, so that production and income can increase even as climatic conditions change. Moreover, the facilitation of increased access to finance for community members is expected to increase the adoption of risk reduction measures by households, groups and communities. Environmental degradation in the project areas could reduce the options for effective climate-resilient agricultural technologies. To mitigate this risk, project NRM activities are designed to be environmentally, socially, and institutionally sustainable. The project has identified a wide range of possible options, including some secondary innovations, that could be refined and implemented to directly address local environmental conditions. While all project activities have been developed to address climate risks experienced in and projected for the project districts, there is risk that increasing climate variability and impacts outpaces the effectiveness of the project activities at the local level. While this is not expected to have a decisive effect over the 5-year lifespan of the project, it is further motivation for the project's emphasis on assisting the RGoB to develop a multi-level framework for managing climate risk, to further mitigate against growing climate risks.

C. Environmental and social risk management

The entire project was screened for environmental and social risks against the 15 principles outlined in the AF's Environmental and Social Policy, as set out in Part II.N above. The project proposal is classified as a "Category B" or "medium risk" project, mainly due to the presence of Undefined Sub-Projects in Component 2 of the project. The full E&S Screening and assessment is included in **Annex 7**.

The Environmental and Social Management Plan (ESMP) is described in **Annex 7** and is articulated at two levels:

1. Risk mitigation measures (and monitoring and reporting thereof) for the risks identified through the risk screening and assessment of the proposal;
2. Procedures for the screening, assessment and mitigation of the Undefined Sub-Projects (in Components 1 and 2) during the implementation of the project. **Annex 7** lists potential and excluded sub-projects.

The ESMP elaborated for this project will consider and track risks that have been identified at proposal stage; screen for any new risks during the implementation of the project and serve to monitor and report on the mitigation measures. The monitoring and reporting measures proposed in the ESMP are fully integrated in the monitoring plan of the project.

The ESMP does not allow the implementation of activities, including undefined sub-projects, with high risk. The proposed project will fully comply with national laws particularly the National Environmental Regulations, the Adaptation Fund's Environmental and Social Policy and the WFP's social and environmental standards. During implementation, WFP and its partners will ensure effective coordination with the National Environmental Agencies in order to duly comply with the requirements established within the National Environmental Regulation and Guidelines. In this regard, a screening form will have to be obtained from NEAs for each Field-Level Agreement (sub-project) and submitted to them for review before implementation starts.

The beneficiaries and affected populations have access to a Grievance Mechanism which is described in **Annex 8**. Complaints and feedback can be filed through different channels, in order to make it as inclusive as possible.

D. Monitoring and evaluation arrangements

Gender-responsive project monitoring, reporting and evaluation will be conducted in line with the WFP guidelines, procedures and standards and in adherence with WFP's internal "Evaluation Quality Assurance System" (EQAS). The EQAS approach promotes a systematic approach to internal and external stakeholder involvement, thereby ensuring balanced and accurate findings that support relevant recommendations for optimal use in evidence-based decision-making. WFP will ensure that project financial monitoring and accounting follow the International Public Sector Accounting Standards (IPSAS), and also accord with and adhere to national regulations and guidelines.

The overall responsibility for project monitoring, evaluation and reporting will rest with WFP. The WFP Research, Monitoring and Assessments (RAM) unit in the CO will provide guidance to the National Project Manager and to the M&E Officer located within the PMU and ensure that monitoring and evaluation (M&E) processes, outcomes, outputs and activities are aligned with the AF Strategic Results Framework and with AF rules and regulations.

The following will be the key project monitoring and evaluation and reporting activities:

Inception planning: The project will begin with an inception period of six months. Inception activities will include developing and signing agreements with the relevant stakeholders and partners, recruitment and induction of staff and procurement of project equipment and material. The inception period will also involve: (i) planning and stakeholder engagement for setting up / activating the relevant coordination mechanisms/structures including the PSC, TWG, and the decentralised coordination mechanisms within the District administrations; (ii) setting up of project accounts; and (iii) holding an inception workshop. The inception workshop will be held to provisionally identify the targeted localities within the identified districts; develop the first year workplan and detailed budget, and further refine implementation approaches, including targeting approaches; and develop systems/tools including for M&E, community engagement, tailoring the complaints and feedback mechanism, and approving standard operating procedures (SOPs) to clarify roles of the stakeholders and partners that will be developed before the inception workshop. All

planning, monitoring and reporting templates shall be validated during the inception workshop and endorsed by the project steering committee.

Baseline assessment: The project baseline assessment will be conducted within the first months of the project to establish necessary baseline values for measuring indicators set out in the results framework. The planning for the baseline assessment will be done as part of the inception process.

Quarterly and annual reviews and progress reports: Regular monitoring during project execution will be reported through quarterly progress reports and annual progress reports. The Project Manager within the PMU will facilitate preparation of quarterly progress reports to be submitted to WFP and the PSC, via the TWG. A strong management information system (MIS) with constantly updated dashboards and almost real-time monitoring of key indicators will be developed as a part of project. This information will feed into the periodic reporting and support evidence-based decision making throughout the project.

Annual Progress Reports: The national Project Manager, with technical support from the WFP CO (Head of the Food Systems Unit), will coordinate inputs from the implementation sectors and responsible partners to prepare Annual Progress Reports for submission to WFP and the PSC. The reports will outline financial, procurement and activity implementation progress against the targets in the results framework as well as compliance with the requirements of the environmental and social assessment and management frameworks.

The annual reports and workplans will be reviewed and approved by the TWG before being submitted to WFP and the PSC no later than one month after the end of the project year. WFP will then consolidate and submit the Annual Progress Reports in the standard AF PPR template to the AF Secretariat no later than two months after the end of the project implementation year.

The national PMU will ensure that the PPRs are supplemented by annual project work plans for the next Project year, also to be approved by the PSC. The annual plan for the forthcoming year will include details on specific project activities, roles and responsibilities, and a detailed budget with a disbursement schedule and procurement plan for major items included as annexes.

At the end of the project, a project completion report shall be prepared within six months after project completion and submitted by WFP to the AF secretariat.

Mid-term review and final evaluation: An external independent mid-term review will be carried out half-way through project implementation and will provide an overview of the state of project implementation, effectiveness of implementation arrangements, and recommendations for project modifications if any. An independent final evaluation will be completed within nine months after project termination.

Finally, a financial audit will be provided by WFP to the AF Secretariat six months after the end of the fiscal year in which the project ended.

An indicative plan and costing for monitoring, reporting and evaluation activities is provided below. Final copies of the view and evaluation reports will be shared with the MoF and MoAL for their records. **Table 8** outlines an indicative schedule for monitoring and evaluation and reporting, and responsibilities between MoAL and WFP.

Table 8. Indicative Project Monitoring and Evaluation and Reporting Schedule

Type of Report	Responsible parties	Budget (USD)	Timeframe and submission deadline
Inception Report	Project Manager	10,000	1 month after inception workshop
Baseline Study Report	Project Manager M&E Officer in PMU WFP CO RAM unit	20,000	1 month after completion of the data collection
Monthly dashboard report	Project Manager	0	Monthly (Last day of month)
Quarterly Progress and Financial Report	Project Manager	0	End of each quarter (1 month after end of quarter)

Project Steering Committee meetings and TWG meetings (minutes, presentations & action plans)	Project Manager	9,600	PSC every six months in Year 1 & Year 5, annually in other years; TWG every 3 months
Annual Progress Reports (Project Performance Report-PPRs)	Project Manager WFP CO (Head of Food Systems Unit)	0	Annually, 2 months after the end of the project implementation year)
Annual project monitoring	M&E Officer in the PMU WFP CO RAM unit	0	Annually for 5 years
Mid-Term Review Report	External Consultants WFP CO RAM unit	20,000	2.5 years after project inception (3 months after data collection)
Final Project Report (Project Completion Report)	Project Manager WFP CO (Head of Food Systems Unit)	5,000	End of project (6 months after end of project)
Final Project Evaluation Report	External Consultants WFP CO RAM unit	20,000	End of project (within 9 months of project completion)
Financial Audit	WFP Auditing company	30,000	End of project (within 6 months after the end of the fiscal year in which the project ended)
Total		**114,600**	

E. Project results framework

In addition to the specific indicators set out in this results framework, the project will contribute to the achievements of the NDC and the SDGs of Bhutan, as specified in Part II.F. **All indicators will be disaggregated by gender and age, where relevant**.

Project impact	Indicator	Baseline	Target	Sources and means of Verification	Risks and Assumptions
Enhanced resilience of smallholder farmers in Bhutan to key identified climate risks and enhanced food security by rolling out innovative index-based microinsurance through an integrated resilience building approach	I.1. Climate Resilience Capacity Score (CRCS)	TBD, Percentage of targeted households with high level of CRCS	TBD after baseline, Percentage of targeted households reporting high level of CRCS, to be at least 50% above baseline	Baseline Survey, Mid-term Review and Endline Survey at the household level	• Ongoing effects of the COVID-19 pandemic on the economy of Bhutan and the results of the Government restructuring could delay implementation and reduce effectiveness of project activities, thus potentially reducing impact. (R) • The political stability in Bhutan will continue during project implementation. (A)

Component 1: Strengthened climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers					
Outcome/Output	**Indicator**	**Baseline**	**Target**	**Source of Verification**	**Risks and Assumptions**
Outcome 1.1 Strengthened access to last mile climate services and increased understanding of smallholder farmers on index insurance benefits	1.1.a Climate services score[183]	TBD	TBD at inception; project will aim for at least 50% of HHs in targeted villages with improved climate services score	Baseline & Endline Survey	• Climate services can be tailored to the needs of the communities and targeted communities use these – assumes the necessary localized data is available or can be developed (A)

[183] This WFP Corporate Results Framework outcome indicator measures the extent to which communities are able to manage climatic shocks and risks through information and practices, including LMCS.

Output 1.1.1. Linkages facilitated with existing climate services and support to gender-responsive digitalised dissemination	1.1.1.a. Number of stakeholders (government. and others) trained on developing LMCS, disaggregated by gender and age	0	40	Workshop / training reports	• No major shocks jeopardize the implementation of trainings (A)
Output 1.1.2. Sensitisation of targeted smallholder farmers on the benefits of index-based microinsurance as part of a package to manage climate risks	1.1.2.a. No. of policy makers sensitized on integrated approach to insurance 1.1.2.b. Number of sensitization initiatives facilitated on insurance and finance strategy	0 0	40 40	Project/ Workshop reports	
Output 1.1.3 Leverage ongoing local adaptation planning to assist smallholder farmers to plan their adaptation responses for increased resilience and income	1.1.3.a Number of SHs (Govt., MFIs, community leaders, influencers) trained on rapid participatory local adaptation planning 1.1.3.b. Number of participatory community workshops on local adaptation planning that integrates layered climate risk management	0 0	60 (At least 15 / district), at least 50% of whom are women At least 12 (1 per gewog)	Project/ Workshop reports Project reports	• Sub-national structures are committed to strengthening their capacities and receive political support to do this (A) • Community members are sufficiently interested in and willing to take part in local adaptation planning process (A)
Outcome 1.2 Strengthened capacities for climate-resilient agricultural support and incentives for	1.2.a Percentage of targeted HHs reporting ongoing benefits from	0	TBD at inception, at least 50%	Baseline and endline survey at HH	• No major shocks and related emergency responses jeopardize the implementation of technical support activities (A)

sustainable resilience building	enhanced livelihood asset base, by age and gender				• Communities prioritize the diversification and strengthening of their livelihood bases in their adaptation plan (A).
Output 1.2.1 Consolidate existing climate-resilient agricultural support and develop and implement recurring training strategy to fill identified gaps	1.2.1.a. Number of extension staff trained	0	45	Project reports	
Output 1.2.2 Identify and empower climate champions for effective peer-to-peer learning to increase resilience and income	1.2.2.a Number of lead farmers and youth entrepreneurs trained and active as climate champions, disaggregated by gender and age	0	40 (at least 10 / district)	Project reports	
Output 1.2.3 Develop and implement learning, knowledge management and communication strategy and feedback loop for learning from activities on the ground	1.2.3.a. No. of dialogues on innovation conducted 1.2.3.b. No. of learning, knowledge management and communication products developed	0 0	8 (2 /year, starting in Y2) TBD, at least 6	Project reports Workshop reports	
Component 2: Innovative climate risk transfer mechanism rolled out and smallholder farmers' resilience built through integrated approach					
Outcome/Output	**Indicator**	**Baseline**	**Target**	**Source of Verification**	**Risks and Assumptions**
Outcome 2.1 Smallholder farmers adopt sustainable pathways for climate risk transfer and diversified livelihoods	2.1.a. Investment capacity index[184] (HH level, in USD)	0	TBD at inception, HH level in USD	Baseline, Mid-term review and End-line Survey	• Extreme weather conditions and severe recurrent drought during the project implementation might limit adaptive capacities (R).

[184] This WFP indicator measures the average monetary value (USD) of the investment capacity of households supported in a given reporting year, defined as the sum of savings, loans for productive purposes, and weather/yield index insurance payouts received from micro and meso insurance schemes.

2.1.1 Risk transfer mechanism for smallholder farmers implemented and scaled up	2.1.1.a. Number of people covered by insurance product 2.1.1.b Number of people who participated in financial/insurance and digital educational and capacity-building initiatives 2.1.1.c. Total sum insured through risk management interventions	0 0 0	40,000 (10,000 HHs) 10,000 TBD after index and insurance product are developed	Project reports Endline survey Project reports Workshop reports Project reports	• Policy changes related to insurance and other financial schemes may adversely or positively impact the project.
Output 2.1.2 Farmers have increased access to business development support and microfinance	2.1.2.a Amount of savings made by participants of financial inclusion initiatives 2.1.2.b Number of green finance products enhanced and linked with insurance	0 0	USD600,000[185] TBD at inception	Project reports Endline Survey Baseline & Endline Survey	

[185] Calculated based on an estimated 60% of participants (6,000 people) saving an additional USD50 per year, for each of 2 years (assuming that participants would need some time and support to increase their savings), this translates into 6,000 x 50 x 2 = USD600,000 additional own savings for the project participants.

Output 2.1.3 Linkages facilitated to enhance diversified livelihoods through value chain and marketing support for climate-resilient value chains	2.1.3.a. Number of climate-resilient value chain analyses developed/ enhanced 2.1.3.b. Number of farmers reporting increased income as a result of value chain and marketing support	0 0	2-4 2,500	Project reports Project reports Endline survey	
Component 3: Innovative climate risk management institutionalised for long-term sustainability					
Outcome 3.1 Strengthened ecosystem for sustainable climate risk transfer through microinsurance	3.1.a. Number of climate risk management mechanisms institutionalised	0	TBD at inception	Project reports Endline survey	
Output 3.1.1. Support stakeholders to institutionalise innovative climate risk management	3.1.1.a. Forum created for institutionalizing innovative climate risk management 3.1.1.b. Number of national programmes into which insurance is integrated	0 0	1 At least one national programme	Project reports Project reports	
Output 3.1.2. Develop enabling environment and advocate for institutionalising of innovative climate risk management	3.1.2.a. Revised regulations by RMA to facilitate sustainability of scheme 3.1.2.b. Policy on multi-level agricultural climate risk management	0 0	1 1	Project reports National regulation Project reports Policy	

F. Alignment with the Adaptation Fund results framework

Project Objective(s)[186]	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Component 1: Strengthened climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers	**1.1.a**. Climate services score[187] (unit of analysis is percentage of targeted population)	**Outcome 3**: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	900,620
Component 2: Innovative climate risk transfer mechanism rolled out and smallholder farmers' resilience built through integrated approach	**2.1.a.** Investment capacity index[188] (HH level, in USD)	**Outcome 8:** Support the development and diffusion of innovative adaptation practices, tools and technologies	8. Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level	2,992,051
Component 3: Innovative climate risk management institutionalised for long-term sustainability	**3.1.a.** Number of climate risk management mechanisms institutionalised	**Outcome 8:** Support the development and diffusion of innovative adaptation practices, tools and technologies	8. Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level	302,128
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 1.1 Strengthened access to last mile climate services and increased understanding of smallholder farmers on index insurance benefits	**1.1.1.a.** Number of stakeholders (government. and others) trained on developing LMCS, disaggregated by gender and age	**Output 3.2:** Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	**3.2.2** No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders transfer of knowledge	576,620
Outcome 1.2 Strengthened capacities for climate-resilient agricultural support and incentives for sustainable resilience building	**1.2.a** Percentage of targeted HHs reporting ongoing benefits from enhanced livelihood asset base, by age and gender	**Output 3.2:** Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	**3.2.2** No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	324,000

[186] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

[187] This WFP Corporate Results Framework outcome indicator measures the extent to which communities are able to manage climatic shocks and risks through information and practices, including LMCS.

[188] This WFP indicator measures the average monetary value (USD) of the investment capacity of households supported in a given reporting year, defined as the sum of savings, loans for productive purposes, and weather/yield index insurance payouts received from micro and meso insurance schemes.

Outcome 2.1 Smallholder farmers adopt sustainable pathways for climate risk transfer and diversified livelihoods	**2.1.1.a**. Number of people covered by insurance product	**Output 8**: Viable innovations are rolled out, scaled up, encouraged and/or accelerated	**8.1.** No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	2,992,051
Outcome 3.1 Strengthened ecosystem for sustainable climate risk transfer through microinsurance	**3.1.1.b.** Number of national programmes into which insurance is integrated	**Output 8**: Viable innovations are rolled out, scaled up, encouraged and/or accelerated	**8.1.** No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	302,128

G. Detailed budget

Cost category	*Yr1*	*Yr2*	*Yr3*	*Yr4*	*Yr5*	*Total*	*Notes*
Output 1.1.1. Linkages facilitated with existing climate services and support to gender-responsive digitalised dissemination							
1.1.1.1 Undertake/complement existing stocktaking of localized climate services in the project areas and develop strategy to address gaps and enhance gender-responsive dissemination							
Workshop and training	30,000					***30,000***	Minimum of 12 workshops and consultations at district and block levels
Travel	5,000					***5,000***	Travel for project staffs and extension agents
1.1.1.2 Support the NCHM and DoA to develop more targeted and effective agro-met advisories for the project areas							
Technical assistance/ FLA	25,000	25,000				***50,000***	Technical assistance provided by International Met agency to support the National Centre of Hydrology and Meteorology (NCHM) and Department of Agriculture (DoA) in agro-met advisory services
Workshop and training		15,000	15,000			***30,000***	Ex-country speciali training for NCHM and DoA in international met agency
Travel	2,500	2,500				***5,000***	Project staffs, WFP Technical Assistance (TA) specialists travel costs
1.1.1.3 Implement steps identified in strategy (Activity 1.1.1.1) for enhanced gender-responsive digitalised and non-digitalised dissemination							
Technical assistance/ FLA		10,000				***10,000***	Technical assistance provided by the National consultant for the Training of Trainers (ToTs)
Workshop and training		40,000				***40,000***	workshops, events taking place at district & blocks level. Minimum of 16 events
Travel		3,000	2,000			***5,000***	Travel costs for project staffs, extension officials
Miscellaneous		1,000				***1,000***	Communication materials required for community consultations and workshops
Total Output 1.1.1	62,500	96,500	17,000	-	-	***176,000***	
Output 1.1.2. Sensitisation of targeted smallholder farmers on the benefits of index-based microinsurance as part of a package to manage climate risks							
1.1.2.1 Develop targeted, gender-responsive and climate-informed insurance sensitisation strategy and materials							
Staff costs	1,624	1,624	1,624	1,624	1,624	***8,120***	Technical assistance provided by the Climate Risk Insurance team

Technical assistance/ FLA	5,000					***5,000***	Costs of technical assistance provided by Responsible partners (RPs) (Micro-finance institutes (MFI) and Insurance companies)
Workshop and training	15,000	15,000				***30,000***	Training, workshops, consultations at district/ block level, minimum of 12 events
Travel	5,000					***5,000***	Travel costs for project staffs, RPs, WFP specialists
Miscellaneous	1,500					***1,500***	Workshop and communication materials for district/ block level workshops
1.1.2.2. Provide advocacy and sensitization to policy makers on benefits of index-based insurance as part of an integrated approach to manage climate risks							
Workshop and training	2,500		2,500			***5,000***	Workshops at national level on advocacy and sensitization to policy makers and institutions
1.1.2.3. Train aggregators and distribution and delivery channels on the climate risk insurance and finance product, as well as ARDCs, academic/ research institutions, extension officials, and community leaders and influencers, on implementing insurance sensitisation strategy							
Technical assistance/ FLA		14,000				***14,000***	Technical assistance provided by a Local Consultant, working together with PMU
Workshop and training	30,000	20,000				***50,000***	Trainings, workshops, consultations and events at various levels. Minimum of 20 events
Travel	5,000					***5,000***	Travel for project staffs, consultant
1.1.2.4 Implement targeted in-person insurance and finance[1] sensitisation strategy linked to financial literacy and awareness							
Technical assistance/ FLA	5,000	5,000				***10,000***	Contractual service for advocacy (MFI, Youth groups, digital advocacy)
Workshop and training	5,000	10,000	10,000	5,000		***30,000***	block festivals, dramas in selected villages and blocks
Travel	2,500	2,500	2,000	1,000		***8,000***	Travel for implementers (youth, MFI, contractual service providers)
Miscellaneous	1,000	1,000	1,000			***3,000***	Materials for advocacy such as posters, communication materials
1.1.2.5 Implement ongoing digital and social media insurance and finance sensitisation strategy							
Technical assistance/ FLA		7,000	5,250	3,500		***15,750***	Local Consultant for digital services
Total Output 1.1.2	79,124	76,124	22,374	11,124	1,624	***190,370***	
Output 1.1.3 Leverage ongoing local adaptation planning to assist smallholder farmers to plan their adaptation responses							
1.1.3.1 Develop supplementary gender-responsive training strategy and materials for rapid participatory local adaptation planning, building on existing initiatives							
Staff costs	22,500					***22,500***	Technical assistance provide by WFP Gender specialist
CO program officer	6,450	4,300				***10,750***	Technical assistance provided by WFP Programme Officer
Workshop and training	25,000	12,500				***37,500***	Gender training for implementing partners and communities
1.1.3.2 Train district-level officials, MFIs, community leaders and influencers on rapid participatory local adaptation planning, leveraging existing initiatives							
Staff costs	7,500					***7,500***	Technical assistance provided by WFP community based participatory planning specialist
Workshop and training	5,000	20,000	15,000			***40,000***	Trainings, workshops, consultations and events at various levels. Minimum of 16 events
Travel	1,500	3,000	2,500			***7,000***	Travel costs for project staffs, DoA, WFP specialists

1.1.3.3 Hold participatory community workshops on local adaptation planning that integrates climate risk insurance and savings, and advocate for the integration of local adaptation plans into district and national adaptation plans							
Technical assistance/ FLA		10,000	10,000	10,000		***30,000***	Costs for Districts and Responsible Partners in lead
Workshop and training	5,000	15,000	15,000	15,000		***50,000***	Block level workshops and consultations
Travel		2,000	2,000	1,000		***5,000***	Travel costs for district and RPs staffs
Total Output 1.1.3	72,950	66,800	44,500	26,000	-	***210,250***	
Output 1.2.1. Consolidate existing climate-resilient agricultural support and develop and implement recurring training strategy to fill identified gaps							
1.2.1.1 Consolidate climate-resilient agricultural support in project districts and develop localised strategy for enhanced technical support							
Technical assistance/ FLA		5,000				***5,000***	Implementation costs for DoA, relevant Agriculture Research Development Centres (ARDC).
Workshop and training	5,000	15,000				***20,000***	Trainings, workshops at local level. Min of 8 events
Travel		5,000				***5,000***	Travel for Project Management Unit (PMU) staffs, DoA, ARDC
1.2.1.2 Enhance existing initiatives to train extension staff on a recurring basis to develop practical skills on climate-resilient agriculture to increase farmers income							
Technical assistance/ FLA		2,000	2,000	1,000		***5,000***	Implementation costs of PMU, ARDC
Workshop and training	5,000	15,000	15,000	10,000	5,000	***50,000***	Various trainings, workshops at district/ block level. Min of 20 events
Travel	1,000	2,500	2,500	1,000		***7,000***	Travel costs for PMU, DoA, ARDC, Extension agents
Miscellaneous		1,000	1,000			***2,000***	Training materials and consumables
Total Output 1.2.1	11,000	45,500	20,500	12,000	5,000	***94,000***	
Output 1.2.2. Identify and empower climate champions for effective peer-to-peer learning and project outreach							
1.2.2.1 Extend the approach of CARLEP to further empower lead farmers and youth agricultural entrepreneurs to be climate advocates for increasing farmers' income through risk layering approach							
Technical assistance/ FLA	1,000	6,000	6,000	1,000	1,000	***15,000***	Implementation costs of ARDC, College of Natural Resources (CNR)
Workshop and training	25,000	25,000				***50,000***	TOT, workshops at local level . Minimum of 20 events
Travel	4,000	4,000				***8,000***	Travel costs for ARDC, CNR, participants
Miscellaneous	2,000	1,000				***3,000***	Training and communication materials
Total Output 1.2.1	32,000	36,000	6,000	1,000	1,000	***76,000***	
Output 1.2.3 Develop and implement learning, knowledge management and communication strategy and feedback loop for learning from activities on the ground							
1.2.3.1 Develop learning, knowledge management and communication strategy							
Technical assistance/ FLA	10,000					***10,000***	Implementation cost of CNR
Miscellaneous	3,000					***3,000***	Learning materials
1.2.3.2 Support dialogues on 'innovation to increase climate resilience' between research organisations and climate-vulnerable communities							
Technical assistance/ FLA		1,500	1,500	1,000	1,000	***5,000***	Implementation costs of CNR, DoA
Workshop and training		12,500	12,500	12,500	12,500	***50,000***	Dialogues at districts and agencies at various levels. Minimum of 20 events

Travel		2,000	1,000	1,000	1,000	***5,000***	Workshops and consultation related travel
Miscellaneous		1,000	1,000	1,000		***3,000***	Publications and materials
1.2.3.3 Develop feedback loop for learning from activities on the ground							
Technical assistance/ FLA	5,000	5,000				***10,000***	Implementation costs of CNR, DoA.
1.2.3.4 Develop and disseminate knowledge products and implement communications strategy							
Technical assistance/ FLA		2,000	1,000	1,000	1,000	***5,000***	Implementation cost of CNR and PMU
Workshop and training		12,500	12,500	12,500	12,500	***50,000***	Consultations and workshops at district level
Travel		2,500	2,500	2,500	2,500	***10,000***	Travel costs of PMU and CNR
Miscellaneous		1,000	1,000	1,000		***3,000***	Knowledge products and materials
Total Output 1.2.3	18,000	40,000	33,000	32,500	30,500	***154,000***	
Total Component 1	**275,574**	**360,924**	**143,374**	**82,624**	**38,124**	***900,620***	

Output 2.1.1. Risk transfer mechanism for smallholder farmers implemented and scaled up							
2.1.1.1 Design the microinsurance product for smallholder farmers, test prototype and refine index seasonally							
Staff costs	3,630	3,630	2,830	2,830	2,830	***15,750***	WFP 2 Insurance Specialists and 1 Programme Officer to support in contract with insurers and service providers (Technical Service Provoder) and distribution channel), review the policy and technical note, assess the post-season evaluation report
Product design, weather and trigger monitoring	50,000	50,000	40,000	40,000	30,000	***210,000***	Cost of Technical Service Provider (TSP) to test, refine and develop insurance index (all charges)
Workshop and training	10,000	10,000	10,000	10,000	10,000	***50,000***	Insurance related workshops with stakeholders and communities
Committee and task force meetings	15,000	15,000	15,000	10,000	10,000	***65,000***	Microinsurance committee meetings and consultations
Travel	22,000	17,000	22,000	17,000	17,000	***95,000***	Travel of stakeholders. Ex-country visits of Government staffs to learn on microinsurance
Miscellaneous	2,500					***2,500***	Training and communication materials
2.1.1.2 Formalise key partnerships at different levels and enhance operational and technical capacities to begin rollout of minimum viable insurance product; extending this to integrate insurance with market access and value chain development programmes							
Staff costs	5,780	5,780	5,180	2,015	2,015	***20,770***	WFP Insurance Specialists and 1 Programme Officer to support in capacity development workshops and meeting for stakeholders, support WFP country office (CO) in the development of Microinsurance committee, provide the terms of references + 1 CO Programme Officer responsible for the oversight of this activity
Technical assistance/ FLA	5,000	5,000				***10,000***	Implementation costs of PMU and RPs
Workshop and training	10,000	10,000	10,000	10,000		***40,000***	Workshops and consultations at national, district and block levels
Travel	3,000	2,000				***5,000***	Travel of project staffs and specialists
Miscellaneous						-	Materials required for publications
2.1.1.3 Develop a Smart Subsidy Strategy so premium support creates a pathway for beneficiaries to increase their income generating capacity and ensure public and/or private involvement to support the scheme financially							

Staff costs	5,980	5,980	2,930	1,915	1,915	***18,720***	WFP 2 Insurance Specialists and 1 Programme Officer to support in conducting ability and willingness to pay assessments, co-create roadmaps to sustainability
Transfer cost (premium support)	60,000	138,000	252,000	165,000	75,000	***690,000***	Premium amount for micro insurance
Distribution support	12,000	27,600	50,400	33,000	15,000	***138,000***	Support and distribution fees
2.1.1.4 Build on existing digital platforms in Bhutan to enhance seamless process with farmers that integrates localised agro-met advisories, insurance, savings and green finance/loans							
Staff costs	1,624	1,624	1,624	812	812	***6,496***	WFP 1 Insurance Specialist to support CO in providing best practices in the customer/client journey, which will be critical in the digitalization of processes
Technical assistance/ FLA		20,250				***20,250***	National digital expert
Procurement (Digitalization)	50,000	50,000	50,000			***150,000***	Development of the digital platform
Travel	5,000	5,000	-	-	-	***10,000***	Travel for project staffs, specialists, others
Miscellaneous						-	Required materials for communication at local level
2.1.1.5 Develop and implement ongoing capacity strengthening programme for the insurance sector, potential aggregators and distribution and delivery channels (MFIs, banks and/or telco), and technical departments (DoA at different levels)							
Staff costs	4,230	4,230	3,330	2,315	1,158	***15,263***	WFP 2 Insurance Specialists and 1 Programme Officer to support with design workshop materials, literacy campaign, review marketing materials, etc.
Study tours and conferences	20,000	20,000	20,000	20,000	20,000	***100,000***	Government officials participating in global microinsurance conferences and study tours
Workshop and training	5,000	10,000	10,000	10,000	5,000	***40,000***	various workshops and traninings
Travel	3,000	4,000				***7,000***	Travel costs of PMU, DOA, WFP specialists, participants
Miscellaneous	1,000	2,000				***3,000***	Support materials for training and workshops
2.1.1.6 Support the reinforcement of saving capacity of smallholder farmers at the formal and informal level so savings can play a key role in climate risk management							
Staff costs	2,630	2,630	2,330	1,715	1,058	***10,363***	WFP 2 Insurance Specialists and 1 Programme Office to support with the design the Savings and Insurance layering (SAIL) programme, provide guidance materials etc.
Savings subsidy	40,000	60,000	100,000			***200,000***	Subsidy to support the SAIL or savings layering
Savings interest	4,000	10,000	20,000	20,000	20,000	***74,000***	Savings interest component support
Workshop and training	15,000	15,000	15,000	5,000	5,000	***55,000***	Trainings and workshops to support reinforcement of savings at community level
Travel	5,000	5,000	5,000	5,000	5,000	***25,000***	Travel costs of missions, PMU, DOA, participants
Miscellaneous						-	Support materials for trainings and workshops
Total Output 2.1.1.	361,374	499,724	637,624	356,602	221,787	***2,077,111***	
Output 2.1.2. Farmers have increased access to business development support and microfinance							
2.1.2.1 Facilitate increased access to existing credit products and available business development support for rural SCIs (small and cottage industries), with a focus on those owned by women and small and marginal farmers							
Staff costs	1,412	1,412	1,412	1,006	503	***5,745***	WFP 2 Insurance Specialists to Provide credit and insurance bundling design.
Technical assistance/ FLA	15,000	15,000	15,000			***45,000***	Responsible Partners' costs

Technical assistance/ FLA		17,500				***17,500***	Local Gender consultant
Workshop and training	12,000	12,000	12,000			***36,000***	Events for partnerhsip building, advocacy, gender trainings
Travel	5,000	5,000	5,000	5,000	5,000	***25,000***	travel of PMU and responsible partners
Miscellaneous	600	600	600	600	600	***3,000***	Support materials for training and workshops
2.1.2.2 Support the development of and access to green finance products that can increase farmers' income, bundled with the insurance product							
Staff costs	2,012	2,012	1,412	1,006	503	***6,945***	WFP 2 Insurance Specialists to support the development of green finance products (product note)
Technical assistance/ FLA		15,000		15,000		***30,000***	Costs of a Green finance consultant
Workshop and training		8,500	8,500	8,500	8,500	***34,000***	Stakeholder worskshops and consultations
Travel		5,000	5,000	5,000	5,000	***20,000***	Travel costs of projectstaffs, specialists, MFI
Total Output 2.1.2.	36,024	82,024	48,924	36,112	20,106	***223,190***	
Output 2.1.3 Linkages facilitated to enhance diversified livelihoods through value chain and marketing support for climate-resilient value chains							
2.1.3.1 Conduct/ enhance value chain analyses and select 2 – 4 climate-resilient and high-value products for focused value chain and marketing support, building on existing initiatives							
Technical assistance/ FLA	10,000	8,000				***18,000***	Local consultant, Department of Agriculture marketing and Cooperatives (DAMC) to determine atleast 1 commercial value chain per district
Procurement	10,000	10,000	5,000			***25,000***	Small value marketing support
Travel	3,000	2,000				***5,000***	Travel of consultant and DAMC staffs
2.1.3.2 Provide additional technical assistance and small-scale inputs to reduce post-harvest losses and enhance processing							
Technical assistance/ FLA	5,000	20,000	20,000	10,000	5,000	***60,000***	Implementation costs of DAMC and PMU
Workshop and training	10,000	15,000	20,000	15,000	10,000	***70,000***	Various technical trainings and workshops
Procurement	20,000	30,000	40,000	40,000	20,000	***150,000***	Climate smart agriculture technology, Post harvest technology, small inputs to beneficiaries
Travel	2,000	3,000	4,000	4,000	2,000	***15,000***	Travel of all implementing partners
Miscellaneous		2,000	2,000	1,000		***5,000***	Support materials for training and workshops
2.1.3.3 Facilitate enhanced market access for selected climate-resilient commodities							
Technical assistance/ FLA		6,000	10,000	4,000		***20,000***	Implementation costs of DAMC, districts, aggregators
Workshop and training		50,000	70,000	50,000	20,000	***190,000***	Workshops, buyer-seller meetings, organic fairs, study tours
Procurement		5,000	20,000	10,000	5,000	***40,000***	Market support materials and hardware
Travel		2,500	10,000	5,000	2,500	***20,000***	travel of facilitators
Miscellaneous			2,000	1,000		***3,000***	Support materials for trainings and workshops
2.1.3.4 Provide support to address any key barriers identified in the value chain analysis							
Technical assistance/ FLA			15,750			***15,750***	Costs of national consultant
Procurement			10,000	10,000	10,000	***30,000***	Provide key inputs and support to address key barriers in value chains
Travel		5,000	5,000	5,000	5,000	***20,000***	Travel costs of project staffs and supporting agencies
Miscellaneous	1,000	1,000	1,000	1,000	1,000	***5,000***	Publication materials
Total Output 2.1.3	61,000	159,500	234,750	156,000	80,500	***691,750***	

Total Component 2	**458,398**	**741,248**	**921,298**	**548,714**	**322,393**	***2,992,051***	

Output 3.1.1. Support stakeholders to institutionalise innovative climate risk management							
3.1.1.1 Support Government officials at different levels, as well as private sector, to enhance insurance ecosystem in Bhutan							
Staff costs	7,180	7,180	5,680	4,665	4,665	***29,370***	WFP 2 Insurance Specialists and 1 CO Programe Officer to provide regulatory guidance and workshops, support draft policies, support implementation
Workshop and training		5,000	5,000	5,000	5,000	***20,000***	Various workshops and consultations at all levels
Travel		5,000				***5,000***	Study tours for gov staffs
3.1.1.2 Undertake studies to enable roadmap for progressive development of integrated climate risk management approach to enhance sustainability							
Staff costs	-	-	2,418	2,418	2,418	***7,254***	WFP Climate risk insurance team or WFP consultant
Technical assistance/ FLA				12,250		***12,250***	National consultant
Workshop and training		12,000	10,500			***22,500***	Undertake consultations in districts, 2 studies
Miscellaneous		3,000				***3,000***	Support materials fo consultations
3.1.1.3 Assist the RGoB to integrate insurance within national programmes promoting value chains such as high value organic and export commodities							
Staff costs	-	6,312	6,312	3,156	-	***15,780***	WFP Climate risk insurance team and CO implementation support
Technical assistance/ FLA			5,000			***5,000***	Technical Service Provider costs
Workshop and training	2,000	2,000	2,000	2,000	2,000	***10,000***	Project Steering Committee meeting costs for 5 years
Travel		2,000	3,000	1,000		***6,000***	Travel for project staffs and WFP specialists
Miscellaneous		1,000	1,000			***2,000***	Support materials for consultations
3.1.1.4 Undertake readiness activities for scaling up the scheme beyond the project districts and leverage additional support for this							
Staff costs	-	-	4,300	4,300	29,150	***37,750***	WFP proposal writer + CO implementation support
Technical assistance/ FLA				12,250		***12,250***	National consultant
Workshop and training				10,000	10,000	***20,000***	Workshops with stakeholders
Travel			2,000	2,000	1,000	***5,000***	Travel for activity related work
Total Output 3.1.1.	9,180	43,492	47,210	59,039	54,233	***213,154***	
Output 3.1.2. Develop enabling environment and advocate for institutionalising of innovative climate risk management							
3.1.2.1 Support regulatory authority to identify and develop additional regulations to facilitate sustainability of the scheme							
Staff costs	1,006	1,006	706	503	503	***3,724***	WFP Climate risk insurance team to support in sustainability of the schemes
Technical assistance/ FLA			8,000			***8,000***	Costs related to Royal Monetary Authority (RMA)
Workshop and training		5,000	5,000	5,000	5,000	***20,000***	Regulation consultations, workshops
Travel		4,000				***4,000***	Travel including WFP mission
3.1.2.2 Support RGoB to enhance/develop policy on multi-level climate risk management focusing on the agricultural sector							
Staff costs			4,300	4,300	2,150	***10,750***	Programme Officer in WFP Country Office to support with project implementation
Technical assistance/ FLA			5,000	5,000		***10,000***	National consultant for policy development work
Workshop and training			10,000	10,000	10,000	***30,000***	Stakeholder workshops
Travel			1,000	1,500		***2,500***	Travel of project staffs

Total Output 3.1.2	1,006	10,006	34,006	26,303	17,653	***88,974***	
Total Component 3	**10,186**	**53,498**	**81,216**	**85,342**	**71,886**	**302,128**	

Project Management Unit (Project execution costs)

Particulars	***PY1***	***PY2***	***PY3***	***PY4***	***PY5***	**Cost USD (5 years)**
National Project Coordinator	19,024	19,024	19,024	19,024	19,024	***95,122***
Monitoring and Evaluation Officer and Comm officer	14,634	14,634	14,634	14,634	14,634	***73,171***
Project Technical Specialist	21,951	21,951	21,951	21,951	21,951	***109,756***
Procurement Officer						***Govt 100%***
Finance Officer/Accountant						***Govt 100%***
Administrative Assistant						***Govt 100%***
Driver						***Govt 100%***
Technical Advisory Group (TAG) meetings (Twice a year)	1,920	1,920	1,920	1,920	1,920	***9,600***
Furniture (set)	10,000					***10,000***
IT equipment PMU + partners (Set)	10,000					***10,000***
Car hire PMU missions	3,500	3,500	3,500	3,500	3,500	***17,500***
POL & maintenance Gov car	3,659	3,659	3,659	3,659	3,659	***18,293***
Project inception cost	10,000					***10,000***
Baseline study	20,000					***20,000***
Final project completion report					5,000	***5,000***
Final project evaluation					20,000	***20,000***
Total	**114,688**	**64,688**	**64,688**	**64,688**	**89,688**	***398,441.46***

MIE Fee

Particulars	**Estimate 5 yrs**	**PY1**	**PY2**	**PY3**	**PY4**	**PY5**	**Notes**
Steering committee meetings							10000 under 3.1.1.3 for PSC meetings
Mid -term Evaluation	***20,000***			20,000			
Final Audit	***30,000***					30,000	
WFP Country Office program associate	***28,297***	5,659	5,659	5,659	5,659	5,659	part time
WFP CO M&E Officer	***5,659***	1,132	1,132	1,132	1,132	1,132	part time
WFP CO Finance officer	***7,628***	1,526	1,526	1,526	1,526	1,526	part time

WFP Car/fuel							10000 included under 2.1.1 clubbed under travel
WFP HQ Fee (6.5%)	***298,565***	59,713	59,713	59,713	59,713	59,713	
Total	***390,149***	**68,030**	**68,030**	**88,030**	**68,030**	**98,030**	

F. Disbursement schedule

The schedule of disbursement of funds aligns with the broad implementation schedule and fund requirements.

	Upon Agreement Signature	**One year after Project Start**	**Two years after Project Start**	**Three years after Project Start**	**Four years after Project Start**	**Total**
Scheduled date	May 2024	May 2025	May 2026	May 2027	May 2028	
Project Funds (USD)	858,846	1,220,358	1,210,576	781,368	522,091	4,593,240
Implementing Entity Fee	68,030	68,030	88,030	68,030	98,030	390,149
TOTAL	926,876	1,288,388	1,298,606	849,398	620,121	4,983,389

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

Annex 1 Gender Assessment

1. Gender Assessment objective and methodology: A detailed Gender Assessment was conducted to inform the development of the Concept Note in April 2022, which was updated in June – July 2023. The main objective of the gender assessment was to contribute to the overall project "to assist smallholder famers to address their key identified climate change risks, and to increase their resilience and adaptive capacity" in a gender-responsive way. Specifically, this assessment aimed to provide an overview of gender issues in Bhutan in the legal and socio-cultural context, highlight differentiated gender impacts of climate change and also gender situations specific to agriculture or smallholder farmers, and provide gender-specific recommendations to address these identified risks and to increase their resilience and adaptive capacity. Collection of data and information for the gender assessment process in 2022 through primary source – surveys, key informant interviews, and focus group discussions – could not be conducted due to the nature of the COVID-19 pandemic restrictions at the time (April 2022). Specifically, a lockdown and travel restrictions were imposed by the government in major parts of Bhutan to contain the Omicron outbreak. However, information and data relevant to the assessment was collected using secondary sources – data and studies conducted on gender, its equalities and equities, and gender-climate interactions in Bhutan particularly in agriculture sector conducted by the National Commission for Women and Children (NCWC) and international organizations including the Asian Development Bank (ADB), World Bank, and various UN Agencies.

Specifically, the assessment extensively reviewed studies conducted on gender-climate-agriculture nexus in the Bhutanese context by related organizations which had similar objectives and concerns – to study and recognize gender differentiated impacts of climate change (especially in agricultural sector), and accordingly correct/improve the marginalized and vulnerable with appropriate effective policy interventions, programmes and projects. Most of these studies were designed to equally consider perceptions of both men and women participants on climate change, its impacts, livelihood risks, adaptive capacities, available resources to cope with the changing climate conditions impact, underlying causes for any differences, and their preferences for adaptation interventions.

The Gender Assessment was updated in June – July 2022 based on a total of 12 community consultations conducted in 12 gewogs of four districts: Trashigang, Lhuentse, Tsirang, and Dagana. In addition to community focus group discussions, as described in Annex 5, the process involved consultations with relevant sub-national authorities and service providers, including NGOs such as microfinance providers. There were 194 people with 105 females (54.1%) and 90 males (46.39%). Among them, there were 21 youths with 11 women and 10 men. Only 1 female mentioned herself as a Person with a Disability. Along with the community consultations, 133 stakeholders were consulted, consisting of 27 females (20.3%) and 106 males (79.7%) men. See Annex 5 for further details of the consultations process.

The Gender Assessment carried out for the Concept Note was also updated to reflect current policy, institutional and other macro aspects, and to reflect any specific gender-related challenges and opportunities of women, men, girls, boys, and diverse groupings. As the full Gender Assessment report has a total of 67 pages, it was not possible to include the full report in an annex, given the page limits for full proposals. Therefore, an executive summary of the findings of the assessment is included below. The full report, with all associated references, is available upon request.

2. Executive Summary of the findings of the Gender Assessment: Bhutan, given its location and mountainous topography, is highly vulnerable to climate change and its impacts. In recent years, Bhutan has been witnessing and experiencing rapid changes in average temperatures and precipitation patterns, as well as increased risks of climate hazards. The mean annual temperature has increased by 0.8°C for Bhutan, as per the 2019 National Center for Hydrology and Meteorology (NCHM) report. The 2020 Nationally Determined Contributions (NDC) survey conducted by NCWC substantiates that 96 percent reported experiencing 'warmer weather' and 'unpredictable weather indicating Bhutanese people are being affected by climate change. Simulated projections have also shown rising trends in temperature and precipitation in both winter and summer with large anomalies during the monsoon season in Bhutan. Evidently, such erratic extreme weather patterns and events pose a serious threat especially to the agriculture sector, that is highly climate-sensitive and on which the majority of the country's population is heavily reliant on. Therefore, Bhutanese farmers who are generally smallholders are found hit hardest by climate change. In particular, women are more vulnerable and thus affected more by the climate change compared to men due to their substantial engagement (at 61.7 percent against 41.7 percent men) in agriculture, compounded further by the increasing feminization of agriculture sector. Moreover, climate change impacts are more pronounced for Bhutanese women due to the existing discriminatory, patriarchal laws, norms, customs and institutions.

Women's engagement in the agriculture sector has not resulted in gainful employment.[189] Woman farmers are often considered employed under the employment status 'contributing family worker in agriculture'. The contributing family worker is defined as a household member who is engaged in a family business or farming activity without any payment, according to the definition from Labour Force Survey Reports (LFSR). In the agriculture sector, the trend over the years (2018, 2020, and 2022) from LFSR shows that women are the highest employed in the agriculture sector under "contributing family members". According to LFSR 2018, out of 135,649 employed women, agriculture employed about 85,700 women which is 63 percent of total employed women, from which 39.1 per-cent of women in agriculture are contributing family members. Men in agriculture representation are lower than women at about 76,400 but their employment status as contributing family members is at 20.5 percent in 2018. However, the proportion of women employed as contributing members in agriculture declined to 36.8 percent in 2020 and further dropped to 29.6 percent in 2022. In 2022, the number of women employed in agriculture was approximately 66,000. Based on the data from

[189] Most recently stated in Kuensel (August 05, 2023), this trend has been reported in several reports.

LFSR 2018, 2020, and 2022, there has been a noticeable increase in the number of regular women employees in rural areas. However, there has been a noticeable decrease in women's representation among skilled agricultural and forestry workers, with figures dropping from around 89,000 in 2020 to 65,700 in 2022.

Demography and agricultural practices in the project areas

There are 15,000 households with 55% women farmers in Dagana, 30,000 households in Tsirang with 45% female farmers, 1,890 households in Lhuentse with 70% houses headed by women, and 12,557 households with 58% women farmers in Trashigang. In Trashigang and Lhuentse, more than 50% of the total households are headed by women. About 50% of the farmers in Tsirang consist of women. Men and women share the same work in the farm. In addition, women are involved in household chores, weeding, collection of leaf litters, manure application, post-harvest and marketing. Crop guarding is done by both men and women. Normally, most manual tough works like digging, ploughing, and transportation are done by men. Men lead the farm works and women are also engaged in weaving and knitting works. Women are more of light manual works (weeding, transplantation) whereas men engaged in heavier work (ploughing).

Concerning livestock farmers, Dagana Dzongkhag has 3,856 households with about 50% of women farmers. Tsirang Dzongkhag has 3,200 households with 80% female farmers. Lhuentse Dzongkhag has 1,540 households. In Dagana and Tsirang, both men and women are involved on farm establishment, cleaning, feeding, milking, processing (milk products, chicken and pork) and marketing. Some women are involved in transporting livestock products or sell products in a market outlet. Men specifically do the slaughtering of animals for meat purpose. In Lhuentse, major livestock activities are undertaken by woman. Most of the time men are out of home for off-farm activities.

Employment

Men spend more time on paid work. Men's participation in regular paid employment is therefore higher at 36.5 percent against that of women's at 19.3 percent. During the last 9 years, labour force participation rate for women ranged from 53.5 percent in 2022 to 65.3 percent in 2021; while the participation rate for men ranged from 70.1 percent in 2018 to 73.4 percent in 2022, with the difference between men and women still over 10 percentage points indicating continued discriminatory practices in employment.

Female unemployment ranged from 3.3 percent in 2019 to 6.1 percent in 2021; while the male unemployment ranged from 2.2 percent in 2019 to 4.1 percent in 2020. Although the overall rate of unemployment is quite low, it has increased during the COVID pandemic years 2020 and 2021. Over the years, it is consistently characterized by higher incidences of unemployment among women.

Access to credit, savings, insurance and other financial services

Both men and women access credit and savings accounts with the banks, BDBL, BOB, BNB, and life insurance is covered through the Gewog offices Women have access to RENEW microfinance schemes, if it exists in a Gewog. In Tsirang and Dagana), women group of Khebisa were very keen on insurance schemes, asking us about other possible schemes aside from the compulsory life and property insurances.

It has been noted that women are actively involved in farmers' groups. There are several farmers' groups across the Dzongkhags formed by women. However, in general, women are less involved in marketing of Agricultural products.

Monthly household income and expenditures by gender

In Trashigang, Bidung and Radhi men's income is higher than women, whereas in Phongmey Gewog women income is higher (Table 12). The income of women ranges from Nu 4,958.33 to Nu 9,252.00 in the 3 Gewogs. In terms of expenses, men spend more than women in Radhi and Phogmey, whereas women spend more than men in Bidung.

In Kurtoe Gewog of Lhuentse Dzongkhag, women earn Nu 12,966.67 per month, which is more than men who earn Nu 1,416.67. Men earn more than women in Minjey Gewog, and youth earn Nu 1,173.00 per month. Women spend more in Kurtoe and youth spend more than women in Tshenkhar Gewog.

The household monthly income of women in Tsirang ranges from Nu 4,423.83 in Barshong Gewog to Nu. 23,237.83 in Tsirang-toed Gewog. In Tsirang-toed Gewog, women earn more than men and youth, while in Sergithang and Barshong Gewogs, men earn more than women and youth. The monthly household income for men ranges from Nu. 6,129.83 in Tsirang-toed Gewog to Nu. 24,836.6 in Barshong Gewog. In terms of expenditure, women tend to spend more than men and youth in Sergithang Gewog.

In Khebisa Gewog of Dagana, the income of women is Nu 10,385.21, which is lower than men who earn Nu. 28,909.67 per month. The income of youth in Dorona Gewog is Nu. 9,275.75, whereas women earn Nu 15,120.35 per month. In terms of expenditure, men tend to spend more with Nu 5,416.00 compared to women, who spend Nu 2657.38 per month in Khebisa Gewog.

Generally, the income sources for men are more varied when compared to the women. From all the gewogs, a common trend is that women typically do weaving works, run a grocery store or restaurant as alternative source of income. The men would typically do contract works in a construction, work as daily wage labour, operate power tillers, undertake transportation works like operating taxi services or vehicle hire in order to diversify their income sources. In Dorona the men do work in construction sites doing masonry and carpentry works.

Gender perspectives District Agriculture Officers

The risks faced are different – men and women work equal time, but women are paid less, have other obligations such as managing the home and families. The women-headed households have no choice but to take on the more demanding farm works like digging, guarding crops, land preparation, harvesting, transportation and marketing.

The risk mitigation strategies are different for women and men under some situations but could be same for some of the households. The particular needs to be able to manage their risks include the resource position of households, the available land holding size and incomes.

Gender perspectives – District Livestock Officers

According to the DLOs, the risks faced by men and women are not different. Therefore, the mitigation strategies are the same for men and women. The particular needs of men and women to be able to manage their risks include: family support, capacity development through training, advocacy, and awareness.

Status of women in Bhutan

Despite the socio-economic progress and the guarantees of formal equality ensured in the Constitution, structural and cultural norms and stereotypes continue to pose barriers to the broader realization of gender equality in Bhutan. Bhutan ranked 126 out of 146 countries with a score of 0.637 in the Global Gender Gap Report 2022[190], which reflects incomplete gender equality status in economic participation and opportunity, educational attainment, health and survival, and political empowerment.

Although, women's status is relatively high in Bhutanese society, there is a continuous and concrete perception that women and men have specific roles to play; regarding women as a better homemaker, wife, and a mother which has limited their access and opportunities, whilst confining them to household and agricultural activities where productivity and earnings are relatively low. Men's participation in regular paid employment is, therefore, higher at 36.5 percent against 19.3 percent for women. Bhutanese women predominate among unpaid family workers and workers with low earnings, and thus bear a disproportionate responsibility for domestic unpaid care work that largely goes unrecognized. To add on, the COVID-19 pandemic and recurrent lockdowns have increased unpaid work especially for women and girls, strongly reinforcing social and cultural norms where women and girls are expected to do unpaid household chores. Additionally, rural women seem to carry a disproportionate share of voluntary (unpaid) community work, affirming the triple role and burden for Bhutanese women. Rightly so, the 2010 GNH Index revealed that Bhutanese women worked almost one hour more per day than men.

Impacts of climate change

As a result of the gender inequalities and gaps, Bhutanese women are more susceptible to the impacts of climate change. One of the most significant social impacts of climate change for rural women is intensification of their already over-burdened workloads, leaving them time-deprived. For instance, women will need to travel further away to collect fuel wood (used by many rural households in Bhutan for cooking and heating), increasing their already substantial workload. The 2020 NDC survey[191] revealed that about half of the survey population (49.3 percent) 'agreed' or 'strongly agreed' that 'climate change increases women's workload more than men's, and that 'climate change impacts women more than men' (55.6 percent).

Importantly, women's vulnerability to climate change impacts is exacerbated by their lower adaptive capacity than men, stemming from prevalent gender gaps in access to climate change information, training and capacity, and climate smart technologies. The same NDC survey revealed that only 68 percent of rural women were aware of climate-smart agriculture (CSA) initiatives as compared to 84 percent of the men. Similarly, only 11.7 percent of women had access to decision making on the CSA support systems as compared to 25.5 percent of their male counterparts.

Other indirect climate change impacts include an increase in gender-based violence, in particular intimate partner violence, due to intra-household tensions and pressures. Recent study on the situation of Violence against Women in Bhutan revealed that one in three ever-partnered women aged 15–64 years had experienced one or other forms of domestic violence in the last twelve months, and 44.5 percent in their lifetime (as of 2017). Moreover, with the on-set of the pandemic and multiple lockdowns, Gender-based violence (GBV) has reportedly increased by 36.6 percent and 53.5 percent in 2020 and 2021 respectively. An even more disturbing finding from the same study was the extent to which domestic violence was condoned by Bhutanese women. As of 2017, the same study found that 53.4 percent of women aged between 15-64 years believed that their partners were justified to hit them for under certain circumstances and reasons. Bhutanese women commonly accept abuse as their plight or their 'karma' whilst the culture of silence they practice prevents them from accessing what public services are available. Moreover, Bhutanese women's economic dependence on their husbands aggravates their vulnerable situation and acceptability of domestic violence. This only heightens women's marginalized and hence more vulnerable situation, constraining them and their adaptive capabilities to the impacts of climate change.

Moreover, Bhutanese women's limited access and controls of resources impedes their capability and efficiency in agricultural development and their adaptive capacity to climate change. Despite the equal legal rights enshrined, Bhutanese women have limited access and control to resources. Of the agriculture land holdings, 54 percent is held by men and 46 percent by women. Similarly, the 2020 NDC survey shows that 32.01 percent women owning land against 63.24 percent men. Men are reported to be the main decision-makers regarding land use, and women were

[190] *Global Gender Gap Report*. World Economic Forum, 2022.
[191] *Gender and Climate Change in Bhutan with a focus on Nationally Determined Contribution Priority Areas: Agriculture, Energy and Waste.* NCWC, RGoB, 2020.

found to be sole decision-makers only in the case of an absent male. In addition, despite Financial Institutions (FIs) equal and non-preferential treatment, and government's concerted effort to advance financial inclusion such as priority sector lending, limited access to finance is one of the many constraints faced by rural women. This limited access could be attributed to lack or limited resources for collateral, limited decision-making power and position, complex loan procedures, and loans not suitable to their needs. Although there are numerous savings and credit schemes, they are mostly commercial and entrepreneurship focused. There are hardly rural-women-targeted schemes that are agricultural (small-holder farmers) focused to enhance their adaptability and resilience to climate change impacts. There is an increasing need for such financial instruments and schemes covering these insecurities and risks.

In addition, while in practice higher substantial proportion of women are engaged in agriculture related activities, however, access to Climate Smart Agriculture (CSA) and Climate Resilient Agriculture (CRA) related technologies, information, trainings and agricultural inputs are limited for rural women in Bhutan. In terms of involvement in adaptation measures introduced, the NDC survey shows that a relatively higher proportion of women reported their participation in interventions such as 'introduction of new crops', 'change in planting dates', 'increase land (area) for plantation', 'efficient use of irrigation, and 'change in animal species/breeds'. On the other hand, a relatively higher proportion of men reported participation in interventions related to 'water conservation/harvesting', 'agro-forestry', 'livestock management', 'local seed bank management', and 'training in climate-smart agriculture technology'. As per the FAO estimates, if women farmers had the same access to resources as men, agricultural output in developing countries would rise by an estimated average of up to four percent, and reduce the number of undernourished people in these countries by as much as 17 percent, translating to up to 150 million fewer hungry people.

Moreover, women's participation in political, civil, economic and social life at all levels is limited due to social and cultural perception about men and women's leadership with stereotypic image of women as less capable leaders. In the parliament and local government, women's participation stands at 15.3 percent and 3.4 percent respectively. Similarly, women are also not well represented in civil service especially at the upper levels with 13.8 percent women against 86.12 percent men. Therefore, women continue to be under-represented in political and public spheres and are found more active in decision-making at private and micro level. Likewise, their participation in decision-makings related to agriculture is found limited, despite their higher composition and exposure to climate change impacts.

Since the effects of climate change are different for women and men, they respond and adapt to climate change impacts differently. As measures to alleviate climate change impacts, men are more inclined to 'look for alternative employment' and 'migrate to city'; leaving women to carry out men's work in addition to their already substantial workloads. On the other hand, women struggle more than men in finding alternative livelihoods, entering formal employment sector, or migrating due to cultural barriers and lack of economic opportunities and education. Thus, women reported alternatives, including; 'change in consumption patterns', 'changing farming practices', and 'taking children out of school'. Bhutanese women (rural women in particular) are therefore more susceptible and vulnerable than men to the climate change impacts. However, they are the key players of agriculture and in ensuring food and nutrition security in the country, with their unique set of knowledge and strengths. Empowering women to contribute their skills and knowledge whilst addressing their heightened vulnerabilities to climate change will therefore be a key to addressing threats to food security and sustainability. Climate change has direct impacts on all aspects of food security, aggravating the country's health and nutritional status and exacerbating the prevalent triple burden of malnutrition in the country. Additionally, the COVID-19 pandemic has intensified food and nutrition insecurities in the Country. Loss of jobs and income from the pandemic meant giving up nutrient-rich foods and shifting diets to more affordable food – shelf stable and pre-packaged foods. Also, with schools closed after the pandemic, 71 percent of the school children in 2020 missed out on the fortified school meals– an essential source of nutrition for children from rural background.

In terms of legal and institutional frameworks, Bhutan has made significant investments in promoting gender equality and women/girls' empowerment. In addition to Constitutional guarantee of equal fundamental rights of women and men, the protection of women and girls have been strengthened by the Child Care and Protection Act 2011 (CCPA), the Penal Code (Amendment) of Bhutan 2011 (PCB), and the Domestic Violence Prevention Act 2013 (DVPA). Also, the RGoB has adopted several international and national legal frameworks of relevance from a gender perspective, including; Convention on the Elimination of all forms of Discrimination Against Women (CEDAW), the Beijing Platform for Action (1995), and Agenda 2030 with its Sustainable Development Goals. Most recently, the National Gender Equality Policy 2020 has been endorsed by the Government. All laws, to the extent possible, attempt to ensure that the rights of women and men are equally included and treated. Every policy in Bhutan is required to be screened using the GNH policy screening tool, which has gender equality as one of the parameters in rating a policy. The NCWC is the main coordinating institutional body for the review, formulation, reform, initiatives, advocacy and support of policies, plans, projects and activities from a gender equality and child-sensitive perspective. The growing numbers and strength of CSOs play an increasingly important role by helping the economically marginalized and the vulnerable women groups. While there are adequate legal frameworks and institutions to address gender issues and gaps, nevertheless, there is an increasing need and efforts to integrate gender into plans, policies, programmes, and projects.

3. Recommendations: Specifically, to address these heightened climate change risks and vulnerabilities, there is a pressing need to adopt gender-responsive (and where possible, gender-transformative) approaches if it is to help achieve food and nutrition security, sustainability and poverty alleviation. In line with this, the project is recommended to consider the following in its design, implementation and monitoring: (i) Recognize and support women's under-valued contributions to household and community livelihoods which is an important strategic element to build household and community resilience; (ii) Support empowerment and leadership-building of rural women, and their active meaningful involvement in the mitigation and adaptation activities. Besides, a central part of gender

transformation is women's empowerment that enables transformation in the power structures; (iii) Work with rural men as allies and facilitate men to support women's empowerment, leadership, voice and participation. This will help challenge and transform dominant social, economic, and political structure that perpetuate gender inequality; (iv) In all its integrated R4 rural risk management strategies and interventions, the project, should target to include more women at 61:41 men in order to ensure gender equality. In particular, female-headed households should be targeted since they are more food insecure than the male-headed households; (v) Include female farmers during the Project's feasibility assessment and prototype testing of the Weather Insurance Index, wherein they are equally and effectively consulted in the agreement of the pre-determine statistical index; (vi) Promote inclusive, active and meaningful participation of female farmers in and during the Project's community consultations, awareness-raising program about the insurance product, and during the sensitization on the benefits of the Weather Index Insurance; (vii) Ensure rural women's equitable access to Weather Index-based Microinsurance since limited access to credit and finance is one of the major challenges constraining rural women; (viii) The project's enhanced Natural Resources Management activities and initiatives should be gender-inclusive and designed as to reduce or at best not increase the workload of already over-burdened and time-deprived rural women; (ix) Ensure equitable access to the project's monetary and in-kind saving schemes and programmes; (x) Enhance gender-equity in accessibility to climate information and services in order to better cope with climate variability and adapt their decision-making in farming practices and crop management; (xi) The project's partners, local leaders and authority, and other stakeholders should be adequately sensitized and trained on the importance of gender-responsive approach and women empowerment, and also on the SBC for improved dietary, nutrition and health practices; (xii) Since one of the major gender issues impacting women is the prevalence of GBV, the project in collaboration with the NCWC and/or RMFIL should conduct awareness and sensitization program on GBV and their impacts for women; (xiii) Include a gender-specialist with adequate gender knowledge in the local context to provide advice within the project and ensure gender equality and responsiveness throughout; (xiv) Monitor and assess the project's progress, its impacts, and benefits using gender-disaggregated data and gender specific indicators; (xv) Measure gender transformation during/after the project, using the 'Women's Empowerment in Agriculture Index (WEAI)' tool that measures changes associated with the root causes of gender inequality especially in agriculture; and (xvi) Lastly, ensure that good practices and lessons learnt from promoting gender equality evidenced through the project are shared effectively and continuously amongst stakeholders, and inform policy/decisions at national and local levels.

The full Gender Assessment contains a list of the 67 references used in compiling the assessment, which can be provided on request.

Annex 2 Detailed vulnerability assessment and initial climate risk-based crop suitability assessment

1. Background to the study

In 2022, the World Food Programme (WFP) assisted the Royal Government of Bhutan (RGoB) to develop a Concept Note (CN) for the Bhutan Adaptation Fund (AF) Large Innovation Grant (LIG) entitled 'Innovative adaptation financing to build the resilience and adaptive capacity of smallholder farmers in Bhutan' (InAF-Bhutan). The CN, which was developed in a participatory fashion with a range of stakeholders in Bhutan and approved by the RGoB prior to submission to the AF, was endorsed by the AF Board in October 2022.

The project's **main goal** is to enhance the resilience of smallholder farmers in Bhutan to key identified climate risks and enhance their food security by rolling out innovative index-based microinsurance through an integrated resilience building approach.

The project will achieve its goal through the following *three* **objectives**:

4. Strengthen climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers;
5. Roll out innovative climate risk transfer mechanism and build smallholder farmers' resilience through integrated approach; and
6. Institutionalise innovative climate risk management for long-term sustainability.

The project will meet these objectives through three interlinked components, as detailed in Part II.A of the CN. The components will deliver an integrated package of interventions to address key causes of vulnerability to climate change and food insecurity for vulnerable smallholder farmers in selected districts in Bhutan.

The primary project beneficiaries will be poor smallholder farmers with high levels of vulnerability to current and projected climate risks. The project will target more women than men, in recognition of the feminization of agriculture in Bhutan, and of the differentiated needs and increased vulnerabilities of rural women. Thus the project will aim to **target 70 percent women** and will especially focus on female-headed households that are more food insecure. The project will include a focus on rural youth living in areas with high levels of climate risk and low employment opportunities.

The CN identified several preparatory studies that would be required to develop the Full Proposal (FP), namely:

- **In-depth vulnerability assessment and climate risk-based crop suitability assessment**: this will build upon the relevant assessments conducted under the NAP process and is an essential step to ensure the project does not lead to **maladaptation**[192]; and
- **Detailed insurance feasibility assessment** to determine the specific forms of index-based microinsurance that are most appropriate for the identified project localities – for example, area yield index insurance (AYII) or weather index-based insurance (WIBI), whether single peril or multi-peril, how best to strengthen Bhutan's insurance ecosystem, etc.

During the stakeholder consultations conducted in Thimphu between 12-16 December 2022, it was agreed that the main building blocks to enable development of the Full Proposal comprised these two studies as well as other mandatory activities, as follows:

- In-depth vulnerability assessment and climate risk-based crop suitability assessment
- Community consultations
- Stakeholder consultations
- Gender Assessment (GA) – revision of initial GA completed for Concept Note
- Detailed index-based microinsurance feasibility study

These studies and actions are linked in the following logical sequence:

[192] Defined as actions that lead to increased vulnerability to climate change, or diminished welfare, now or in the future, usually an unintended consequence. IPCC AR6 Glossary, 2021.

1. Conduct the *in-depth vulnerability assessment and initial climate risk-based crop suitability assessment* (as documented in this report) in order to identify the smaller set of districts in which project actions will be focused.
2. Once the localities are selected in a broad sense, the *community consultations* will be carried out in the project localities in order to ground truth the findings of the VA and climate risk-based crop suitability assessment, and gather important disaggregated and gender-responsive local-level information on climate risks, livelihood systems, and socio-economic factors; gaps in service provision including climate services, agricultural extension, and financial services; experience of and willingness to pay for insurance, appropriate value chains to develop, and other aspects necessary for insurance product.
3. The *revision of the initial Gender Assessment* conducted for the CN would also take place during the community consultations, as additional localised information to reflect the specific gender-related challenges and opportunities of women, men, girls, boys, and diverse groupings will need to be integrated into this.
4. After the local-level consultations, which will also include consultations with district and local government, have been concluded, the *detailed index-based microinsurance feasibility study* will be completed. This will recommend the most appropriate basis and structure for the insurance product, provide further verification of the provisional crops identified, including with respect to long-term sustainability and scalability of the insurance and associated activities, so that the initiative can then be taken over by government, etc.
5. After the completion of the above steps and discussion of the insurance feasibility study by key stakeholders, *final decisions will be taken* on the form of insurance to be developed, and the focus crops/commodities.
6. After potential endorsement of the Full Proposal by the AF, *specific localities within the selected districts will be identified* based *inter alia* on the findings of the Consolidated Livelihood Exercise for Analysing Resilience (CLEAR) to be carried out later in 2023 under the Building Resilient Commercial Smallholder Agriculture (BRECSA) project. The CLEAR is an analytical approach developed by WFP to better understand how food security is affected by climate risks[193], and will provide further disaggregated information relevant to targeting for the AF project.

This report documents step 1: the in-depth vulnerability assessment and initial climate risk-based crop suitability assessment.

2. Approach to the vulnerability assessment and initial climate risk-based crop suitability assessment

An early step in the FP development is to carry out an in-depth vulnerability assessment and climate risk-based crop suitability assessment, drawing strongly on the National Adaptation Plan (NAP) assessments, in order to determine the project localities, and provisional crops that could be promoted – these would need to be demonstrated to the AF as being sufficiently climate-resilient for the selected localities to serve as a solid basis for a sustainable approach to the index-based microinsurance that is the focus of the project, and its central innovation.

The aims and proposed methodology of the in-depth vulnerability assessment and climate-risk-based crop suitability assessment were presented at a Technical Group meeting held in Thimphu on 15 December 2022 at the UN conference hall. The participants included many of the key stakeholders who would form part of the multistakeholder Task Force to be constituted to guide the development of the Full Proposal.

It was agreed that once the localities have been selected, then the planning process should consider the cropping systems in those districts to identify the most appropriate crops to focus on for the index insurance.

The aims of the VA and climate risk-based crop suitability assessment are:

- To identify, based on a range of agreed criteria, the districts in which the project will be implemented and the vulnerable smallholder farmers to target for the LIG, and to identify, based on climate risk, provisional crops that could be promoted, building on existing studies and information.

[193] https://www.wfp.org/publications/2017-clear-approach

- To undertake a rigorous and evidence-based assessment so that the AF project supports activities that lead to greater climate resilience and sustainability of smallholder livelihoods, and to avoid maladaptation.

The vulnerability assessment part of this study follows a multi-criteria analysis (MCA) approach, which the participants at the Technical Group meeting held in Thimphu on 15 December 2022 agreed should be the preferred approach. Multi-criteria analysis is a decision-making analysis that evaluates multiple (potentially conflicting) criteria as part of the decision-making process. It is similar to a cost-benefit analysis but has the advantage of not being solely limited to monetary units for its comparisons.

The MCA process is a flexible one that usually involves specific steps to arrive at a decision considering a range of different criteria that have been weighted to some extent to facilitate comparison across the different options.[194] For the purposes of this study, these steps are:

1. Problem/context identification – in this case, the need to select a set of districts in which to carry out firstly the community consultations and secondly, the project implementation;
2. Identify the options available – these are the six districts identified in the project Concept Note as endorsed by the RGoB and the AF;
3. Decide the objectives and select the appropriate criteria – in this case, the overall project objectives are set out in the CN, and repeated above; the criteria selection process is described below;
4. Rank the different options in terms of the agreed criteria – this process largely uses the weightings and values used in the assessments conducted to develop Bhutan's National Adaptation Plan, and is explained below and summarised in Table 1;
5. Take a decision based upon the above steps – in this case, the vulnerability assessment makes a preliminary recommendation of four priority districts, based upon the MCA process, to facilitate final decision making by the RGoB.

Based on an initial vulnerability assessment and climate risk analysis carried out when developing the CN, six preliminary districts were identified in the CN (this constitutes step 2 of the above list) to be considered for inclusion in the proposed LIG project, based on the following criteria:

iv. vulnerability to climate risks, as assessed by the RGoB;

v. poverty levels; and

vi. agricultural potential, including for climate-resilient and sustainable agriculture and commodity landscape-based organic production.

The six preliminary districts are Paro, Punakha, Dagana, Tsirang, Lhuentse, and Trashigang. Paro and Punakha are located in the west of the country, and Dagana in the south; these districts are predominantly within the temperate zone, although part of Dagana lies within the sub-tropical southern belt. Lhuentse and Trashigang are located in the east of the country, which has received relatively reduced investment in agricultural development and experiences heightened drought risk. Tsirang lies in the central part of the country and has been selected for preliminary consideration based not only upon the climate risks and vulnerabilities experienced, but also because of its potential for large-scale conversion to organic agriculture.[195]

Three of the six districts were selected for community consultations to develop the CN, as these provided a range of livelihood systems and were feasible in the context of COVID-19 restrictions on travel and meetings: Paro, Punakha, and Dagana. More detailed community consultations will be carried out during FP development in a smaller set of districts than the provisional six identified (maximum of four), to ground truth the findings of this assessment and to gather additional information needed to conduct the insurance feasibility study and to develop the activities for the proposal.

The CN noted good alignment between the preliminary set of districts identified and the criteria included in the 'Climate change and vulnerability analysis' (CCVA) mapping carried out for the development of the National Adaptation Plan (NAP) process in Bhutan, which includes a district-level vulnerability mapping against various criteria, including climate variability, hazards, and various socio-economic parameters. For example, Dagana and Lhuentse are among the top four districts with over 80 percent of females involved in agriculture, while that for Tsirang is over 70 percent. Dagana and Trashigang, together with Samtse,

[194] See, for example, https://www.toolshero.com/decision-making/multiple-criteria-decision-analysis-mcda/; https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7612/1132618.pdf; https://www.cifor.org/knowledge/publication/769/

[195] This potential was confirmed by a personal communication with the Head of Programmes, National Centre for Organic Agriculture, 16 June 2022.

have the highest sensitivity to climate change arising out of their livelihood and economic situation, with out-migration being the highest in Trashigang (nearly 11.67 percent in 2017). Tsirang and Dagana score low in terms of presence of adaptation strategies such as irrigation, improved farm machinery and social capital, while Trashigang has a medium score in this regard. Dagana and Tsirang are also ranked very low in terms of adaptive capacity, while Trashigang scores low and Lhuentse scores medium in terms of adaptive capacity. In terms of overall vulnerability, Dagana is ranked the second most vulnerable district, while Tsirang is the fourth most vulnerable.[196]

Final decisions for the districts to be included in the project, which it has been agreed will be fewer than six due to the need to avoid fragmentation of resources, will be based on the above criteria, as well as additional climate risk, socio-economic, environmental, agricultural, and practical factors.

This study has been based upon the following criteria that have been distilled from the analysis contained in the Concept Note, as well as discussions held with key stakeholders in Thimphu in December 2022:

i. vulnerability to climate risks, as assessed by the RGoB (climate hazards, sensitivity to climate change, etc.);

ii. poverty levels;

iii. agricultural potential, including for climate-resilient and sustainable agriculture and commodity landscape-based organic production;

iv. need to avoid fragmentation of resources;

v. socio-economic variables, including gender, education and nutritional indicators;

vi. environmental factors;

vii. presence of the necessary pre-conditions for large-scale roll-out of index-based microinsurance, including

    a. access to existing microfinance channels,

    b. production of selected crops at a sufficient volume for the necessary aggregation,

    c. value chain development and marketing activities, and

    d. the presence of suitable distribution channels for the insurance

viii. ability to leverage off the activities of existing and planned projects, in order to promote efficiencies and synergies across investments;

ix. vulnerable areas that have received relatively lower levels of investment;

x. levels of out-migration.

An initial analysis has been conducted by the WFP study team based on these and additional criteria used in the 'Climate change and vulnerability analysis' (CCVA) mapping carried out for the development of the NAP, including the presence of adaptation strategies, levels of adaptive capacity, and sensitivity to climate change arising from livelihood and economic situation, as included in **Table 1** below.

This analysis, which has been developed to aid decision making by a broader range of stakeholders, will be subjected to further discussion by the multistakeholder Task Force guiding the development of the AF project, to select the project localities and climate-resilient crops to be supported.

There was broad agreement at the Technical Group meeting held in December 2022 that the number of districts could be reduced to four, to prevent fragmentation of resources and to ensure the maximum impact from the project's resource envelope. The group also discussed the possibility that, based on the criteria presented earlier, particularly poverty and vulnerability levels, possible choices could be Lhuentse and Trashigang in the east, and Dagana and Tsirang in the south-central parts of the country. Participants in general agreed that it would be important to take this project to the most vulnerable districts like Lhuentse and Trashigang in the eastern part of Bhutan, given that they are highly vulnerable and with very limited adaptation capacities. Informed stakeholders noted that farmers in Paro and Punakha are in general far better off than those in the east. The Department of Agriculture (DoA) highlighted the importance for farmers to make a good income for the long-term sustainability of the insurance and for its further scaling up, and thus felt that Paro district should also be considered because the farmers, although better-off, are also vulnerable. The December 2022 discussions were not held to pre-empt the findings of the detailed

[196] Climate change and vulnerability analysis mapping for formulation of the NAP process in Bhutan. Draft dated, July 2021, prepared by pwc for UNDP.

study, but rather to assist participants to begin discussions on the relative weighting of criteria, and to agree on the focus for this study.

Therefore, as guided by the stakeholders, this study considers the six provisional districts identified in the CN and subjects them to further assessment to reduce the number of project implementation districts, in accordance with available funding and other practical considerations.

An important principle discussed during the stakeholder consultations throughout the process to develop the CN and subsequently is that the AF resources are provided to serve those most vulnerable to climate change, and thus should ideally be deployed to fill in the resource gap that the government might normally experience in trying to reach more challenging areas. The project concept aims to help farmers to increase their incomes in a sustainable and climate-resilient manner, and thus could result in the more neglected and vulnerable areas ultimately making a greater contribution to the country's GDP in the future.

3. Sources of information and analysis

It was agreed at the Technical Group meeting held on 15 December 2022 in Thimphu that the following sources of information would be used to develop the vulnerability assessment and climate risk-based crop suitability assessment:

- 'Climate change and vulnerability analysis' (CCVA) mapping carried out for the NAP;
- NAP sectoral assessments for agriculture, water, forests and biodiversity, and human health;
- CIAT study on climate risks for agriculture in Bhutan (2017);
- ADB climate risk profile for Bhutan (2021)

In addition, the project team consulted the 2022 Labour Force Survey Report[197] and the 2022 Poverty Analysis Report[198], for more up-to-date socio-economic variables that better reflect recent trends. The 2019 RNR Census was also used – the most recent agricultural census information at the time of compilation.

The context, key findings and constraints of the sources of information are now discussed, prior to the presentation of a summary matrix on vulnerability assessment. After this, provisional crop suitability is presented, followed by a summary of the provisional findings of this study.

The NAP assessments

The NAP studies assessed the future impacts of climate change on the different sectors using the CMIP-5 model. It is intended that the assessments will be repeated every 5 years, to be up-to-date and as the methodology continues to evolve – for example, some countries are already conducting assessments based on the IPCC AR6 scenarios.

In addition to the four NAP sectoral assessments (agriculture, water, forests and biodiversity, and human health), a fifth NAP study undertook a climate change vulnerability assessment and mapping (CCVA) to assess vulnerability and adaptive capacity across the different administrative regions in Bhutan, using a combined top-down – bottom-up approach. The CCVA conducted vulnerability mapping at the district and block (gewog) level, which involved community consultations.

The participants at the Technical Group meeting held on 15 December 2022 in Thimphu agreed that the deepened vulnerability analysis and climate risk-based crop suitability assessment required to develop the project's Full Proposal should make full use of the NAP assessments, as these represent the most up-to-date and detailed climate risk assessments for Bhutan. However, the findings of the NAP agriculture sector assessment should be balanced with the findings of the CIAT study and crop suitability modelling for Bhutan. The AF study should also make use of all the NAP assessments, and in particular the NAP water sector study, as this is highly relevant for the agriculture sector, had a more intensive level of consultations, was conducted by an experienced consultancy, and did integrate the occurrence of extreme events. The NAP agriculture sector assessment did not factor these in and did not include the risks associated with changing occurrence of pests and diseases. However, the baseline for identifying vulnerability in the CCVA did consider extreme events for historical as well as future hazards, with certain limitations as noted below. Thus, overlaying and integrating the findings of the different assessments will provide enhanced information for the project's planning.

[197] National Statistics Bureau (2022) Labour Force Survey report (LFS report) 2022.
[198] National Statistics Bureau of Bhutan (2022) *Bhutan Poverty Analysis Report 2022*.

Regarding the NAP sectoral assessment on forests and biodiversity, the objective was to undertake a wildfire risk assessment in Bhutan, by analyzing fire likelihood, fire behaviour, and fire impact. The findings of this are, it is assumed, represented in the hazard index in the CCVA report. The assessment does not factor in broader impacts of climate change on biodiversity and environmental degradation. The ranking of gewogs at higher risk for the 2021-2050 time slice, which combines the information about forests and households at risk, will be useful to consider when detailed localities are selected during project inception.

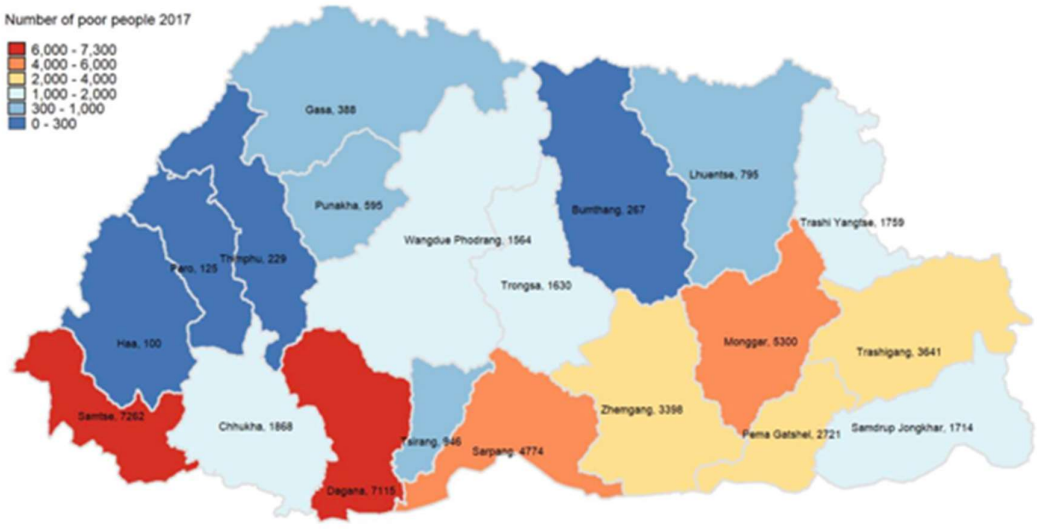
Annex 1 provides synthesised and summarised district-level information drawn from the CCVA and the NAP sectoral assessments, which provides the context and a starting point for the VA and crop suitability assessment conducted for the AF full proposal development. Relevant information has been integrated into the decision matrix presented in **Table 1**.

Bhutan Poverty Analysis Report 2022

Poverty data for this assessment were obtained from the Bhutan Poverty Analysis Report 2022.[199] This report provides updated poverty statistics based on the 2022 Bhutan Living Standard Survey (BLSS) data and the revised poverty methodology, which allows poverty measures to better reflect the current living standards and consumption patterns of the Bhutanese population. The information in the Poverty Analysis Report (PAR) is thus more up to date than the poverty information in the NAP.

According to the PAR, poverty in rural areas (17.5%) is significantly higher than urban areas (4.2%), further substantiating the focus on rural areas for the proposed project. Only 0.4% of the population is subsistence poor, i.e., persons belonging to households with per capita consumption below food requirements of Nu. 2,852. Thimphu and Punakha have the least poverty, and poverty rates are higher in Zhemgang, Samdrup Jongkhar, Samtse and Trongsa, compared to other Districts. As Table 1 indicates, Tsirang, Lhuentse and Trashigang have higher than average poverty rates, which motivates for their inclusion in the proposed project implementation areas. As the PAR highlights, areas with the highest poverty rates do not necessarily contain the largest number of poor people because that number depends also on the population size. Thus, both headcount ratio and the number of poor people (see Map 1) should be used to inform planning and development.

Map 1. Number of poor people per district in 2017[200]



The CIAT study

A joint study by the International Center for Tropical Agriculture (CIAT) and the Bhutan Ministry of Agriculture and Forestry (MoAF), funded by the United Nations Environment Programme (UNEP), was undertaken to assess the impacts of climate change on five key crops (i.e. rice, maize, potato, chili and tomato) and three diversification crops (i.e. quinoa, kiwi and cardamom).[201] Quinoa has recently been

[199] National Statistics Bureau of Bhutan (2022) *Bhutan Poverty Analysis Report 2022*.
[200] National Statistics Bureau of Bhutan (2022) *Bhutan Poverty Analysis Report 2022*.
[201] Parker L; Guerten N; Thi Nguyen T; Rinzin C; Tashi D; Wangchuk D; Bajgai Y; Subedi K; Phuntsho L; Thinley N; Chhogyel N; Gyalmo T; Katwal TB; Zangpo T; Acharya S; Pradhan S; Penjor S. 2017. Climate change impacts in Bhutan: challenges and opportunities for the agricultural sector. Working Paper No. 191. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Wageningen, The Netherlands. Available online at: www.ccafs.cgiar.org

introduced into various areas and trials are currently underway. Kiwi is a potential cash crop that could offer farmers new economic opportunities, and cardamom is an important cash crop for Bhutan.

This study, hereafter referred to as the CIAT study, generated a range of climatic suitability maps for cardamom, chili, kiwi, maize, potato, quinoa, rice, and tomato, for current suitability, future suitability under Representative Concentration Pathway (RCP)[202] 4.5 and RCP8.5, projected change in suitability and biophysical suitability. While these provided insights about potential growing areas and areas gaining and losing in suitability, they did not provide seasonal advice.

Crop suitability is a measure of how well a crop can be grown in a given locality. It is complex and heterogeneous, and many variables influence where a particular crop is grown, and what crops are grown. Thus crop suitability modelling requires integration and analysis of multiple layers of biophysical and socioeconomic information. The maps generated for the CIAT study integrated a range of biophysical factors, with some caveats such as a soil classification map that was considered not sufficiently accurate but noted that further study would be required to integrate the necessary socio-economic factors.

Specific findings of the CIAT study are discussed under section X that contains the preliminary climate risk-based crop suitability assessment.

The ADB climate risk profile

The climate risk profile for Bhutan[203] conducted by the Asian Development Bank (ADB) in 2021 represents an important contribution to assessing future climate risk in Bhutan but does not provide district-level information. A central issue raised is the need to avoid only relying on the RCP4.5 scenario when assessing climate risks, as studies published since the IPCC AR5 report such as Gasser et al. (2018) have presented evidence which suggests a greater probability that the Earth will experience medium and high-end warming scenarios than previously estimated. [204] Thus the ADB study presents climate change projections associated with the highest emissions pathway (RCP8.5) to facilitate decision making which is robust to these risks.

Projections for annual average temperature rise for Bhutan are greater than the global average: 4.5°C, compared to 3.7°C under the RCP8.5 emissions pathway by the 2090s. Under the same pathway and time-period, annual average of monthly maximum and minimum temperatures are projected to increase greater than annual average temperatures, 4.7°C and 4.6°C, respectively. Climate model projections of future rainfall are less reliable than for temperature, but in general suggest increases in median annual rainfall under all emissions pathways. There is greater confidence around changes to the future intensity of heavy rainfall events: under all emissions pathways, an increase in the precipitation associated with a maximum 5-day rainfall event is expected across Bhutan, with heaviest rainfall occurring in the southeastern areas of the country. Projected increases in the number of days with very heavy precipitation could further increase the risk of flooding and impact runoff, erosion, and rates of river discharge.

The ADB study notes that flooding is the country's most significant climate-related hazard, ranking 76th globally, and that the risks associated with drought are low.[205] Flood risk is concentrated in the central and north-western regions of the country. However, current observations show that dry spells and drought are increasing in different parts of the country. The ADB study itself notes that by the 2090s, the median probability of a heat wave in Bhutan is projected to increase dramatically from the current probability of 2% to approximately 20% under RCP4.5 and RCP6.0, and as high as 36% under RCP8.5. The southern tropical regions at a lower altitude are at the greatest risk of prolonged exposure to extreme heat at least one in every five years, while the northern regions are at low risk.[206]

The information on potential significant risks from dry spells and drought indicates the importance of overlaying drought risk in the future, when developing more detailed vulnerability assessment. This is an area that could be focused on in the CLEAR, to enhance identification of vulnerable areas and decision making on adaptation options. Bhutan is a partner in the next generation South Asia Drought Monitoring

[202] The Representative Concentration Pathways or RCPs are four greenhouse gas concentration (not emissions) trajectories used for climate modelling and research for the IPCC fifth Assessment Report (AR5) in 2014. The pathways describe different climate futures depending on the implementation of climate policies internationally.

[203] Climate Risk Country Profile: Bhutan (2021): The World Bank Group and the Asian Development Bank.

[204] Gasser, T., Kechiar, M., Ciais, P., Burke, E. J., Kleinen, T., Zhu, D., . . . Obersteiner, M. (2018). Path-dependent reductions in CO2 emission budgets caused by permafrost carbon release. Nature Geoscience, 11, 830-835. URL: https://www.nature.com/articles/ s41561-018-0227-0?WT.feed_name=subjects_carbon-cycle

[205] European Commission (2019). INFORM Index for Risk Management. Bhutan Country Profile. URL: https://drmkc.jrc.ec.europa.eu/ inform-index/Countries/Country-Profile-Map

[206] World Bank (2020). Global Facility for Disaster Risk Recovery. Think Hazard Country Profile. http://thinkhazard.org/en/report/ 31-bhutan/EH

System (SADMS) initiated in 2021, which will be an important mechanism to develop greater clarity on emerging trends.

4. Analysis: vulnerability assessment matrix

The information presented in the vulnerability assessment matrix has been derived largely from the district-level vulnerability and risk assessment carried out under the NAP process, which was based on the Climate Change Risk Assessment Framework of the fifth assessment report (AR5) of Intergovernmental Panel on Climate Change (IPCC). According to this, risk (or impact) (R) is a function of hazard (H), exposure (E) and vulnerability (V). It is used primarily to refer to the risks of climate-change impacts.[207]

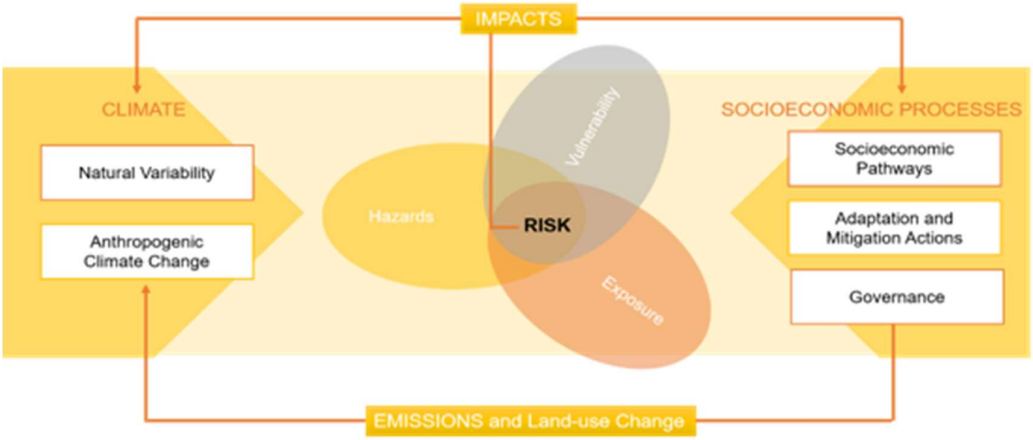


Figure 1: The contributing factors of Risk (adapted from IPCC AR5, 2014, P.1046)

The CCVA provides valuable information that represents the most comprehensive and up-to-date assessment in the country. There are several caveats to the information:

- The CCVA notes the difficulty in identifying potential impacts in terms of frequency and volume of extreme climate events, limited availability of annual data for indicators at district and gewog level; and uncertainties in cause-and-effect relationships as some of the limitations for the risk assessment.
- The historical climate data consisted of two key indicators of climate - temperature and rainfall. Thus extreme events such as drought – which is already occurring in Bhutan and is projected to increase into the future – were not included.
- The 'hazard' information is based upon past events as well as future climate risk. Climate projections were developed to provide data on three variables: maximum temperature, minimum temperature and rainfall, for near-, mid-, end-century for two Representative Concentration Pathways, RCP4.5 and RCP8.5.
- Regarding extreme events, the hazard assessment covers landslides, floods, hailstorms, Glacial Lake Outburst Floods (GLOFs), windstorms and wildfires, but does not include drought, which is increasingly being experienced and particularly in the eastern part of the country. Heatwaves are also not included. This is a significant omission, given that climate models project a significant increase in the likelihood of heatwaves and droughts. These are likely to impact more severely on communities in Bhutan's lowlands.[208]
- GLOF hazard has only been experienced in Punakha District to date, but there are future GLOF hazard risks for Gasa, Lhuentse and Bumthang as well as broader downstream risks, according to the NCHM/DGM (2019) assessment.

Given these caveats, the overall climate hazards rankings of the CCVA (as presented in the relevant row in **Table 1** below) are likely to be under-estimated for Lhuentse and Trashigang, as they do not factor in drought already experienced and projected to occur into the future, as well as future GLOF risks.

As the NAP CCVA is the only recent assessment to provide systematic district-level assessment, it necessarily forms the main basis for the decision matrix. However, regarding drought and dry spells, further information is provided in the NAP sectoral assessments for water and agriculture. Thus, for Dagana, future

[207] IPCC (2014) Fifth Assessment: Synthesis Report.
[208] Climate Risk Country Profile: Bhutan (2021): The World Bank Group and the Asian Development Bank.

climate projections indicate medium to high changes in precipitation for most gewogs (sub-districts) in Dagana by 2035 and 2085. Dry spell duration is projected to increase for many gewogs, affecting water availability and agriculture[209]. By 2035 and 2085, most gewogs in Tsirang are expected to experience medium to high changes in precipitation, with an increase in dry spell duration, affecting water availability and agriculture. This is particularly concerning for Tsirang Toed and Pungtenchu, which may face high change factors, while Serithang gewog is projected to experience the highest drought. Lhuentse, which experienced a higher increase in temperature between 1996-2020 and has annual average rainfall of less than 1,000 mm[210], is projected by 2035 and 2085 to experience medium to high changes in precipitation in most gewogs, with some areas having an increased risk of dry spells. For Trashigang, by 2035 and 2085, most gewogs are projected to experience medium to high changes in precipitation, with an increase in extreme precipitation events expected under the RCP 8.5 scenario; dry spell durations are expected to decrease in the future. In Punakha, dry spells will generally decrease under RCP 4.5, but increase under RCP 8.5, while in Paro drought and dry spells will decrease for most gewogs, but Chadozampa and Phobana villages remain vulnerable to erosion and landslides[211].

Please see **Annex 1** for further summarised district-level information.

The assessment in the CCVA incorporates major components of vulnerability – namely, demographic, social, economic, food and water, and infrastructural components – into the composite indices for sensitivity and adaptation. **Table 1** below includes these composite indices from the CCVA, as well as several simpler and more up-to-date socio-economic indicators, such as poverty rates calculated in the 2022 Poverty Analysis Report, and more recent information on livelihoods and employment from the 2022 Labour Force Survey.

The variables selected for inclusion in the decision-making matrix are based on those most relevant to the approach and intervention modality of the proposed AF project. Thus, for example, information on agricultural employment is included, rather than employment in general. The % of farming households who have recently accessed agricultural credit, as assessed in the 2019 RNR Census, is also included as a variable, given the focus on index-based insurance.

The CCVA sensitivity index includes socio-demographic, economic, and health indicators, as well as indicators that were considered to be proxies for environmental degradation. The adaptive capacity index includes indicators related to knowledge, infrastructure, economy, access to basic facilities/household amenities, and adaptation strategies. Note that the sensitivity composite used in the CCVA factors in a number of health and nutrition relevant indicators, including infant mortality rate, food insufficiency, and disability prevalence.

In 2022, the RGoB and WFP completed a 'Fill the Nutrient Gap' (FNG) analysis for the country. Although considered important to further factor in nutrition information into the VA, beyond what is already included in the CCVA sensitivity index, the recent FNG does not contain district-level information to facilitate this – although it does state that the non-affordability of a nutritious diet is worst in the central and eastern parts of Bhutan. See **Annex 2** for key points from the FNG to consider during when developing the proposed project activities. The project team will incorporate disaggregated nutrition information into the selection of specific project gewogs / localities during the inception phase of the project, to the extent that this is available.

In **Table 1**, the components are scored at different levels that are colour coded in a traffic-light system from green through amber to red. In most cases, green indicates a lower risk or less priority for resilience building, while red indicates a higher risk and a greater need for resilience building and adaptation. This ranking is also used to highlight districts that are higher or lower for each of these factors. Thus the more red and amber rankings that a district scores, the greater the need for climate investment and action. Data in the table is directly sourced from the CCVA, unless otherwise indicated in the footnotes.

[209] 2021, Deltares. Assessment of climate risks on water resources for the National Adaptation Plan (NAP) in Bhutan
[210] Assessment of climate risks on agriculture for National Adaptation Plan (Nap) formulation process in Bhutan
[211] 2021, Deltares. Assessment of climate risks on water resources for the National Adaptation Plan (NAP) in Bhutan

Table 1. Vulnerability assessment matrix to aid decision making for district selection

	PARO	PUNAKHA	DAGANA	TSIRANG	LHUENTSE	TRASHIGANG
Vulnerability to climate risks						
Climate variability	Low	Low	High	Very low	High	Low
Overall climate hazards	Low	High	Medium	Very low	Medium	Very low
Overall sensitivity	Low	Medium	Very high	Medium	High	Medium
Sensitivity to CC arising from livelihood & economic situation	Very low	Very low	Very high (1 of 3 highest)	Low	Medium	Very high (1 of 3 highest)
Presence of adaptation strategies	High	Very high	Low	Low	High	Medium
Adaptive capacity	Very high	Very high	Very low	Very low	Medium	Low
Overall vulnerability	Very low	Very low	Very high (2nd most vulnerable)	High (4th most vulnerable)	Medium	High
Poverty, gender and socio-economic variables						
Poverty rate	6.0	2.9	9.9	19.5	15.7	20.6
% farming HHs who accessed agric. credit[212]	10.82%	12.66%	15.28%	6.62%	6.13%	6.59%
Outmigration	Low	Low	Medium	Medium	Medium	Very high
% employed in agriculture[213]	33.0%	58.5%	75.4%	67.7%	61.7%	65.8%
Youth unemployment[214]	26.9%	16.6%	8.6%	17.6%	31.5%	26.1%
Female to male youth unemployment[215]	37.1% / 19.6%	21.7% / 8.6%	13.0% / 4.7%	21.0% / 14.5%	41.8% / 15.5%	30.8% / 18.8%
Female-headed HHs	41.4%	39.5%	60.2%	22.2%	52.5%	27.2%
% females involved in agriculture (male %)	47.49% (24.06%)	62.99% (34.76%)	81.16% (60.07%)	71.14% (53.29%)	81.73% (59.28%)	78.99% (51.74%)

[212] RNR Census (2019)
[213] Source of data is National Statistics Bureau (2022) Labour Force Survey report (LFS report) 2022.
[214] Source: LFS 2022. Youth unemployment ranges from the lowest figure of 1.6% in Gasa district to the highest in Sarpang (44.2%). The colour coding has been applied to reflect the range as presented in Table 4.6 in the LFS 2022 report.
[215] LFS 2022

5. Summary of the detailed vulnerability assessment process

The summary matrix presented in Table 1 indicates that Dagana, Tsirang, Lhuentse and Trashigang have higher levels of vulnerability to climate risks than do Paro and Punakha. They also score lower on the whole with respect to poverty, gender and the socio-economic variables considered.

In 2022, the poverty rate for Bhutan was 12.4%, implying that 12 out of 100 individuals belong to households whose monthly per capita real expenditure is below the upper bound poverty line of 6,204 (current Nu/person/ month). Poverty is not evenly distributed across areas: while the poverty rate reaches 17.5% in rural areas, it plummets to 4.2% in urban areas. Table 1 shows that Tsirang, Lhuentse and Trashigang have poverty rates higher than the average for Bhutan. Moreover, Trashigang is the district with the second highest share of poor individuals, out of the total in the country, accounting for 9.5%, while Tsirang has 5.2% of the share of poor individuals.

In the agriculture sector, Dagana (75.4%) and Tsirang (67.7%) have the highest proportion of employed persons, followed by Trashigang (65.8%) and Lhuentse 61.7%.[216] These four districts thus comprise the largest pools of agricultural livelihoods in the country, further emphasising their suitability to be included in the proposed project, with its focus on microinsurance and associated secondary innovations for agricultural livelihoods.

Thus, while further discussion and analysis will be conducted with the multistakeholder Task Force guiding the AF project, the provisional findings of this VA are that Dagana, Tsirang, Lhuentse and Trashigang are, out of the six considered, the four priority districts for inclusion in the proposed project. The community consultations will further ground-truth these findings, and the insurance feasibility study to be conducted will take the analysis to a deeper level and determine whether and how an effective and sustainable index-based microinsurance product can be developed in the potential localities.

Youth unemployment is an important factor to consider given the trends and the stated focus on youth and women in the CN. The youth unemployment rate for Bhutan in 2022 is estimated at 28.6% which is an increase by 7.7 percentage points as compared to 20.9% in 2021. The share of youth unemployed to the total unemployment is 46.7%, indicating that for every 100 unemployed persons, there are about 47 unemployed youth. The proportion is higher for females than males in rural areas. In general, the female youth unemployment rate has been dominating over the years.[217] While Paro has the second highest youth unemployment rate of the districts considered, this is less significant given that it has the lowest percentage of the population employed in agriculture – which is the major focus sector of the proposed project. The ratios of female to male unemployment are considered medium to high in all six districts.

The feminisation of agriculture in Bhutan was highlighted as a significant factor during the participatory process to develop the CN, substantiating the decision to target 70 percent women. More than two-fifths (41.8%) of the females in rural areas are contributing as family workers in agriculture as compared to males (22.0%).[218] The percentage of females involved in agriculture is particularly high in Dagana, Tsirang, Lhuentse and Trashigang, with Dagana and Lhuentse having over 80% of females involved in agriculture, while the figure for Trashigang is almost 79% and for Tsirang it is over 70%. Dagana and Lhuentse have the highest number of female-headed households amongst the six districts, which further suggests their suitability for inclusion in the project, as it will especially focus on female-headed households that are more food insecure.

During the December 2022 stakeholder consultations, it was advised to focus the project on key communities based on climate vulnerabilities, because even similar communities in the same districts might not be suffering from the same impacts. More detailed VA will be conducted at the start of the project implementation, once the specific gewogs/localities within the ddistricts have been identified. This is important to further disaggregate and identify poor and vulnerable individuals and groups within the project areas, to ensure they benefit from the project activities. It is important to also acknowledge that insurance sustainability can be promoted by including farmers from different levels of income and vulnerability, while still targeting poorer and more vulnerable farmers for subsidy provision during the AF LIF implementation process. As the farming communities within Bhutan's districts are not homogenous, it is envisaged that the localities selected will allow for this important element of sustainability; this will be ground-truthed during the community consultations and factored into the insurance feasibility study.

[216] LFS 2022
[217] LFS 2022
[218] LFS 2022

The following findings from the 2022 PAR provide guidance on differentiated poverty, to be further explored during the community consultations and during project inception:

In general, larger households (in both rural and urban areas) are more likely to be poor. Thus, the share of individuals in poverty is under 1% among households of only one member and reaches 40.2% among households with nine members or more. Food poverty rates are virtually null for one-person households and reach 3.7% among the largest households (nine members or more). Poverty rates are highest among households with very young heads (under 25 years of age) and for those with heads over 65 – 13.3% and 20.9% respectively; the latter group accounts for over 20% of the poor (PAR, 2022). Unlike in many other countries, female-headed households on average are observed to be less poor than male-headed households; however, the situation differs according to locality and the presence of other indicators of poverty within a household. Literacy rates among the poor are lower than for the rest of the population. The literacy rate is higher in urban areas both for poor (72%) and non-poor(83.2%) compared to rural areas (57.6% and 64.3%).

6. Provisional climate risk-based crop suitability selection

Given the provisional findings of this VA that Dagana, Tsirang, Lhuentse and Trashigang are the four priority districts for inclusion in the project, the next step is to consider what the most suitable focus crops could be, from a current and future climate risk perspective.

According to the 2019 RNR Census, a total of 11 cereals are grown in Bhutan, of which maize and irrigated paddy account for 31% of the total agricultural land. Maize was grown on 36,835 acres, while irrigated paddy was grown on 36, 670 acres. Regarding produ ction figures for the 2019 RNR Census, paddy yielded 63,404 MT while maize production was 55,259 MT. The total vegetable production was 43,136 MT; potato production was 44,278, more than the entire range of other vegetables, owing to its mass.

While the priority crops selected by the MoA have been used as the starting point for discussions on the proposed project and provide the broad range of possible crops that can be subjected to climate risk-based crop suitability assessment, in reality it is necessary to consider a smaller range of crops, given the need for scale of production in order to make the post-harvest and marketing of these viable and capable of generating higher incomes for farmers. The WFP insurance specialists have indicated that it is likely to be more viable to focus on cereals for the microinsurance, rather than fruit or other crops that take a longer time to reach production status. While these and other factors will be more fully explored in the insurance feasibility study, they do indicate that the boundaries for this climate risk-based crop suitability selection should be restricted to the cereals and other annual crops that are produced at the greatest scale.

This is particularly so considering that the area harvested has declined for many important crops, while yields have only marginally increased. Domestic paddy harvested area decreased by 23% and production by 25% in 2021 as compared to that of 2020. The maize harvested area decreased by 27% and production by 25% in 2021.[219] As a result, there is increasing reliance on food imports, undermining resilience to external shocks. For example, rice self-sufficiency in 2019 was estimated at 35%. According to the National Statistics Bureau, while food prices have greatly increased since the start of the pandemic, they did not increase significantly during 2022 compared to 2020 and 2021.

The findings of the NAP agricultural assessment indicated productivity increases for almost all the 11 priority crops that were selected for their economic and/or livelihoods importance, for both RCPs (GHG emissions pathways)[220] and for all three time slices (short term: 2021 – 2050, medium-term: 2051 – 2069, and long term: 2070 – 2099). The 11 crops were rice, maize, chili, potato, tomato, kiwi, apple, mandarin, cardamom, quinoa and onion.

However, caution is needed in using these findings, due to the poor quality of some of the data, and as the model used for the agriculture sectoral assessment did not capture the growing effects of climate change on the occurrence of extreme weather events, pests and diseases, and crop water management. The main variables used in the crop suitability assessment were temperature and rainfall. Therefore, while the findings are important, these limitations in the methodology mean that other factors, and in particular the impacts of recurrent extreme events, need to be considered when assessing how farming systems will be affected by climate change.

In the technical discussions held in December 2022, stakeholders confirmed that when interpreting the NAP agriculture assessment, if for example maize production in a certain district is assessed as being positive going forward under climate change, this is for the district as a whole – thus the findings include

[219] FAO STAT, 2022

[220] RCP 4.5 (stabilisation scenario) and RCP 8.5 (overshoot scenario) were used. See

the assumption that crop production can shift to higher elevations when temperatures become too high at lower altitudes. As the proposed project will target individual farmers, who will take out individual insurance premiums, and many if not most of the smallholder farmers who have land at lower elevations do not also own land at higher elevations, the finding of increased maize productivity does not necessarily apply to many of these individual farmers. Thus, the AF project will need to factor in a more detailed level of assessment when selecting specific localities than that contained in the NAP agriculture sector assessment, to ensure that participant farmers can continue to benefit at least into the medium-term from the project activities.

Moreover, much of the land at higher elevations is covered with forests and thus it may not be permissible or desirable for that land to be converted to agriculture. Given that the eastern part of the country is prone to drought, and as the occurrence of extreme events like drought and flooding were not integrated into the NAP's crop suitability assessment, the results of the NAP agriculture assessment are not precise enough and do not reflect ground realities.

A further limitation is that the studies do not reflect the many micro-climates in Bhutan. There is limited availability of hydrological data given the variable topography and as localized soil data is missing, the assessment had to use soil data from a global source. Accurate rainfall data is available from 20 sites but only from 1996 onwards.[221]

Thus, there are major limitations in the findings due to the impossibility at this stage of disaggregating according to micro-climates. The National Environment Commission (NEC) stated that it would be extremely useful to have micro-climatic studies for Bhutan and noted it would be helpful if the AF project could contribute to this. While this would not be possible given the limited budget envelope for the proposed project, the CLEAR exercise that will be conducted under the BRECSA project could help to fill this gap and would need to use more up-to-date climate projection models with enhanced downscaling.

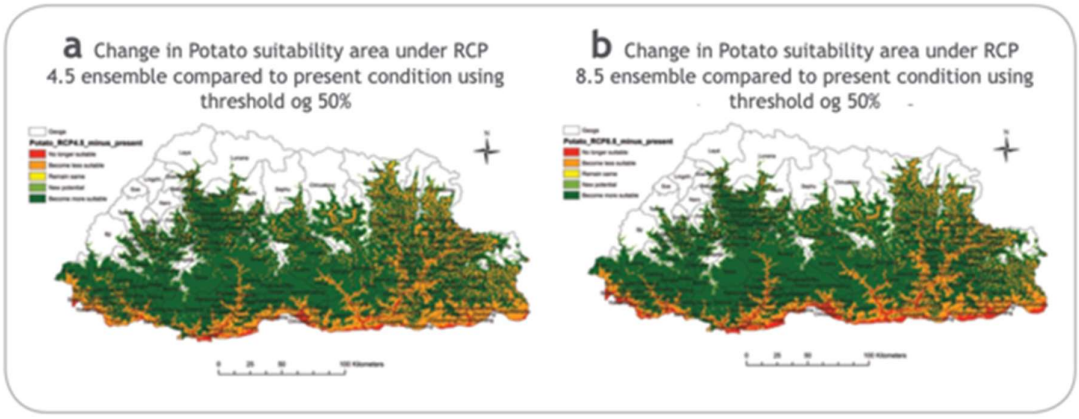
A key finding of the CIAT study was that all the crops assessed show reduced suitability to various extents in some current growing areas, especially in the lower altitudes in the south. Therefore these areas require more intensive adaptation efforts or need a diversification of crops, with selected crops becoming more suitable in new altitudes. Elevation is a key factor for climatic suitability of crops in a mountainous country such as Bhutan, which ranges from 97 m.a.s.l. in the southern lowlands to 7,570 m.a.s.l. at its highest peak. The CIAT study mapped elevation with a 30 m resolution ASTER GDEM.[222]

While current and future suitability for all eight of the commodities considered in the CIAT study were mapped, and the study factored in elevation, a narrative explanation was only provided for potato. However, more detailed findings for the other crops can be deduced from the CIAT mapping – and could be integrated into the CLEAR study to provide more detailed climate risk information, that could in turn inform the implementation of the project.

The CIAT study results for potato reveal a gradient, where lower altitude areas in the south (<1,000 m) become unsuitable, driven by increasing temperatures, whilst the mid-latitude areas (1,000–3,000 m) experience expansion in areas that are suitable. This is notable in both RCP 8.5 and to a lesser extent in RCP 4.5. The high-elevation areas (>3,000 m) remain largely climatically unsuitable for potato. The study noted that while new areas will become available for potato growers in the future, climate adaptation strategies – such as improved water management and potentially new intercropping models – will need to be developed for potato farmers in lower altitudes that may lose suitability or even become unsuitable. Eventually potato farmers in future low-suitability areas would need to diversify to new and more suitable crops or transform their livelihood strategy and move towards off-farm employment.

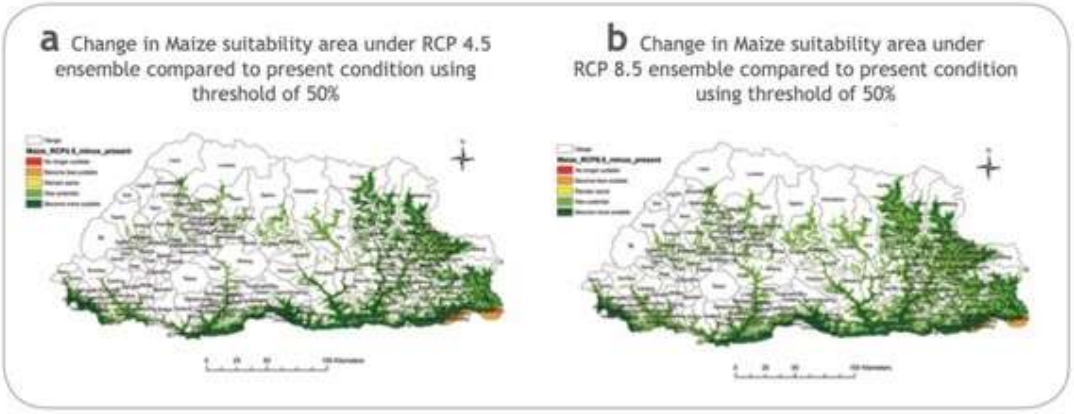
Map 2. Change in potato suitability by 2050 under RCP4.5 and RCP8.5[223]

[221] There are approximately 60 AWS; the number of class C stations is being reduced as the quality of data produced from them was not reliable.
[222] CIAT study, 2017
[223] CIAT study, 2017



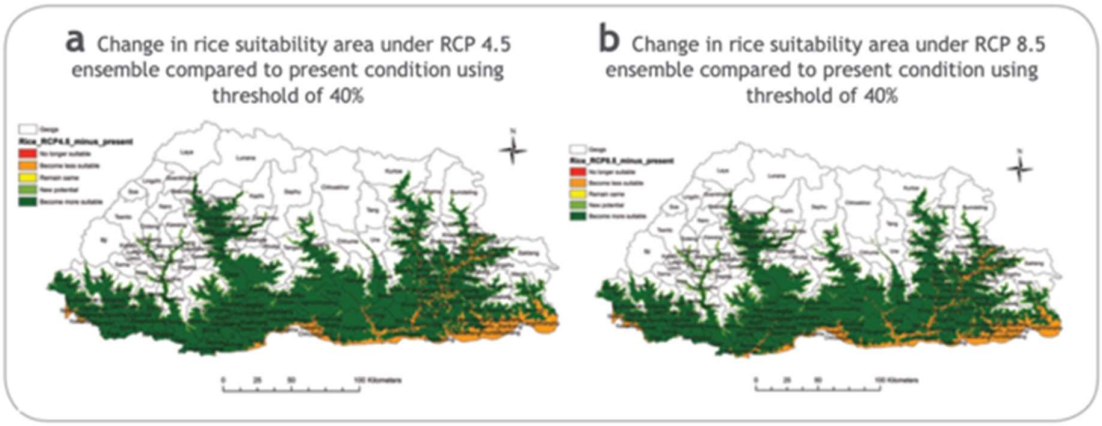
For maize, the CIAT crop suitability modelling showed large areas in the eastern parts of the country, and to a lesser extent in the south, that are likely to become more suitable for maize production under both RCP 4.5 and RCP 8.5 scenarios by 2050.

Map 3. Change in maize suitability by 2050 under RCP4.5 and RCP8.5[224]



For rice, the CIAT crop suitability modelling showed reduced suitability along the southern border and most notably in the south-east by 2050, but increased suitability across the temperate zone of the country.

Map 4. Change in rice suitability by 2050 under RCP4.5 and RCP8.5[225]



[224] CIAT study, 2017
[225] CIAT study, 2017

Thus the CIAT study provides support for the suitability under future climate risks in the medium-term (up to 2050) of maize (especially in the eastern parts of the country) and rice (but not along the southern border and in the south east). Farmers in Bhutan have recently had good experiences with hybrid maize designed for heat and drought tolerance, as well as a resistance to stem and root lodging. Farmers in Mongar doubled their yields using this variety.[226]

While there are still large parts of the country that will be suitable for potato, this crop shows the largest expanse of areas of current cultivation that will no longer be suitable. These findings of the CIAT study should be interpreted with some caution, given that more up-to-date climate projections are now available – but they do factor in the critical variable of elevation.

The ADB climate risk study further notes that over the longer-term future, sustained temperature increases, and particularly daily, monthly and annual maximum temperatures are likely to drive a northward range shift in the optimal growing ranges of current crops. This finding, although not disaggregated for individual crops, largely supports the CIAT study findings. The ADB study states that temperatures for some areas may result in expanded growing seasons and a net gain in agriculturally productive land. However, the increase in other stressors may offset these gains.[227]

Recent studies for South Asia indicate increased drought intensity in the future with negative impacts on crop yields, with rice projected to have the highest risk of yield loss, followed by maize and wheat.[228] While the northeastern region of India is projected to be a drought hotspot, additional downscaling would be needed to determine whether this would also apply to adjacent areas in Bhutan. What is clear is that Bhutanese farmers already report crop damage during plant development due to heavy rain fall, strong winds and in some cases due to summer droughts and heat waves causing significant yield losses.[229] A recent study exploring ecological distribution of rice (*Oryza sativa L.*) under the impact of climate change through maximum entropy modelling found that large changes are likely to take place in major rice-growing ecological zones of Bhutan. This is likely to have a negative impact on the livelihood and food security of the people as crop production might start declining due to unfavourable climatic factors.[230]

Thus, while both the NAP assessments and the CIAT study provide support for the climate resilience of both maize and rice going forward, both approaches do have certain caveats and other studies provide more nuanced perspectives. These provisional crop suitability findings will need to be further discussed by stakeholders and decision makers. The insurance feasibility study will provide further assessment of the most suitable commodities for the project, from other perspectives. The project should also look at climate vulnerabilities to select targeted commodities for aggregation, post-harvest and marketing support.

During the December 2022 stakeholder consultations, an informal ranking exercise was conducted to determine whether there was any convergence amongst the group of technical experts on the potential crops to be targeted for the index insurance and value chain development work. Maize was a clear priority for the eastern districts, followed by vegetables. In the south-central parts, paddy emerged as the priority, followed by vegetables. In the west, paddy was prioritised, followed by potato.

Agricultural statistics bear out this informal ranking exercise. For example, Lhuentse has high productivity in maize, paddy, onions, and apples. Trashigang, which receives between 1,607 mm and 1,864 mm of precipitation annually, has high maize productivity and a high net sown area to geographical area ratio, indicating a strong agricultural presence[231]. Moreover, Dagana is the second highest producer of maize in the country. Rice is one of the main staples of Bhutan and constitutes the highest production by mass.

While it is likely that, for practical reasons, the index insurance to be developed in Bhutan will need to be focused on staple crops, it is important to remember also that poor dietary quality and overconsumption of staples are key drivers of malnutrition in Bhutan.[232] A further implication of the FNG findings is that it would be important to try to support the move from a staple-based farm to a more diverse and nutritious farm, if this can be done without harming the insurance model. Annex 2 contains further information from the 2022

[226] https://www.cgiar.org/news-events/news/farmers-harvested-double-yield-by-adopting-wengkhar-hybrid-maize-1-in-bhutan/
[227] ADB 2021 Climate Risk Profile for Bhutan
[228] Foyez Ahmed Prodhan, Jiahua Zhang, Til Prasad Pangali Sharma, Lkhagvadorj Nanzad, Da Zhang, Ayalkibet M. Seka, Naveed Ahmed, Shaikh Shamim Hasan, Muhammad Ziaul Hoque, Hasiba Pervin Mohana, Projection of future drought and its impact on simulated crop yield over South Asia using ensemble machine learning approach, Science of The Total Environment, Volume 807, Part 3, 2022.
[229] National Statistics Bureau (2021) Agriculture Survey Report 2021.
[230] Chhogyel N, Kumar L, Bajgai Y, Sadeeka Jayasinghe L (2020). Prediction of Bhutan's ecological distribution of rice (Oryza sativa L.) under the impact of climate change through maximum entropy modelling. The Journal of Agricultural Science 158, 25–37. https://doi.org/10.1017/S0021859620000350
[231] Assessment of climate risks on agriculture for National Adaptation Plan (Nap) formulation process in Bhutan
[232] FNG, 2022

FNG to consider in further steps in project planning, including the insurance feasibility study and the development of the project activities.

While the proposed project cannot address all of the aspects underlying the structural weaknesses in Bhutan's food system, it does aim to increase incomes for food producers and processors through a climate resilient and sustainable approach. As the FNG and many other studies point out, larger scale, market-oriented production can make an important contribution to nutrition through higher incomes and home consumption.

7. Next steps

During stakeholder consultations in December 2022, it was agreed that it would make sense to use multi-criteria analysis (MCA) for the selection of the districts, as this would be accepted by decision makers as being objective, and not to use any particular tool. The selection process should be multi-criteria-based, participatory and consensus-based.

This report provides a documentation of the vulnerability assessment conducted through the MCA approach and makes a preliminary recommendation of four priority districts – Dagana, Tsirang, Lhuentse and Trashigang – out of the six considered, for inclusion in the proposed project. This has been done to facilitate final decision making by the RGoB, through a participatory and consensus-based approach. It is anticipated that this will be a two-step process, involving technical specialists at the DoA to ensure technical feasibility, followed by discussion and endorsement of the final decision through the Task Force. Once this decision has been taken, detailed planning can begin in May 2023 for the local government consultations and community consultations.

The local-level consultations, to be held in June 2023, are being designed to further ground-truth these findings, and the insurance feasibility study to be conducted will take the analysis to a deeper level and determine whether and how an effective and sustainable index-based microroinsurance product can be developed in the potential localities. Once this has been discussed and agreed with the RGoB and the Task Force, the project activities can be formalised and the Full Proposal developed. It is anticipated that this process will be finalised in October 2023, with final submission to the AF in November 2023.

The full study included two annexes, which are available on request:

Annex 1: Climate risk description per district

Annex 2: Nutrition information to consider in detailed project planning

Annex 3 Insurance Feasibility Study

Annex 3 contains the Executive Summary of the Insurance Feasibility study carried out by the WFP Climate Risk Insurance team during full proposal development. The 100-plus page full feasibility study is available on request.

Integrated and sustainable Climate Risk Insurance (CRI) scheme in Bhutan

Executive Summary

I. The insights in brief:

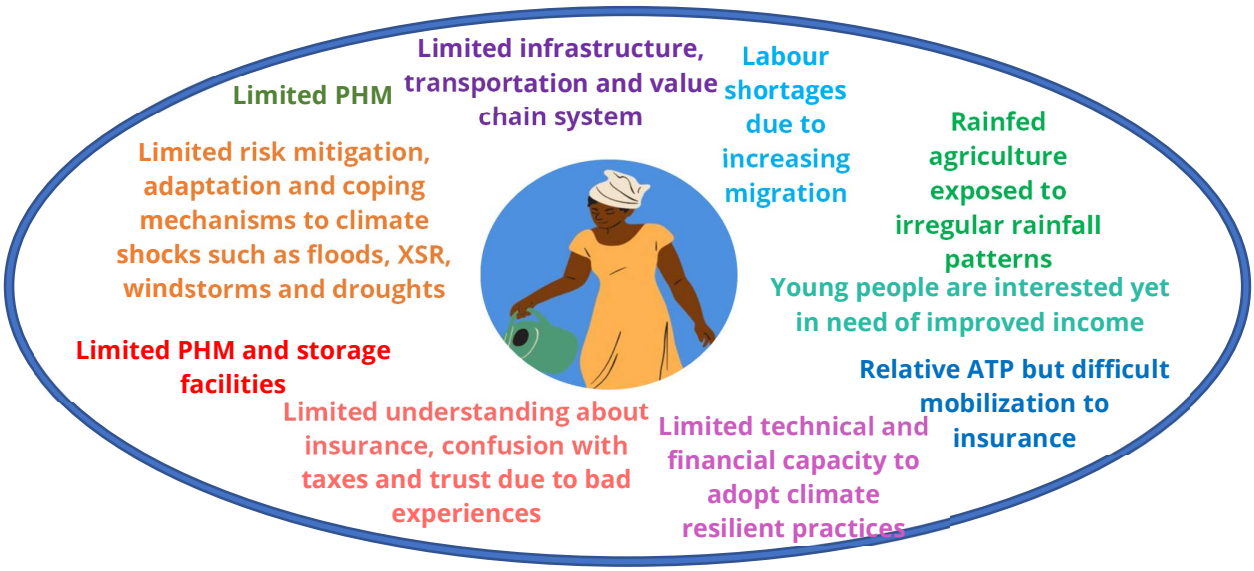
Strengths and Opportunities:

- WFP boasts extensive experience in Index Climate Risk Insurance (WIB & AYII) and maintains a global and regional team of experts. WFP has built close collaboration with other UN Agencies such as UNDP and IFAD.
- Climate Risk Insurance (CRI) and financial inclusion are a priority for RGoB.
- Farmers' resilience is a shared priority among INGO partners, insurers, and government entities.
- Insurers are driven to action, yet there exists a requirement for the development of agricultural insurance schemes that are scalable and economically viable. Governmental support is seen as a condition for this.
- Farmers recognise climate risks as predominant, specifically excess of rain, deficit of rain, floods ,and windstorm.
- Farmers exhibit a robust savings culture, indicating financial discipline and readiness for participation.
- The rural landscape benefits from the presence of Microfinance Institutions (MFIs) and banks, enhancing outreach potential.
- An array of distribution channels remains underutilised in insurance, offering ample avenues to reach intended beneficiaries.
- Technical Service Providers specialized in Index Based Insurance bring a wealth of expertise to CRI implementation.
- The integration of credit and crop insurance, allowing pay-out utilization for loan repayment, offers a mutually reinforcing approach.
- Increasing digital literacy and expanding national internet and mobile connectivity create favorable conditions for digitalization.
- Risks deemed high priority can be effectively covered by insurance.

Weaknesses and Threats:

- Affordability may pose a challenge for the most economically vulnerable farmer segments.
- Limited understanding of insurance, compounded by confusion with taxes and lingering distrust from past negative experiences, hinders adoption.
- Data fragmentation and lack of data sufficiency raise concerns, despite ongoing efforts to bolster data availability for effective product design and implementation.
- The absence of an incentivization framework for insurers to participate in CRI presents an obstacle.
- A dearth of local CRI experts contributes to a knowledge gap in the country.
- Insurers require greater reinsurance support for underwriting agricultural risks.
- Cost - structure.

II. Farmers' apparent challenges:



III. The recommendations in brief:

1. Who should be insured?

- 10,000 poor smallholder farmer households in 5 years
- 70% beneficiaries will be women; female and male youth
- *Programme locations: Dagana, Lhuentse, Thsirang, Trashigang*

2. What are the perils that farmers face and can the perils be covered?

Climate-related

1. **Excess and lack of rain, erratic rainfall**

   Yes, excess and lack of rain, which can lead to drought or excessive moisture, are often insurable risks under certain crop insurance policies. These risks can have significant impacts on crop yields and quality, making them crucial considerations for farmers.

2. **Flooding**

   Yes, flooding can be covered by insurance policies.

Non-climate related

3. **Pest and Diseases**

   Yes. Crop insurance policies may provide coverage against damage caused by pests that significantly impact crop yield. This could include insects, rodents, and other animals that damage crops. This is indirectly related to climate change, as well.

4. **Human-Wildlife Conflict (HWC)**

   Coverage for losses due to human-wildlife conflicts, such as damage caused by animals like elephants, deer, or birds, is not a standard feature of traditional crop insurance policies.

Insurance is basically a three-dimensional function of hazard, exposure, and vulnerability. To begin thinking about insurance, consider the following :

The risk needs to be measurable with clear methodologies and approaches in assessing the damages and benefits

Second the loss occurrences need to be independent with a measurable correlation between loss occurrences.

And finally, the moral hazard needs to be low.

Source: UNDP concept paper - developing human-wildlife conflict insurance solution in Bhutan

The project has identified that climate-related perils faced by farmers are <u>excess and deficit of rain and erratic rainfall</u>. There have been deviations from average or historical rainfall patterns for a specific period. This also results in flooding and even landslide[233].

We have noted that there is high concern about Pest and Diseases and HWC, therefore, we propose a layered approach called Savings and Insurance Layering (SAIL).

3. **What should be insured?**

   Since every Dzongkhag has its own priority crops and we aim for scalability, we propose a Crop agnostic product – the proposed insurable interest is the **agricultural income** lost by farmers due to insurable risks.

   The insurable interest can be quantified through:

- Average costs of production to be established and linked with programme building market access and value chain development.
- The loan amount is linked to the cost of production or the cost of the green intervention to adopt. To define average costs of production based on the Consultants' Report but other points of reference the average loan of RENEW that is around 1,000 USD, Tarayana's lowest one is around 500 USD.

4. **Against what perils are we protecting the farmers through Climate Risk Insurance?**

   <u>Excess of rain and deficit of rain</u> (erratic rainfall, drought)

[233] Ungar Flashfloods: A tale of tragedy and resilience, Neten Dorjl

5. **What is the most suitable modality of index insurance product (WIBI, AYII)?**

Modality - WIBI[234] (precipitation data from local weather stations + satellite info) – deviations due to microclimates picked by risk retention layer (SAIL)

6. **How is insurance integrated with other components of the integrated approach?**

<table>
<tr><th></th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 4</th><th>Year 5</th></tr>
<tr><td rowspan="3">Modular approach on Climate Risk Integration</td><td colspan="5">Savings and Insurance Layering (SAIL) Approach: Integrating CRI and Savings (the SAIL is the minimum viable product)</td></tr>
<tr><td></td><td colspan="4">Bundling agricultural inputs and CRI[235]</td></tr>
<tr><td></td><td></td><td colspan="3">Innovative Green Finance and CRI[236]</td></tr>
</table>

The Minumum Viable Product is the Savings and Insurance Layering (SAIL) approach (see no. 7 for explanation). This will be offered at the beginning of the programme. An expansion of services will be an important sustainability strategy, such as bundling insurance with inputs and innovative microfinance will be explored and studies to asses farmers' needs to access loans to improve productivity while contributing to climate mitigation/adaptation measures.

7. **What is Savings and Insurance Layering (SAIL) Approach?**

The different perils that farmers face should be managed by different financial products. Relying on insurance for very frequent risks can result in an unsustainable insurance programme,

[234] **Weather Index Based Insurance (WIBI)** - Weather index-based insurance, often referred to as parametric insurance, is a type of insurance that pays out based on predefined weather-related triggers rather than traditional loss assessment. Pay-outs are triggered when a specific weather parameter such as rainfall measured by a particular weather station or satellite over a given period reaches a pre-determined threshold. The terms of the insurance contract are set to correlate, as accurately as possible, with the value of loss for a specific crop type or more broadly the impact of a weather event. If the index reaches the threshold, subsequently all people insured in the defined area will automatically receive the same pay-out without assessing individual losses.

[235] CRI bundled with inputs have historically been effective to sustain a climate risk insurance programme. The R4's biggest insurance programme was integrated with the Farmer Input Support Programme (FISP) in Zambia, and the covered farmers have reached 1 million. The team will organize a mission and study tour to study how this can be implementable with the gov't.

[236] The innovative green microfinance products will need further development and market assessment. The innovative green microfinance products will need further development and market assessment. Microfinance institutions offer loans and financial services to individuals and small businesses engaged in eco-friendly activities, such as organic farming.

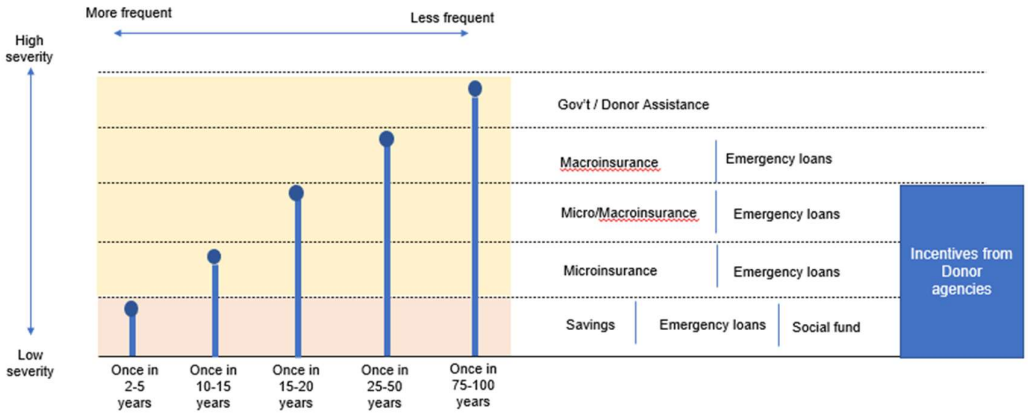


Figure 1 Financial products that can help manage risks

Bhutan has a high savings culture. Based on the 2022 Bhutan Living Standard Survey, About 92% of households have saving accounts and 7.8% of households have recurring deposit accounts.

Considering this, we propose that we start with a layered product wherein the savings component can help farmers manage their more frequent risks.

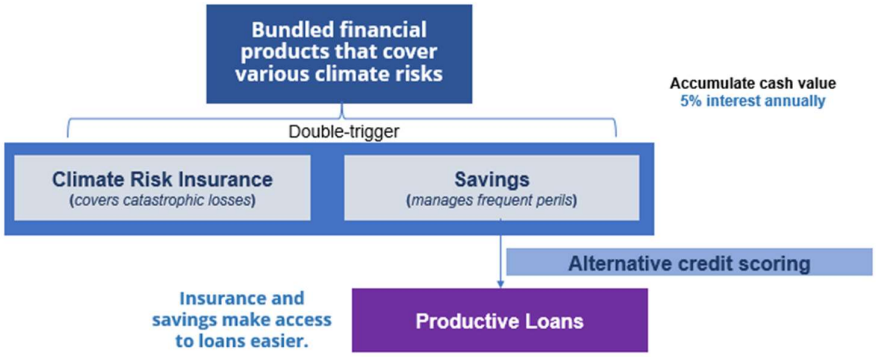


Figure 2 Savings and Insurance Layering Approach

The climate risk insurance trigger will pay out upon severe climate events while the savings component will help the farmers during the frequent perils they have.
This will also result in access to productive loans. For example, upon a deposit of 400 Nu or $4.8, the farmers may be eligible for a 4,000 Nu or $48 loan that can help farmers to buy agricultural inputs.

8. Who are the potential main/implementation partners? (Please note that these are recommended partners)

1. Insurance company – BIL and/or RIC
2. MFIs and Banks – Renew MFI and BDBL (through the community centers)
3. Technical Service Providers (for product design and weather/trigger monitoring) - TBD

9. What is the most suitable distribution channel/s:

[237]We have identified that MFIs and Banks are the most suitable distribution channels because of the following:

- **Primarily, Microfinance Institutions**

  Microfinance Institutions (MFIs) offer a compelling avenue for distributing insurance products due to their unique positioning. They cater to underserved populations and thrive in regions where traditional insurance companies lack a robust presence.

  RENEW MFI has a customer base of 69,895 and their field staff visit the communities once a month to process financial transactions and financial literacy.

  Moreover, their mandate also includes the development of Green Loans.

- **Secondarily, BDBL through Gewog Community Centres**

  The BDBL is widely known and its banking services are widely utilized. Clients can transact through the Gewog Community Centers established to provide essential services, including financial services. The community centers usually have one staff that is in-charged of all services in the centre, however, staff from BDBL would often provide assistance to clients.

10. What are the targets[238] set on a yearly basis?

- Year 1: 2,000 smallholder farmers in 3 districts (Dagana, Tsirang, and Trashigang) with green loans and productive loans with RENEW of an average amount between 500 and 1,000 (product available also for other farmers but beyond the subsidy schemes
- Year 2: 3,000 RENEW 3 districts + 1,000 BDBL (Lhuentse) + 500/1,000 SAMS/ SF
- Year 3: 4,000 RENEW 3 districts + 2,000 BDBL (Lhuentse and Trashingang) + 1,000 SAMS /SF
- Year 4: 5,000 RENEW 3 districts + 3,000 BDBL (Luhentse, Transhigang, Dagana) +1,000 SAMS/SF TBD + 500 BRECSA (Tsirang)
- Year 5: 5,000 RENEW 3 districts + 3,000 BDBL (Luhentse, Transhigang, Dagana) +1,000 SAMS/SF TBD + 1,000 BRECSA (Tsirang)

11. What are the farmers' Ability and Willingness to Pay?

The ATP and WTP of farmers, based on their capacity to save on a monthly basis, ranges from $2.96 to 9.44.

It is prescribed that the premium rate does not go beyond $10.00 annually.

12. How much would it pay-out amount:

- Maximum payout amount of the loan, a portion of it to cover the outstanding loan.
- Established insured amount based on costs of production.

13. What is the sustainability strategy – exit strategy?

1. Graduation Strategy

[237] The Savings and Insurance Layering (SAIL) approach should be able to contribute to strengthening MFIs' business model.
[238] Clear commitments will be discussed by the final entity to serve as the distribution channel.

A graduation strategy will be formulated based on the specific context, gradually allowing farmers to take on a growing portion of the insurance premium over time, as outlined in the comprehensive approach described earlier. An illustrative example is presented below:

Year	% of subsidy by WFP	% of farmers' contribution	Year	Amount of subsidy by WFP	%Amount of farmers' contribution
2024	100%	0%	2024	10	0
2025	50%	50%	2025	5	5
2026	20%	80%	2026	2	8
2027	0%	100%	2027	0	10
2028	0%	100%	2028	0	10

Figure 3 Sample graduation strategy with a $10 premium

At the end of the 3rd year, the farmers should be able to pay the premiums in full[239].

2. **CRI linked with agricultural inputs**

Bundling CRI with better farm inputs has demonstrated a significant increase in acceptance and uptake among farmers. This is particularly prominent in markets where the concept of insurance coverage hasn't been fully comprehended or appreciated by the target market. By linking CRI with other tangible products and services, it becomes more attractive and marketable to a wider range of farmers resulting to increased willingness to pay for insurance,

14. **The value proposition of the scheme**

Government	• Alignment with the National Financial Inclusion Strategy, DRR, climate objectives • Financial inclusion, social security, risk mitigation -> economic and social stability
Farmers	• Building economic identity • Access to expanded financial products / initial deposits + savings bonuses • Building of Net worth • Financial empowerment
Insurers	• Reduce administrative and operational costs, focusing on covering catastrophic events • Sustainability of CRI programmes • Digitalization, competitive advantage
Financial institutions	• Market expansion • Technical and capacity development support • Digitalization • Expanded service offerings

[239] There are indicative per percentages and depending on the participants' capacity, we may recommend that farmers start with small contribution upon enrollment.

Annex 4 Summary of national stakeholder consultations

The project team adopted a participatory approach to the development of the Concept Note and the Full Proposal. For the Concept Note, this included four national-level stakeholder consultation workshops, a series of bilateral consultations with a range of stakeholder groupings, six community consultations meetings held in three districts, and a final focused validation workshop. For the Full Proposal, a multi-stakeholder Task Force was established to oversee the project development, which comprised representatives of the Department of Macro-Fiscal and Development Finance (DMFDF) of the Ministry of Finance (MoF), in which the Designated Authority (DA) of the AF for Bhutan is located; the Policy and Planning Division, Ministry of Agriculture and Livestock (MoAL); the Department of Agriculture (DoA); the microfinance institutions: RENEW Micro Finance Private Limited (RMFPL) and Taryana Micro Finance Limited (TMFL); insurance companies: Royal Insurance Corporation of Bhutan (RICB) and Bhutan Insurance Limited (BIL); the National Commission for Women and Children (NCWC); and the Youth Development Forum (YDF). The Task Force met on a regular basis, with additional stakeholders invited when appropriate. In addition to the Task Force meetings, a series of bilateral consultations with a range of different stakeholders was conducted from January to September 2023, and local and community consultations were held in 12 localities in the four project districts (three per district) to develop the full proposal.

A. National Multi-Stakeholder Workshops held during Concept Note development

Punakha Workshop, September 28-29, 2021

Background: A multi stakeholder consultation was held in Punakha between September 28 – 29, 2021 led by the Gross National Happiness Commission (GNHC), as the National Designated Agency of the Royal Government of Bhutan in collaboration with the WFP for the Large Innovation Grant (LIG). The objectives of the workshop were to (i) provide background on the proposed Adaptation Fund Large Innovation Grant; (ii) discuss and agree on the focus for the LIG project; and (iii) agree on the stakeholder and community consultations process for the LIG. **Participants:** The workshop brought together a diverse range of relevant stakeholders, including the Department of Livestock, Policy and Planning Division, Department of Agriculture, and National Center for Organic Agriculture from the then Ministry of Agriculture and Forests, GNHC, District Agriculture Officers, Department of Disaster Management, and National Center for Hydrology and Meteorology. The meeting had 15 male and 4 female participants.

Output: Through a consultative process, the following 11 possible innovation focus areas to consider for the LIG, which included both local innovations as well as innovations from other countries / regions were identified as priority needs in enhancing the resilience of the agriculture sector in Bhutan.

Thematic area	Areas of intervention
1) Adaptive production	• Enhance services to counter pests and diseases • Community based rangeland management • Protected Agriculture and Organic Farming • Sustainable Land Management • Adaptative Farming to counter Climate Behaviour
2) Improve access to markets	• Improve linkages between producers and market
3) Improve water use & management	• Enhanced water harvesting • Efficient water Use: Smart irrigation systems/technologies
4) Enhance climate services	• Enhanced weather forecast services for informed decisions: Economic Activities and Disaster Risk Reduction • Weather and climate services for building climate resilience through enhanced weather forecast services • Climate index micro- insurance schemes: Enabling environment to enhance National Food and Nutritional Security

Follow up: Based on further discussion between the GNHC and the WFP, it was agreed that the LIG proposal will focus on the climate index based micro- insurance schemes, considering its need in the country and qualifying as an innovation for Bhutan.

Thimphu Workshop, October 29, 2021

Background: A multi stakeholder consultation was held in Thimphu to conduct a deeper dive on the status of crop insurance including challenges faced by the farmers and challenges in instituting crop insurance schemes in Bhutan. The objectives of the workshop were to: (i) better understand the needs of crop insurance in Bhutan and; (ii) present the WFP's integrated approach to weather-index insurance as a potential solution to Bhutan's challenges. This workshop was mainly focused on the agriculture sector. **Participants:** The participants included officials from Agriculture Research and Extension Division, National Plant Protection Center, National Soil Service Center, and National Center for Organic Agriculture from the Department of Agriculture, and Policy and Planning Division of the then Ministry of Agriculture and Forests, National Center for Hydrology and Meteorology, Bhutan Trust Fund for Environmental Conservation and the UNDP. The meeting had 11 male participants.

Output: The participants came to an agreement on the need for microinsurance in the agriculture sector.

Thimphu Workshop, June 15, 2022

Background: A multi stakeholder consultation was held in Thimphu to present the framework of the proposed project and to agree the project components, outcomes and outputs. In addition, WFP provided a recap of the Adaptation Fund criteria, the process undertaken to date and next steps. **Participants:** The participants included officials from the Agriculture Research and Extension Division and the Policy and Planning Division of the then Ministry of Agriculture and Forests, Gross National Happiness Commission, National Center for Hydrology and Meteorology, National Environment Commission, Ministry of Finance, Bhutan Trust Fund for Environmental Conservation, the Microfinance Institutions (MFIs) of RENEW (Respect, Educate, Nurture and Empower Women) and Tarayana; and the two insurance corporations in Bhutan, namely Bhutan Insurance Limited, and Royal Insurance Corporation of Bhutan (RICB).

Discussion: There were discussions and queries on: Selection of the districts for community consultations: the DOA clarified that due to the lockdowns because of COVID-19, the selection was done based on what was feasible for the consultations; Shifting of use of traditional knowledge to scientific based weather forecasting or their use in conjunction; The importance to develop a sustainability plan of the insurance schemes after the end of the project; The project should be developed to provide an integrated resilience approach such as financial literacy, enhancing agromet services, etc.; The coverage of the insurance schemes.

Conclusion: The participants agreed on the overall project framework as presented and agreed to participate in the follow up discussions and contribute as required.

Insurance Workshop in Thimphu, June 23, 2022

Background: A multi-stakeholder consultation was held in Thimphu to present and discuss (i) a summary of findings from the various consultations held with communities, relevant agencies in the Royal Government of Bhutan, Insurance companies, Banks and Microfinance Institutions catering to the rural population; and (ii) insurance types are available in the market, key characteristics of these options, and suitability for Bhutan's context. The Royal Insurance Corporation of Bhutan (RICB) presented a summary of the Priority Sector Lending (PSL) scheme as background on existing crop insurance in the country. **Participants:** The participants included officials from Gross National Happiness Commission, RMFPL, TMFL, the then Ministry of Agriculture and Forests, Agro-Logistics and Marketing Cooperative, RICB and Bhutan Insurance Limited. There were 12 participants with 4 women and 8 men.

Discussion: The discussions included the following: *(i) Priority Sector Lending (PSL) Crop Insurance Schemes* – This was launched in 2017 through a collaborative process between the insurance companies, Department of Agriculture (DoA) and Royal Monetary Authority. This insurance is only applicable to those farmers who have taken a loan from the PSL. The PSL Insurance Scheme came about upon the request of the banking institutions to provide security to the lending part. The PSL faced challenges with recovery and the process was found tedious as it required verification at the district and the insurance company. (ii) *Queries on area yield and weather-based index insurance* – There were queries on how these schemes work, what are the verification measures put in place to ensure that farmers use adequate inputs, what happens if crops are damaged at early stages in a yield-based microinsurance scheme and if the insurance renewal is annual. The WFP team clarified some of the queries and added that the technical details will be a part of the design of the insurance products based on the needs of the farmers. (iii) *Crop and district selection* – The DoA and WFP agreed to further discuss the selection of potential crops and districts within a week's time. It was agreed that it would be important to know the number of farmers in each selected district and the project could focus on up to 6 districts.

Conclusion: The participants expressed that the proposed crop insurance project will be an opportunity to understand how better to manage the risk for climate-vulnerable smallholder farmers using the risk transfer mechanism of insurance. They expressed their interest and willingness to continue to be involved in the development of the project.

Participants in the National Validation Workshop held in Thimphu, 20 July 2022

1. Mr. Wangda Drukpa, Advisor, Department of Agriculture (DOA)
2. Ms. Kesang Tshomo, Project Manager of National Organic Flagship Programme, DOA
3. Mr. Lakey, Principal Agriculture Officer, DOA
4. Mr. Sagar Acharya, Senior Agriculture Officer, DOA
5. Ms. Tshering Dema, Dy. CEO, RMFPL
6. Ms. Susmita Subba, Sustainability Officer, RMFPL
7. Mr. Yeshey Lotay, General Manager, Bhutan Insurance Limited (BIL)
8. Mr. Kelden Dorji, Assistant Manager, BIL
9. Ms. Phuntsho Choden, Assist. Programme Officer, Bhutan Trust Fund for Environmental Conservation (BTFEC)
10. Mr. Dungkar Drukpa, OIC, WFP Bhutan Country Office
11. Mr Binai Lama, Food Systems and Agriculture Value Chain Specialist, WFP Country Office
12. Ms. Dechen Tshering, WFP National Consultant
13. Ms. Katiuscia Fara, Senior Climate and Disaster Risk Reduction Advisor, WFP Regional Bureau Bangkok
14. Ms. Penny Urquhart, WFP International Consultant
15. Ms. Shayne Rose Bulos, WFP HQ (Rome), Insurance and Financial Inclusion Specialist

A. National Multi-stakeholder Workshops held during Full Proposal development

B.1 Task force meeting held on 9 May 2023

Venue: DoA conference hall

A. Meeting Agenda

Time	Agenda	Responsibility
2:15 to 2:30 PM	Registration of participants & Introduction	All participants
2:30 to 2:40 PM	Welcome note	Binai, WFP
2:40 to 3:00 PM	Detailed vulnerability assessment and initial climate risk-based crop suitability assessment	Penny, WFP
3:00 to 3:10 PM	Feasibility study – other considerations	Shayne, WFP
3:10 to 3:30 PM	Discussion and endorsement	Binai
3:30 to 3:10PM	Way forward and tentative date for next meeting	Ngawang
3:30-	Tea and snacks	

B. List of participating agencies

1. Department of Macro-Fiscal and Development Finance, MoF
2. Policy and Planning Division, Ministry of Agriculture and Livestock
3. Department of Agriculture
4. National Commission for Women and Children
5. RENEW Microfinance
6. Tarayana Microfinance
7. WFP

C. Record of the meeting

a) Mr. Ngawang opened the meeting on behalf of the Department of Administration (DoA) and warmly welcomed all the participants. He expressed gratitude to the task force for recognizing the significance of the meeting. Following his remarks, the participants proceeded with a round of introductions.

b) Binai, WFP also welcomed the task force members and provided a brief purpose for this meeting, which was to discuss the vulnerability assessment and initial climate-risk based crop suitability assessment and insurance feasibility.

c) Binai provided a short presentation covering the ToR of the taskforce, tasks undertaken for the development of the successful concept note, and important stages of the full proposal development that is underway.

d) Penny, WFP provided a presentation on the vulnerability assessment and initial climate-risk-based crop suitability assessment

e) The aim of in-depth vulnerability and initial climate-risk-based crop suitability assessment:

- To identify, based on a range of agreed criteria, the project localities and vulnerable smallholder farmers to target for the LIG, building on existing studies and information
- To undertake a rigorous and evidence-based assessment so that the AF project supports activities that lead to greater climate resilience and sustainability of smallholder livelihoods, and to avoid maladaptation

f) Provisional criteria to identify localities:

- presence of the necessary pre-conditions for large-scale roll-out of index-based microinsurance, including
- access to existing microfinance channels,
- production of selected crops at a sufficient volume for the necessary aggregation,
- value chain development and marketing activities, and
- the presence of suitable distribution channels for the insurance
- ability to leverage off the activities of existing and planned projects, in order to promote efficiencies and synergies across investments;
- vulnerable areas that have received relatively lower levels of investment;

- levels of out-migration
- presence of the necessary pre-conditions for large-scale roll-out of index-based microinsurance, including
- access to existing microfinance channels,
- production of selected crops at a sufficient volume for the necessary aggregation,
- value chain development and marketing activities, and
- the presence of suitable distribution channels for the insurance
- ability to leverage off the activities of existing and planned projects, in order to promote efficiencies and synergies across investments;
- vulnerable areas that have received relatively lower levels of investment;
- levels of out-migration

g) Findings of the MCA

- While further discussion and analysis will be conducted with the multistakeholder Task Force guiding the AF LIG, the provisional findings of this VA are that Dagana, Tsirang, Lhuentse and Trashigang are, out of the six considered, the four priority dzongkhags for inclusion in the AF LIG
- The community consultations will further ground-truth these findings, and the insurance feasibility study to be conducted will take the analysis to a deeper level and determine whether and how an effective and sustainable index-based micro insurance product can be developed in the potential localities

h) Shayne, WFP provided information about the insurance feasibility study being carried out as a part of the full proposal development. She explained the objective of the insurance feasibility study with the following key questions:

- Is there a need for agricultural or climate risk insurance and other financial products (savings, credit, etc.) by the participants of the selected value-chain/s in the selected dzongkhags?
- What factors impact the sustainability of an insurance scheme to protect them?

She emphasized the importance of evaluating various factors when choosing the value chain(s) and locations. These factors include the number of farmers involved, the production quantity, government priorities, distribution channels, client trust in those channels, and internet connectivity.

D. Discussion and action points

a. There was a suggestion to form a multisectoral management level committee to provide approval for key decisions in the proposal, in addition to the taskforce endorsement. While this seemed a good idea to clear each important stage in proposal development, WFP and DoA responded that it is important to make this process faster and smoother considering the tight timeline. ***DoA will discuss this with their management and suggest the best options for management approval for key decisions during the proposal stage***

b. There was a question on why WFP does not have a dedicated local consultant to support proposal development. WFP responded that there is no project preparation grant available and hence WFP is using part time of in-house specialists based in headquarter, regional office Bangkok and Bhutan country office. In country, the DoA counterpart is also supporting the proposal development. However, for in-depth community consultations to be undertaken in the four districts, a local consultancy firm is being engaged by WFP.

c. There was a question on why insurance on human wildlife conflict is not being considered for this proposal. WFP and DoA clarified that this proposal is for climate change related adaptation initiatives, which is being addressed through index based micro-insurance activities. HWC cannot be directly justified for consideration in this proposal.

d. There was a question on why all the districts cannot be considered for this project. Another opposing suggestion was whether this project should be tried in only one or two districts to ensure concentration of resources and corresponding results. WFP and DoA clarified that the funds of USD 5 million cannot cover all the activities for all 20 districts. On the other hand, having the project in only one or two districts would not be able to showcase a good proof of concept, and the project may not be able to impact the expected target number of beneficiaries.

e. There was a suggestion to ensure that the project does not duplicate the efforts of similar projects and should instead build complementarity. WFP and DoA responded that this is indeed the approach, and that other

projects and pipeline proposals are being studied to design complementarity and synergy with this proposal. WFP has requested DMDF to share information on current and pipeline projects on similar themes.

f. Tarayana Micro Finance (TMF) noted that based on the ground realities as a Micro Finance provider the four districts are okay but, while it is essential to target clients who are vulnerable, TMF tends to provide to sections who are above the transient poor segments. There is a very fine line between promising them loans but also not to drown them in debt. A balanced approach to the insurance game is suggested as financial literacy and knowledge on insurance is low among these districts. As the consultants correctly mentioned, awareness creation will require additional thought.

g. Based on the multicriteria analysis and results of various multistakeholder consultations undertaken to date, the taskforce recommended the consideration of the four pre-identified districts of Trashigang, Lhuntse, Tsirang and Dagana to be considered for the proposal. WFP and DoA would carry out the community consultations in 12 locations in these four districts, to ground ground-truth findings of the MCA and to collect primary level information and understanding for the insurance feasibility report

List of participants:

Institution	Name	Position	Gender
Department of Macro-Fiscal and development Finance, Ministry of Finance	Mr. Dhendrup Tshering	Programme Officer	Male
Policy and Planning Division, Ministry of Agriculture and Livestock	Mr. Leki Choda	Planning Officer	Male
RENEW Microfinance	Ms. Susmita Subba	Sustainability Officer	Female
Taryana Micro Finance	Mr. Jamyang Phuntsho	Banking officer	Male
Women and Children Division, National Commission for Women and Children Secretariat	Ms. Yeshey Lham	Chief Programme Officer	Female
Department of Agriculture, Ministry of Agriculture and Livestock	Mr. Ngawang	Sr. Agriculture Officer	Male
World Food Programme (WFP)	Penny Urquhart	WFP Climate Resilient Development Specialist	Female
	Shayne Rose Bulos	Climate Risk Insurance Specialist	Female
	Binai Lama	Programme Policy Officer, WFP Bhutan	Male

B2. Task Force meeting held on 9 June 2023; Venue: DoA Office

A. Meeting Agenda

Time	Agenda	Responsibility
11:00-11:10	Registration of participants	All participants
11:10-11: 30	Welcome and introduction	Binai, WFP
11:30-12:00	Update findings of community consultation based on two consultation area in Trashigang	Penny, Ana & Andrea
12:00-12:30	Presentation of the findings on the Insurance Feasibility Process	Penny, Ana & Andrea
12:30-12:45	Deliberation and endorsement of the assessments	TF members

12:45-12:50	AOB	
12:50-13:00	Way forward and closing	Binai, WFP
13:00	Lunch	

B. Participants List:

Name	Designation	Organization
Ngawang	Sr.Agriculture Officer	DOA, MOAL
Tshering Tobgay	Dy. Chief Agriculture Officer	DOA, MOAL
Tshetrim	Dy. Chief Horticulture Officer	DOA, MOAL
B.B.Rai	Head SAP	DOA, MOAL
Tshering Choden	Program Co-ordinator	MOF
Dhendup Tshering	Program Co-ordinator	MOF
Leki Choda	Planning Officer	PPD, MOAL
Susmita Subba	Green Finance Officer	RENEW Microfinance
Binai Lama	Programme Officer	WFP
Penny Urquhart	WFP Climate Resilient Development Specialist, HQ	WFP
Ana Aguilar	Climate Risk Management Specialist, RBB	WFP
Andrea Camargo	Lead Microinsurance Portfolio Climate Risk insurance Team, (HQ)	WFP
Karma Yangden	Programme Associate	WFP

Participant introductions

Mr. Ngawang, DoA, welcomed the participants and briefly explained the agenda for the meeting. Following the welcome note, each participant from the different agencies introduced themselves.

Concept Note and update on the local and community consultations held to date

- Mr. Binai Lama, WFP, presented the concept notes of the AF proposal and the community consultation methodology and the findings from the two-community consultation (Radhi and Bidung gewog) and informed on the presence of gender balance in the FGDs.
- He highlighted key points from the visit with the DoA, DoL and planning officer of Trashigang Dzongkhag, including their insights on data collection.
- **Penny –** Shared about the CARLEP Project which has made a tangible difference to farm size and it's insufficient because it doesn't cover everybody. And the activities are not enough.
  -Shared that there was good coverage of the banks, microfinance, financial service providers in Trashigang Dzongkhag.
  - Erratic rainfall, increasing temperature and Drought concerns was shared by the farmers and the stakeholders
  -Shared about the loss 70-80% of maize harvest from the 2 consultation and inadequate data on the seasonal forecast at the local level.

Insurance Feasibility

- Andrea mentioned that one key lesson we've learned over the years is that insurance can't really be sold as a standalone good because, well, you never wake up in the morning thinking, "Oh, I need insurance, I need to go and buy it. Material goods that will suddenly have real purchasers are not accepted by insurance. Therefore, it's essential to include insurance in a package that really focuses on things like increasing productivity and resilience.

Discussion and Action Points

- The participants held a fruitful discussion on the findings presented, and indicated their interest in hearing about the findings once all 12 local and community consultations were completed.
- WFP will compile a list of important data requested, which the Task Force undertook to provide as soon as possible.
- Final points were made on the key next steps:

- Local consultations will be completed by 01 July 2023
- Final report mid-July 2023
- Insurance feasibility study - late July 2023
- Development of activities by end July 2023
- Implementation arrangements and innovation workshop – early August 2023

B3. Innovation Workshop held on Tuesday 08 August 2023 at the Thimphu Deluxe hotel, Thimphu

A. Objectives of the workshop

- Stimulate discussions between diverse stakeholders to harness multiple perspectives on innovation relevant to the project, with a particular focus on research organisations and representatives of climate-vulnerable communities.
- Identify secondary innovations to accompany the primary innovation of climate risk insurance for smallholder farmers.
- Identify modalities for ongoing dialogues on innovation between research organisations and climate-vulnerable communities and associated learning and knowledge management; and
- Identify innovation initiatives and potential partnerships with research and innovation groups that could be leveraged during project implementation.

B. Agenda

Time	Agenda topic	Responsibility
9:15 to 9:30 AM	Registration of participants	Binai, WFP Bhutan
9:30 to 9:40 AM	Opening remarks and agenda	Ngawang, MoAL / Binai, WFP
9:40 to 9:50 AM	Participant introductions	Binai, WFP
9:50 to 10:10 AM	Process to date and main components of InAF Bhutan	Binai, WFP
10:10 to 10:30	Presentation of key findings on secondary innovations from the project localities Buzz group session	Penny, WFP
10:30 – 10:45 AM	*Tea break*	
10:45 – 11:30 AM	Facilitated discussion of buzz group findings on secondary innovations	Penny, Binai, Participants
11:30 – 11:45	Presentation on relevant agricultural innovation initiatives and platforms	ARDC, DoA
11:45 – 12:45 AM	Break-out groups: Discussion and mapping of further relevant agricultural and financial/insurance innovation initiatives and platforms	Penny to introduce; Participants
12:45 – 13:05 PM	Report-back in plenary and discussion	Binai, WFP
13:05 – 13:20	Modalities for ongoing dialogues on innovation – group discussion in plenary	Penny, WFP
13:20 – 13:30	Next steps and meeting closure	Binai, WFP / Ngawang, DoA
13:30 PM	*Lunch*	

Record of meeting

1. Opening remarks, introductions, and process to date

Ngawang of DoA opened the meeting and thanked participants for their attendance. He emphasized the importance of the AF project to implement the RGoB's priority of climate risk insurance to help smallholder farmers to manage their risks better in an integrated fashion, which would help them to enhance their resilience and increase their incomes in a sustainable way. He stressed the importance of bundling insurance with other innovative technologies, for effectiveness and sustainability.

After the participant introductions, Binai Lama, Programme Policy Officer, WFP Bhutan, provided an overview of the process to date to develop the endorsed concept note for the AF Large Innovation Grant project, InAF-Bhutan. He explained that the process to develop the full proposal was entering its final stages, and that there would be several rounds of review and submission of versions before the full proposal was submitted to the Adaptation Fund Secretariat before the end of 2023. The proposal would be considered by the Adaptation Fund Board at the next meeting after that, which would be in March 2024.

Mr Binai Lama presented to the participants on:

a) Objectives of the project:

- Strengthen climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers.
- Roll out innovative climate risk transfer mechanism and build smallholder farmers' resilience through integrated approach; and
- Institutionalise innovative climate risk management for long-term sustainability.

b) Project area and target groups: Four districts: Tsirang, Dagana, Trashigang, and Lhuentse; 10,000 direct beneficiaries; focus on women and youth.

c) Consultative process: A comprehensive overview of the process was provided, including project planning, formation of taskforce groups and meetings held for the approval of the concept notes of the Adaptation Fund project. Consecutive stakeholders meeting and community consultations held for the adaptation fund project were mentioned. The importance of conducting the community consultation and the area was mentioned to the participants and the gender assessment report was also highted. The insurance feasibility study on the AF for the Bhutan was also mentioned and full proposal development process was updated to the participants.

Discussion points:

1) Mr. Kinzang Wangdi from the Agro Logistic and Marketing Cooperative (ALMC) raised why the selection of the project area is similar for all the other projects and asked why the higher altitude area are not included in any projects?
    - For the selection of the project area, the DoA focal and WFP team replied that the intention is to cover all districts in the future. However, this project has a limited budget envelope; thus, considering the need for the insurance to be delivered within an integrated approach of a range of layered activities, to be sustainable in the future, only four dzongkhags can be covered. A multi-criteria analysis (MCA) was conducted which demonstrated the high levels of climate risks and vulnerability faced in these areas.
2) Mr. Kinzang Thinley from Tarayana Foundation raised a question on the type of crops to be insured.
    - WFP answered that the insurance feasibility study has found that a crop-agnostic approach, in which the insurable interest would be agricultural income, would be preferable than focusing on only one crop.

<u>2. Presentation of key findings on secondary innovations and buzz group discussions</u>

Penny Urquhart from WFP HQ presented the key findings on secondary innovations as identified in the local consultations in the 12 gewogs within the four project dzongkhags and facilitated a session of buzz group discussions on this. She emphasized that the findings from the local consultations, while useful, were not a complete set of options for the project to consider supporting. Thus, the workshop was being held to generate further suggestions from the key informants from the ARDCs, the NCOA, and the financial services stakeholders.

Her presentation covered the following:

1) Agricultural adaptation innovations
    - Water-related: Improved access to water sources and irrigation, and improved water management, e.g. Rainwater harvesting (ICIMOD project in Barshong Gewog, Tsirang)
    - Crop diversification (e.g. avocado, early chili and litchi in Sergithang Gewog, Tsirang; more garlic in Trashigang)
    - Shifting crops to higher altitudes (e.g. citrus and mangoes in Trashigang)
    - New crops e.g. adzuki beans, quinoa- drought resistant
    - Sensitization for cultivation of mixed crops
    - Traditional varieties of cereals and vegetables that are more climate resilient.
    - Traditional methods of cultivation that are like conservation agriculture (e.g., in Trashigang)
    - Local farmers methods to control pest and diseases
    - Agroforestry – use of agroforestry is limited
    - Protected agriculture - use of greenhouses
    - Biogas
    - Rituals and prayers – For rainfall and a good harvest.

Penny emphasised that while the last point cannot be considered an adaptation innovation, as this is more a form of a local preparation and/or coping strategy, it was the prevalent response of farmers across the dzongkhags when asked about their agricultural adaptations.

2) Financial services innovations

Penny noted that very little information was received during the local consultations on relevant financial services innovations. However, the following points have been raised during national-level consultations and/or proposed by WFP for consideration:

- Financial services innovations that could utilise the very high internet connectivity of the country

- An alternative credit screening system to reduce high loan default rates
- Plan to eventually develop green loans
- Seamless process of communication with farmers that links climate information services with savings and insurance

Buzz group session on secondary innovations

To generate discussion amongst participants and map out the range of potential existing innovations and innovation ideas, participants worked in groups of two to answer the following questions:

1. Which is the most relevant and promising **climate-resilient agricultural innovation** of those presented? (Each person identifies one and explains to partner why) (5 minutes)
2. Identify a key gap – one or more **local agricultural innovations** that could be relevant and promising for the project – and specify where and how this arose and is being used and scaled up. Write this on a card. (5 minutes)
3. Identify one or more **financial services local innovation** that could be relevant and promising for the project – e.g. for use in insurance dissemination. Be prepared to explain to group why and how this could be used. (5 minutes)

There was consensus from the group that the following options were the most important, out of the range of options identified from the local consultations:

- Traditional and cultural knowledge and varieties
- SLM and soil fertility management
- Improved resilient varieties – seeds etc.
- Organic agriculture
- Integration between agriculture and financial services
- Mobile and digital solutions
- Smart technology and automation
- Protected agriculture.

Secondary innovations that were relevant and promising were identified in the buzz groups and subsequent plenary discussion and grouped under the following headings:

Agricultural Adaptation Options

1.Traditional Knowledge

- Promoting millets as a drought resilient crop (traditional varieties and nutritious)
- Promotion of indigenous crop varieties over hybrid
- Mass cultivation of the citrus crop (good for carbon capture too)
- Protect against soil erosion
- Indigenous knowledge integration
- Knowledge management mainly traditional knowledge
- Documentation of interventions
- Case study of success story

2.Organic farming

- Organic farming – carbon sequestration, reduction in carbon footprint, pest & disease resilient
- Adoption of organic farming management practices (use of compost, local seeds /breeds, etc.)
- New loans for organic farmers

3. Infrastructure/ technology

- Improved structures e.g., drying sheds to prevent infrastructure damage
- Drones for monitoring crops e.g., with thermal cameras
- Camera traps for wildlife
- Technology for regular soil moisture, temperature
- Technology for accurate and timely weather services
- Digital apps for transactions

4.Crop diversification

- Crop diversification
- Farm mechanization

- Resilient seed varieties (e.g., paddy seeds variety that require little water)

5.Sustainable land management (SLM)
- SLM and soil fertility management
- Landscape approach lab development (SLM)

6.Good agricultural practices and soil testing
- Soil testing & crop monitoring (drones)
- Promote good agricultural practices (GAPs)

7.Marketing and logistic losses
- Strategies to address marketing and logistics losses.

8.Protected agriculture
- Protected agriculture
- Protected agriculture (efficient use of the water, fertilizer could reduce the inputs required for the cultivation)
- Protected commercial agriculture
- External factors can be controlled
- Protected agriculture (external factors can be controlled)
- Farming management

9. Human wildlife conflict
    - Danger caused to people while going to wild / village
    - Electric fencing
    - Camera trap integrated with early warning system and information passage

10. Pest and disease control
- Local farmers' methods for pest control
- Enhanced local pest control
- Agroforestry
- Agriculture
- Pest and diseases control detector / sensor

11. Livestock
- Integrating livestock into the farming system (for organic manure)
- Biogas for cooking and organic slurry/ manure
- Livestock insurance integration

12. Automation and irrigation
- Smart automation
- Automatic irrigation system
- Soil testing & recommendation – automate this
- Crop monitoring using drone
- Water related
- Biogas
- Traditional method
- Irrigation channel and automatic irrigation
- Water irrigation

These points will be consolidated with secondary information and further analysed in the full proposal to set out the range of potential adaptation options for integration with the insurance and savings activities.

Financial Services Innovations
- Clustered location insurance system for specific high-value crops. For example, potatoes at high altitudes, cardamom at mid-altitudes, and rice, ginger, and black pepper at lower altitudes
- Crop specific – High value / commercial crop.
- Financial services local innovation - insurance availability at gewog level for optimum services to farmers
- Encourage private insurance in Bhutan such as Bhutan Insurance Limited

- Supply chain assurance
- Technology
- Low interest loans
- Risk mitigation
- Awareness

Discussion points

1. Dr. Karma, MD, BTFEC: How this project is integrating with the existing project specially in Tsirang and Dagana? WFP – The integration of the existing projects and program are vital for the success of insurance project, and we have discussed with the DOA on the matter and still have some discussion for the integration of the project with insurance project.
2. How is crop insurance integrated with HWC insurance schemes? It was explained that the insurance product cannot cover this under climate risk insurance. However, WFP is aware of the initiative under the BioFin project to develop indemnity insurance for HWC and will maintain close communication with the UNDP project development team, as it is essential, in a small market like Bhutan, that the two insurance products are synergistic and possibly even integrated.
3. NCOA: the insurance scheme must be at the gewog level, not only at the dzongkhag level – in other words, the financial services' providers must have reach to the gewog level to facilitate access for farmers.
4. Renew Microfinance Private Limited (RMFPL) noted the importance of collaboration with the DoA on providing financial literacy to farmers, as well as the potential for providing loans to commercial farmers for inputs. They also noted that digitalization is complicated and requires connections with so many stakeholders; many of their clients do not understand Dzongkha or English.
5. The chair of the agri-marketing and logistics cooperative (ALMC) and the hydroponics representative noted that protected agriculture should be combined with smart technologies – simple greenhouses do not work. They also felt that landscaping and infrastructure development on farms – such as drying/cooling sheds, heating, and smart automation, such as plumbing, irrigation, climate control, were important.
6. There was strong support from the chair of the ALMC, who is himself an organic farmer[240], and others on the importance and desirability of organic farming as an adaptation approach. The NCOA noted that a combination of traditional and scientific methods is needed for successful organic production. Selection of high-yielding varieties is needed. The model should be modern organic agriculture for increased yield and income. The chair of the ALMC stated that he hoped that the high-yielding organic seeds are not hybrid, because with those, the farmer cannot save his own seeds and use them again. The NCOA clarified that the seeds are open pollination varieties (OPV).
7. While hydroponics is a good approach, the start-up costs are extremely high and thus this is not recommended for the target farmers.
8. Ngawang (DoA) noted that while protected agriculture may originally be thought to be a good approach, this is resulting in a proliferation of plastic in the environment, and thus he feels that crop diversification is a better adaptation strategy – if one crop fails, another may succeed.
9. While the MoAL has supplied greenhouses, but there is a lack of data on impact – to what extent has this helped?
10. Good options for diversification are high-end medicinal herbs, and developing the technology to domesticate these, where needed.
11. Farm mechanisation is a driver for enhancing agricultural production, as the cost of labour is a decisive factor. Dr Chhetri from CNR noted that gender-friendly tools and equipment are needed.
12. Participants felt that one cannot neglect any innovation, as all are important.

<u>3. Presentation of relevant agricultural innovation initiatives and platforms</u>

Dr Tshering Penjore of ARDC Wengkhar presented on initiatives on innovation agriculture technologies /solutions for smallholder farmers, with the following key points:

- HWC- Development of fabricated electric fence system
- Irrigation – Development of SMART irrigation system using open -source resources (both software and hardware)
- IoT based water management system for rural water supply.
- Development of hydroponic control and management system using open sources resources
- Development of bioacoustics repellent device to minimized human wildlife conflict.
- Development of chatbot for agriculture
- Shoot tip grafting method for producing diseases free citrus planting materials.

[240] He grows organic kiwi fruit, amongst many other crops, at his farm in Punakha, which is called Othbar farm.

- Hot callusing system to increase the success rate of walnut grafting.
- Smart mushroom production system using IoT based automation and monitoring system.
- Automated Agro met stations.
- Smart Nutrigation

Discussion Points

1. Mr. Kinzang, ALMC, asked on the importance of developing improved solutions for the HWC.
2. Dr Deepak, Seed Production, noted the newly released varieties of resilient paddy seeds that are promising. These require no additional water input. The varieties are Wengkhar Kamja 3 (mid-high altitude) and Samteling Kamja 3 (low altitude). Cauliflower and similar cole crops are also promising from an adaptation perspective.
3. WFP noted that the project aims to use insurance linked with savings, as well as other supportive activities, to incentivize the uptake of climate-resilient technologies and approaches, including organic agriculture.
4. Chair of the ALMC and a farmer in Punakha – recommends that project focuses on organic agriculture; production is good, productivity good. 7-8 varieties of fruit, plus vegetables, cold crops etc. Labour costs high; fermented cow urine for red ant, very effective. Only small amount of FAW, does not know if he was just lucky. Does soil test in farm, every 5 years.
5. NCOA: Bhutan has had experience now on organic broccoli and cauliflower exported to Singapore, with more demand for other products. Bhutan can't compete with chemically grown products, but with organic production, has a competitive advantage.

<u>4. Discussion and mapping of further relevant agricultural and financial services/insurance innovation initiatives and platforms</u>

There was insufficient time to hold break-out groups on this topic, thus discussion was held in plenary. Penny made a short presentation identifying the following national platforms and initiatives:

- Agricultural Innovation Centre in Paro – this focuses on agricultural machinery.
- Japan/UNDP project "**Promoting Technologically Enabled Agriculture for the Vulnerable Farming Population in Bhutan**" Activity 3.2. Support creation of **Innovation Lab** that will organise open innovation challenges and scaling of viable innovative digital solutions in agriculture such as precision farming.
- **Bhutan Climate Futures Lab / FAB23 Bhutan July 2023** - focused on five challenges—climate adaptive agriculture, water conservation, human wildlife conflict, cultural preservation, and assistive technology.
    - E.g., student from Gyalpoizhing College of Information and Technology with seven international members aims to help farmers in Gelephu grow chillies using greenhouses shaped with traditional Bhutanese roofs; incorporated raised planting beds with adjustable drainage for proper ventilation during different seasons. Soil detectors, soil moisture, and other sensors check soil humidity and air temperature directly sending it to the cloud, then to the app where it can be checked. If the temperature exceeds above 35 degrees, the app is notified with a warning message.
- **National Innovation Platform** (NIP) "**Naykap Gokab**" (MoICE, DHI Innotech, UNDP) – launched 5 May 2023, for showcasing innovations and ultimately to attract investment to test, implement, and scale up solutions.
- Examples on platform include blockchain-based payment system; solar bamboo fan and light; environmental advocacy through sports.

Discussion then centred around whether any other innovation initiatives and platforms in Bhutan relevant to the topic could be identified, how the project could interact with and benefit from these, and whether there were any gaps that the project could fill, to share lessons and enhance the innovation process in Bhutan.

- Dr TP: there are many platforms, but most of these remain on academic level and their solutions are very difficult to reach the farmers. Need agricultural scientists to innovate because IT people lack the technical knowledge.
- Ngawang – he has advocated for several years that there should be a national forum to discuss, display, present all agricultural innovations that can uplift the livelihoods of the farmers at the national level. DoA to do this with CNR, CST, and other research institutions and send the technologies that work to the field.
- Dr Rekha: Bhutan Climate Futures Lab is very relevant and CNR is involved in some of this. All concerned parties – all technicians, scientists, social scientists, policy makers, should come together to support this, rather than have an additional platform.
- NCOA: model organic villages in many districts, have organic farmers fairs, landscape-based farming. Two consecutive years in Sarpang. Promote discussion, and to sell produce.
- All ARDCs have units for customer support, they help in organising field demos, farmer field schools, explain research / technology to farmers – for dissemination of knowledge and technology.

WFP emphasized that the project is being designed to support what DoA is already doing on agricultural innovation, and to bring this together where appropriate with innovations in the financial services sector. The idea is to integrate

digital technologies and applied tools into the insurance roll-out. Digital marketing platforms would be an important element to build on. The project would aim to develop a seamless way of linking agro-met advisories with insurance and savings via mobile phones.
It was agreed that the proposal would identify potential modalities for ongoing dialogues on innovation, particularly between communites and researchers.

5. Next Steps

Mr Binai Lama presented on the upcoming steps for the full proposal development of the adaptation fund project:

1. First draft of proposal for review and national validation in Bhutan: 7 – 20 September
2. First submission to AF: 27 September
3. AF comments received: hopefully by 11 October.
4. RGoB internal validation process and Cabinet approval: 19 – 27 October
5. 2nd submission to AF: 01 November
6. Review from AF by mid-November
7. Revision and 3rd submission to AF: by early December

B4. Task Force meeting held on 10th August 2023 at Thimphu Deluxe Hotel

Objectives

- To inform members about the current progress of Adaptation fund programs and way forward
- To engage taskforce members in discussion regarding project arrangement plans

Agenda

Time	Agenda topic	Responsibility
11:00 – 11:15 AM	Registration of participants	Karma Yangden, WFP Bhutan
11:15 – 11:25 AM	Opening remarks	Ngawang, DoA
11:25 - 11:40 AM	Full proposal development to date and timeline	Binai, WFP
11:40 – 12:00 PM	Implementation arrangements of the project	Ngawang, DoA
12:00 – 12:20 PM	Insurance feasibility study	Penny, WFP
12:20 to 12:50 PM	Discussions	Participants
12:50 – 01:00 PM	Meeting closure	Binai, WFP Bhutan

Participants list

Sl#	Name	Agency
1	Susmita Subba	RENEW Microfinance
2	Jamyang Phuntsho	Tarayana Microfinance
3	Ngawang	ARID, DoA
4	Tshering Choden	DMDF, MoF
5	Binai Lama	FSR, WFP
6	Karma Yangden	WFP
7	Dhendup Tshering	DMDF, MoF
9	Penny	WFP
10	Kelden Dorji	BIL
11	Bikash Subba	RICBL
12	Yeshi Dorji	RICBL
13	Priyanka Nepal	Tarayana Microfinance

1. Full proposal development to date and timeline

Mr. Binai Lama, WFP Bhutan presented the taskforce members on the status of the adaptation fund project and timeline of the upcoming tasks and way forward, as follows:

- First draft of proposal for review and national validation in Bhutan: 7 – 20 September

- First submission to AF: 27 September
- AF comments received: hopefully by 11 October.
- RGoB internal validation process and Cabinet approval: 19 – 27 October
- 2nd submission to AF: 01 November
- Review from AF by mid-November
- Revision and 3rd submission to AF: by early December

2. Project implementation arrangements

For the implementation arrangements, Ngawang (DoA) made a presentation which included suggestions for the project organization chart, the composition, and roles of the Project Steering Committee (PCS) and the Project Management Unit (PMU), as well as the fund flow mechanisms. A rich discussion ensued, in which various refinements were made to the proposals.

Mr. Dhendrup Tshering of the DMDF, MoF suggested that it would be wise to include a Technical Working Group composed of technical-level representatives of the responsible partners, to ensure solid operational coordination and to review the quarterly progress reports, amongst other functions.

3. Insurance feasibility study proposals

Ms. Penny presented on the insurance feasibility study.

- Start with **Minimum Viable Product** – which is **insurance linked with savings** (risk transfer + risk absorption)
- The MVP is supported by **risk reduction activities** – improved climate services, enhanced TA for climate-resilient technologies (e.g., smart irrigation, organic agriculture, conservation agriculture, GAPS, etc – the exact approach will depend on the location), and sensitisation, financial literacy, enhanced access to credit, etc.
- **Value chain development** of selected **climate-resilient and high-value** commodities (will include PHL and market access)
- The product can be **developed** so that it is linked with **green finance** – access to green loans (modular add-on)

Discussion

- Mr Ngawang, DOA asked Penny why the windstorm was not included in the proposal? – to this Penny said that windstorm damage data is less compared to the rainfall data.
- Agricultural inputs questions were also raised by the Ngawang, DoA and to which Penny has said that the insurance team will be able to clarify on that and everything will be cleared in the proposal documents.
- Mr Kelden, BIL raised a question on the premium, on selection of four district area and support of premium duration and methods to cope with frequent insurer? - To this Penny has said that the premium is not yet fixed and still the discussion will be done with the insurance team and DOA. For the selection of four district was given based on the high climate risk and good agriculture production and for the frequent risk occurrence, penny said that she would discuss with the insurance team about it.

4. Conclusion of Task Force meeting

The meeting concluded with the note of thanks to the participants by Mr Binai Lama and Ngawang DOA.

B. List of stakeholders consulted at the national level

Institution	Name	Position	Gender
Government			
Department of Agriculture, Ministry of Agriculture and Livestock	Mr. Wangda Dukpa	Advisor	Male
	Mr. Tirtha Bdr. Katwal	Programme Director	Male
	Mr. Lakey	Principal Agriculture Officer	Male
	Mr. Tshering Wangchen	Deputy Chief Agriculture Officer	Male
	Mr. Saha Bir Rai	Deputy Chief Agriculture Officer	Male
	Mr. Dorji Rinchen	Deputy Chief Agriculture Officer	Male

Institution	Name	Position	Gender
	Mr. Sagar Acharya	Sr. Agriculture Officer	Male
	Mr. Sangay Chophel	Sr. Plant Protection Supervisor III	Male
	Mr. Jigme Tshering	Land Management Officer	Male
	Mr. Kailash Pradhan	Agriculture Officer	Male
	Mr. Jimba Rabgyal	Agriculture Officer	Male
	Ms. Kesang Tshomo	Project Manager of National Organic Flagship Program	Female
Department of Livestock, Ministry of Agriculture and Livestock	Sonam Wangchuk	Livestock Officer	Male
Policy and Planning Division, Ministry of Agriculture and Livestock	Mr. Dorji Wangchuk	Planning Officer	Male
	Mr. Sonam Pelgen	Planning Officer	Male
Policy and Planning Division, Ministry of Finance	Mr. Lobzang Dorji	Sr. Planning Officer	Male
Department of Disaster Management, Ministry of Home and Cultural Affairs	Mr. Thinley Norbu	Chief Program Officer	Male
	Mr. Tshering Dorji	Assistant Program Officer	Male
Gross National Happiness Commission	Mr. Wangchuk Namgay	Chief Programme Coordinator	Male
	Ms. Kuenzang L Sangey	Chief Planning Officer	Female
	Ms. Tandin Wangmo	Chief Planning Officer	Female
	Mr. Karma	Sr. Language Development Officer	Male
	Ms. Dorji Pem	Programme Coordinator	Female
	Ms. Dhendrup Tshering	Assistant Programme Coordinator	Male
	Mr. Kuenzang Tobgye	Assistant Project Coordination Officer	Male
National Center for Hydrology and Meteorology	Mr. Singay Dorji	Chief	Male
	Mr. Ugyen Chophel	Sr. Statistician	Male
	Mr. Saroj Acharya	Hydrology Meteorology Officer	Male
	Ms. Phuntsho Wangmo	Assistant Environment Officer	Female
National Council for Women and Children	Ms. Ugyen Tshomo	Chief Programme Officer	Female
	Ms. Yeshey Lham	Chief Programme Officer	Female
	Ms. Tshewang Lhamo	Sr. Programme Officer	Female
National Environment Commission	Mr. Tshering Tashi	Officiating Chief Environment Officer	Male
	Mr. Tashi Dendup	Sr. Environment Officer	Male
	Ms. Tshering Yangzom	Sr. Environment Officer	Male
	Mr. Sonam Dargay	Environment Officer	Male
Gasa District	Mr. Tashi Dendup	Planning Officer	Male
Haa District	Mr. Cheda Jamtsho	Planning Officer	Male
Punakha District	Mr. Gyembo Namgay	Agriculture Officer	Male
	Ms. Rinzin Lhamo	Agriculture Officer	Female
University			
College of Natural Resources	Ms. Rekha Chhetri	Assistant Professor	Female
	Ms. Chogyal Wangmo	Associate Lecturer	Female
Development Partners			
Bhutan Trust Fund for Environmental Conservation (BTFEC)	Mr. Singye Dorji	Officer In-charge	Male
	Mr. Dorji	Acting Chief Program Officer	Male
	Ms. Sonam Wangmo	Administrative/ Human Resource Officer	Female
	Mr. Thinley Wangdi	IT/ Data Manager	Male
	Ms. Phuntsho Choden	Programme Officer	Female
	Ms. Rinchen Dema	Assistant Finance Officer	Female

Institution	Name	Position	Gender
Food and Agriculture Organization	Mr. Chador Tenzin	Assistant Representative	Male
United Nations Development Programme (UNDP)	Mr. Sangay Chophel	GCF Project Technical Specialist	Male
World Food Programme (WFP) Innovation Accelerator	Mr. José Shehata	Innovation Venture Consultant	Male
	Mr. Dahy Ahmed	Innovation Venture Consultant	Male
	Mr. Xavier Herault	New Ventures Consultant	Male
Corporations			
Bhutan Development Bank Ltd.	Mr. Phub Dorji	Chief Executive Officer	Male
	Ms. Sonam Pelden	Credit Officer	Female
	Mr. Yoezer Pelden	Microfinance Officer	Male
	Ms. Pema Choden	Credit Officer	Female
	Ms. Phuntsho Choden	Credit Officer	Female
	Mr. Sangay Tshewang	Credit Officer	Male
National Development CSI Bank Ltd	Mr. Sonam Rigyel	Director	Male
Royal Insurance Corporations of Bhutan	Mr. Divya Dewan	Manager Underwriting	Male
	Mr. Sonam Dargay	Manager Claims	Male
	Mr. Tashi Tshering	Manager	Male
	Mr. Gangay	Assistant Manager	Male
	Mr. Subash Mongar	Assistant Development Officer	Male
Civil Society Organization			
Youth Development Fund	Ms. Roma Pradhan	Sr. Programme Coordinator	Female
	Mr. Sonam Gyamtsho	Programme Officer	Male
	Mr. Karma Chophel	Project Officer	Male
Cooperatives			
Agro-Logistics Marketing Cooperative	Mr. Sangay Needup	Chairman	Male
Private sector			
Bhutan Insurance Limited	Mr. Yeshey Lotey	General Manager	Male
	Ms. Dawa Choden	Deputy Manager	Female
RENEW Microfinance	Mr. Bernd Baehr	Chief Executive Office	Male
	Ms. Tshering Dema	Deputy Chief Executive Officer	Female
	Mr. Jampelyang Dorji	Chief IT Officer	Male
	Ms. Susmita Subba	Sustainability Officer	Female
Tarayana Microfinance	Mr. Karma Dorji	Chief Executive Officer	Male
	Mr. Jamyang Phuntsho	Company Secretary	Male

List of stakeholders consulted during the May – June 2023 mission for full proposal development

Institution	Name	Position	Gender
Ministry of Agriculture and Livestock (MOAL)	Dasho Thinley Namgyel	Secretary, Ministry of Agriculture & Livestock	Male
National Centre for Hydrology &Meteorology (NHCM)	Karma Dupchu	Director, NHCM	Male
	Dr. Singay Dorji	Chief Statistical Officer	Male
	Ugyen Chopel	Dy. Chief Statistical Officer	Male
	Monju Subba	Dy. Executive Engineer	Female
Policy and Planning Division, Ministry of	Leki Choda	Planning Officer	Male
	Sonam Eduen	Planning Officer	Female

Agriculture (PPD)	Tashi Yangzom	Communication Officer	Female
Department of Agriculture (DOA)	Yonten Gyamtsho	Director	Male
	Namgay Thinley	Chief, Agriculture Production Division	
	Rinzin Wangchuk	Chief, Agriculture Research and Innovation Division	Male
	Tshering Tobgay	Dy. Chief Agriculture officer	Male
	BB.Rai	Head SAP,	Male
	Ngawang	Agriculture officer, Agriculture Research and Innovation Division	Male
	Tshering Wangchen	Dy. Agriculture Officer	Male
	Tsheltrim	Agriculture Officer, National Organic Flagship Programme	Male
Royal Insurance cooperation limited (RICBL)	Gaugay	Dy. Manager, General insurance department	Male
	Tashi Tshering	Dy. Manager, General insurance department	Male
Bhutan Insurance Limited (BIL)	Kelden Tshering	Product development officer	Male
	Yeshey Lotay	Gerneral manager	Male
Royal Monetary Authority (RMA)	Jurmey Tenzin	Analyst, RMA	Male
	Pema Chogyal	Analyst, RMA	Female
	Namgay Lhaden	Training Officer	Female
	Sonam Choden	Training Officer	Male
	Tshering D Dorji	Assistant Analyst, RMA	Male
World Wildlife Fund (WWF)	Chimi RInzin	Director, WWF	Male
UNDP	Netra	UNDP	Male
Radhi gewog officials	Youten Phuntsho	GUP, Radhi Gewog	Male
	Dorji	Gewog Administrative Officer	Male
	Pema Wangda	Agriculture Extension Officer	Male
	Yonbi Nima	Khadam Tshogpa (Village Representative).	Male

	Pema Tenzin	Dekiling-Tsangbar Tshogpa	Male
	Rinchen Wangdi	Mangmi, Radhi gewog	Male
	Tashi	Pakaling Tshogpa	Male
	Thinley Dorji	Tongling Pam Tshogpa	Male
Bidung gewog officials	Chador Phuntsho	Gup, Bidung gewog	Male
	Tshering Phuntsho	Tshekhar Tsogpa	Male
	Sonam Zangmo	Kakha Nye Tshogpa	Female
	Pema Wangchuk	Tshekthum Tshogpa	Male
	Tenzin Thinley	Saling Tshogpa	Male
	Ugyen Lhendup	Lempthang Tshogpa	Male
	Pema Wangchuk	Agriculture Extension Officer	Male
	Kinley Tenzin	Livestock Extension Officer	Male
	Pema Lhendup	Forest Ranger	Male
Ministry of Finance (MOF)	Tshering Choden	Program Coordinator	Female
	Dhendup Tshering	Program Coordinator	Male
RENEW Microfinance	Susmita Subba	Green Finance Officer	Female
World Food Programme (WFP)	Binai Lama	Programme Policy Officer, Bhutan	Male
	Penny Urquhart	WFP Climate Resilient Development Specialist, HQ	Female
	Luzandrea Camargo	Lead Microinsurance Portfolio Climate Risk insurance Team, (HQ)	Female
	Ana Aguilar	Climate Risk Management Specialist, RBB	Female
	Karma Yangden	Programme Associate, Bhutan	Female

D. Key points from stakeholder discussions – May / June 2023 mission

National Government	
Ministry of Finance (MoF), Dept. of Macro-Fiscal & Development Finance (DMDF)	• Discussion centred around risk financing. The DMDF indicated that there is not that much on Loss and Damage at this stage but this will become more important. Good data on climate-related losses will be important – currently does not exist. • Under the new Biodiversity Financing initiative (BioFin), Bhutan will implement 4 key areas: (i) Integrating biodiversity into planning, budgeting and resource allocation; Sustainable Development Plan – stocktaking on National Biodiversity Strategy and Action Plan (NBSAPP), and integrating into local govt level; Ecotourism – generating revenue from this; and (iv) Human wildlife conflict (HWC) – looking into avenues where insurance could come in. Areas 3 and 4 are linked to Bhutan 4 Life, in which WWF is a partner. • Tiger Bonds are being explored – for central Bhutan. HWC is a component of REDD+ and is under the GCF project. Confirmed that there is no good database on HWC losses. • DMDF encouraged the AF LIG to look into the enabling environment and ensure that scaling up of the insurance will be facilitated. • RGoB is interested in supporting an insurance premium for smallholder farmers but currently the fiscal space is lacking for this. If the AF LIG could generate data on the return on investment of the insurance, this would help. WFP noted that this could be done by quantifying in the past what the

	Govt. has spent and how much could be saved through insurance. This could be done under Component 3. • The Full Proposal (FP) will spell out a multi-dimensional exit strategy and roadmap, starting from the minimum viable product. • There is a new USD36 m GCF/FAO project, at the Concept Note (CN) development stage, which will allocate USD10 m to the National Centre for HydroMet (NCHM). JICA has also supported hydromet infrastructure. • RGoB has a Green Finance Roadmap until 2030 – the AF LIG should refer to this.
Director, Department of Agriculture	• Around 50 % of Bhutanese population main livelihood is based on agriculture. Produce for the export mentioned was potato, vegetables, and fruits (citrus and apple), spices (Ginger and turmeric), non-wood forest products – Cordyceps. • Major issues raised were crop damage due to the human-wildlife conflict, irrigation, and labour shortage due to rural urban migration. • Strategies to overcome the issues mentioned are (i) irrigation – Flagship program in 13th 5-year plan; (ii) promote High value crops recommended for the labour shortage and high-tech agriculture machines; (iii) HWC (Human Wildlife Conflict) – Promote the chain link fencing. • The DoA had considered crop insurance in the past but it had not been implemented due to a lack of funding. Both the department and the farmers lacked the financial resources necessary to pay the insurance premium. • Selection of crops - not every crop could be selected for the crop insurance but it would be ideal to cover a range of crops. The project needs to launch as soon as possible and should have an independent PMU.
National Organic Agriculture Flagship Programme (NOFP)	The discussion centred around the following points: • *Progress in different Dzongkhags*: the NOFP provided an update on the progress with respect to organic production, indicating that all four of the project dzongkhags include organic production, with Tsirang having the highest volume. • *Challenges*: these include lack of understanding of organic production, its importance and the concept by the farmers; pest and disease management; and lack of premium prices. • *Opportunities*: potential opportunities that organic agriculture can bring to Bhutan can be harnessed through a focused effort on commercialization of organic production; support needed is mainly on access to markets to ensure price premium; recent export of organic broccoli and cauliflower from Tsirang to Singapore is promising and other commodities can be developed for export; • *Roles and responsibilities of the NOFP*: these include registration and assistance with certification of organic famers; support with market linkages; and provision of technical assistance; • *Lack of reliable data regarding crop losses*: there are crop losses caused by climatic impacts, but there is no reliable data available on crop losses, and no distinction is made between organic and conventional agriculture in any reporting of losses. There is no consolidated database on losses from human-wildlife conflict (HWC). While perceptions are that HWC losses may be greater than those due to climate impacts, this may not necessarily be the case;
DoAL Agricultural Research and Innovation division	• The project focal points is an agricultural economist whose thesis was on agricultural insurance in Butan, which provides an extremely useful context and recommendations of relevance for the design of the AF LIG insurance product. Thesis explored the landscape on and why previous agricultural insurance schemes had not worked; made recommendations on options for Bhutan depending on whether the country had resources to address the issue or not. • Cattle insurance scheme: premiums were too high. RGoB had 2.7 billion Nu in Endowment Fund for HWC. The RGoB's priority is to provide compensation, but this is not possible in current economic / fiscal environment. There is a range of different compensation initiatives on HWC, but no-one has done an assessment of the impact of all the small schemes. • For the sustainability strategy of the AF LIG, it would not work to propose taking funds out of REDD+ or any existing funds. It could be acceptable to propose a new fund to be capitalised from some other source
Sub-national government	
Meeting with Trashigang dzongkhag officials	• Trashigang has 15 geogs. 2 geogs are highland geogs – Merak and Sakteng (nomadic and highlanders engaged in livestock rearing). Merak and Sakteng lost 50-60 yaks in the last two years due to unusual extreme cold. Fodder supplement not available. Trashigang district faces serious

(ADAO, ADLO, Asst, Planning Officer)	drought and untimely rainfall destroying crops. In the past maize was affected by untimely rain. This year, the paddy plantation is about to start and there is no rain. • Modern technology is required in all aspects as part of all agriculture development projects, to respond to climate risks and assist in agriculture sector development. Govt provides seeds, inputs, and technical assistance as support to all farmers. CARLEP project distributes 100% subsidized seeds and seedlings for year 1. From year 2, there is a cost sharing modality. Trashigang grows maize as the main crop, which uses urea. Organic inputs and fertilisers are required if organic agriculture is to be encouraged. • Trashigang has three notable land user certificate (LUC) groups: pineapple plantation opposite Dremetse (Kanglung gewog); fruits, dallay chilly, tomatoes in Yangnyer gewog; and asparagus and groundnuts in Lumang gewog. • Farmers use pesticides, which have to be demanded in July for the entire year. Farmers purchase required pesticides on cash from district/ gewog agriculture offices. Crops are sown as per agro-ecological zones (altitudes). Every gewog has a gewog cropping calendar. • NCHM weather forecasts (24 hourly) are shared among all agriculture staffs in the country via WhatsApp/ telegram group. These forecasts are shared with all villagers/ farmers by gewog extension supervisors. Farmers require medium (10 days) and long term (30 days) weather forecasts to plan properly. There have been also instances of weather forecast being wrong. • CARLEP provided transit insurance and insurance coverage for year 1 for imported jersey cows. After second year, farmers discontinued cow insurance due to high premium. Tigers are known to have killed cows just outside Trashigang main town. Historically too, there are accounts of tigers roaming this area. • A few commercial style farms may be possible in future but most of the farmers are subsistence and now becoming semi-commercial with development project's support and availability of local markets, schools, etc. Trashigang's main issue is access to large markets like Thimphu and Paro which is too far.
Royal Monetary Authority (RMA)	• Financial inclusion: Since 2018, RMA, with the support of the Alliance for Financial Inclusion (AFI) and ADB, has been adopting different steps to implement the National Financial Inclusion Strategy (NFIS). They have supported the creation of MFIs (currently 5); have been involved in interventions offering access to financial services (youth focus- school banking programme in Bhutan); carried out impact assessments; financial education programmes; demand studies; etc. • Innovative approaches: They have a Sandbox that allows to test innovative approaches such as the creation of credit scoring tool; currency for blind people; and e-KYC system; and have been very active in creating a framework on green finance. With the support of ADB they have been creating a roadmap and a taxonomy on green finance. • Attitude towards the project: Aware and conscious about the need of climate risk insurance and agricultural insurance in the country. However, they are concerned about the financial capacity and skills of local insurers for such an endeavour, not having experience in index insurance, and the sustainability of those schemes, amongst others.
Academic / research	
College of Natural Resources	• CNR department has experience in land trend dynamics, sustainable planning, organic agriculture, and CSA project with ICIMOD – the latter has a 1-yeare extension until June, locality is Pemagatshel (where farming is not really commercialised). They work through the extension agents in the field, using them as intermediaries. Involved in a USAID-funded project (CARE?) • Attributes of progressive farmers are: being very passionate about farming; having some resources (budget, economically sound); good social network; land. Took 29 farmers on a field trip to progressive farmers - write-up has been shared with the team. One good example is a retired govt. official in Samdrup Jonkhar who is far ahead in terms of technologies. No women included in first round, but after field trip, did identify some. • Support for economically disadvantaged farmers is provided; however, now the Govt. is doing this on a cost-sharing basis, which has its pros and cons. • Key constraints with respect to organic farming are farmers wanting immediate results but takes longer for this than when chemical fertilisers are used; pests and disease – pest management – e.g. Fall army worm in Pemagatshel and no immediate organic pesticide to treat this, but National Organic Programme (NOP) is trying to address; still need to promote drought resistant varieties; organic production is more labour intensive • Farmers are interested in organic farming because they can see the constraints of chemical fertilizers in terms of harm to soil. In the CNR's study areas (largely Pemagatshel), there is no

	organic potatoes or rice, but rather farmers sell small quantities of anything they grow – e.g. beans and fruit. In the eastern parts of Bhutan there is very minimal use of chemical pesticides. • Diversification is very important for resilient farming; however, most of the farmers they work with in Pemagatshel plant maize as a monoculture, and have two crops / year, so soil nutrient levels are poor and contribute to increased pests and diseases. Farmers need access to correct weather forecast to be responsive to the pest and disease challenges. • Community-based and systematic monitoring: the CNR has not conducted this in the past, but has followed up on an informal basis with farmers; realises its importance and would be keen to participate through their students, if the travel costs of students could be paid.
UN agencies / Development partners	
UNDP Bhutan and DoA to discuss National Adaptation Plan (NAP) process	The mission met with officials of the Department of Agriculture and UNDP Bhutan who are centrally involved in the National Adaptation Plan (NAP) process to discuss the CLEAR exercise that will be conducted under the BRECSA project, but could also inform implementation of the AF Large Innovation Grant project. The Bhutan NAP was finalized in 2022, the main report included supplementary reports that were useful for the preparation of the AF-LIG full proposal but that would also be useful for the CLEAR+. In addition to the reports produced, the NAP team has valuable experience including on the challenges to produce the reports. The main outcomes of the meeting were: (i) The crop modeling for future scenarios could be improved with more localized data. In that sense, CLEAR+ will be a good position, since two important components for the Climate and Food Security analysis will be in place: a new set of climate change projections, and a new Agroecological Zone Map. The NAP had to work with the previous versions of these, which had limited resolution and were not comprehensive; and (ii) Another potential gap that CLEAR+ could help to close is on the livestock sector, including poultry and fish farms since they were not captured on the NAP.
NGOs	
WWF	• The WWF Country Director was with the DoA for 16 years, including in the East, and with UNDP for 6 years managing the climate/environment portfolio. • Insurance: Many agencies have explored insurance in the past, he worked on the crop insurance portfolio, traditional products became too expensive. Investment to compensate farmers for HWC is inadequate, past efforts included remuneration for cattle loss to tigers. There is no good database on HWC; previously an annual survey on crop depredation by animals was created, which was a good damages report. The Govt. linked the former (successful in some areas) community insurance schemes up into the Endowment Fund under His Majesty's Office, which was detrimental because the community experience with insurance collapsed. Too little attention to damage to crops, although this has been tried many times – the reinsurance cost was too expensive. UNDP LDCF had allocated USD1m to establish the Endowment Fund. Rural people will always be thinking about who pays the premium. WWF has been supporting the re-emergence / strengthening of the community insurance model with respect to tiger HWC; discussing HWC with UNDP. WFP noted that in Ethiopia it created a National Dialogue Platform on Rural Insurance. • Innovative financial instruments to protect nature: Bhutan Trust Fund for Environmental Conservation (BTFEC) was innovative, the world's first such trust fund, investments are made in the US; Bhutan4Life (GCF-funded) is a successful approach – a sinking fund approach to leveraging project resources, The Nature Conservancy (TNC) is involved. • Under the new UNDP BioFin programme, WWF feels that the results-based budgeting is an appealing area, involving mainstreaming the SDGs into local-level planning and will be important for conservation. It will address the need to bridge the gap between national development planning and the local government level. As schools, hospitals and roads are priorities now, environmental risks are absent in local-level plans. • Quantification of ecosystem services: WFP explained that quantification of the resilience services in The Philippines had been used to discount the insurance premium. WWF has been thinking of quantifying ecological assets, which could be traded. This was halted by the Ministry of Finance, possibly due to lack of interest. Druk Holding and Investments Limited (DHI), which is the investment arm of the Govt, was pursuing carbon market opportunities instead. Technical capabilities are possibly lacking in the national agencies at the moment. WFP explained that in a UNDP project in Ghana, green irrigation is being used to gain carbon credits and reduce the premium. • Payments for ecosystem services (PES): SNV work – 3 PES schemes in eastern Bhutan; UNDP ACREWAS project focused on drinking water has one upstream area. As there are so few, there is no need to conduct a mapping exercise on this.

	• REDD+: lack of degraded forest areas in Bhutan has reduced the utility of REDD+, all areas have been explored by the Department of Forests without success. Forest inventory is currently being updated. WFP RAM unit would have land cover map. Drone-mounted lidar technology is in the early stages. WFP noted that the by-products of insurance design can be useful in supplementing available data in a country. WWF has been advocating to Govt. on high forest – low deforestation credits. The Govt. might issue a green bond soon and channel the resources to renewable energy. There are many opportunities for wildlife credits, but no current examples. WWF has been advocating for weirs instead of dams for hydropower; wind and green hydrogen are being discussed. • Corporate social responsibility (CSR) approaches: limitations as this does not build systems and is too small and ad hoc. • WWF noted that the RGoB now has a strong appetite for new technologies as it is being pushed to achieve larger development results. WFP should be cognisant of the political imperative for fast results. • Conservation institutions/programmes: Apart from BTFEC and BHutan4Life, Bhutan Ecological Society (BES) is relevant, as well as IUCN. TNC not present. International foundations include Birdlife International and Mavro.
Insurance / banking / microfinance institutions	
Royal Insurance Corporation of Bhutan (RICB) and Bhutan Insurance Limited (BIL)	• *General concerns*: people rely on Government, which affects insurance uptake; farmers are confronted by more structural concerns such as lack of infrastructure, technical assistance, PHM facilities, access to markets, limited incomes. • *Attitude towards agricultural insurance*: RICB and BIL are interested to offer crop insurance; they have brought several proposals to the MoA but they did not succeed mainly due to the lack of alignment with the Government in respect of the perception of the ability to pay of insurance by farmers; lack data as a key constraint for the development of insurance products. • *Distribution and delivery*: both insurers have penetration across the country, for instance RICB has branches across the country and adequate manpower for distribution, but currently they depend largely on Government's structures to reach out beneficiaries; administrative costs linked to claims assessment are very high and reduce product value.

C. List of stakeholders consulted at the sub-national level

Date	Gewog	Participants	Roles
Trashigang			
3rd June 2023	Radhi	11 men 1 women	Gup, GAO, Tshogpa, Teacher, AES, business, Driver
5th June 2023	Bidung	8 men 3 women	Gup, Tshogpa, AES, LES, Forest Ranger, Business
7th June 2023	Phonmey	7 men 3 women	Mangmi, Tshogpa, business
Lhuentse			
9th June 2023	Kurtoed	11 men 1 women	Gup, Mangmi, GAO, Tshogpa, AES, LES, Business, Forest Ranger
10th June 2023	Minjey	6 men 7 women	Mangmi, GAO, Tshogpa, AES, LES, Business
12th June 2023	Tsenkhar	10 men 3 women	Gup, Mangmi, GAO, Tshogpa, AES, LES, Forest Ranger, Business
Tsirang			
19th June 2023	Sergithang	10 men 1 women	Gup, Mangmi, GAO, Tshogpa, AES, LES, Forest Ranger, Business
20th June 2023	Tsirangtoed	12 men	Mangmi, GAO, Tshogpa, AES, LES, Forest Ranger, Business
21st June 2023	Barshong	11 men	Gup, Mangmi, GAO, Tshogpa, AES, LES, Forest Ranger, Business
Lhuentse			
23rd June 2023	Larjab	8 men	Gup, GAO, Tshogpa, AES, LES, Forest Ranger, business
24th June 2023	Khebisa	4 men 4 women	Mangmi, GAO, Tshogpa, AES, Business
26th June 2023	Dorona	8 men 4 women	Mangmi, GAO, Tshogpa, AES, LES, Forest Ranger, Business

Annex 5 Summary of community consultations

5.1 Community consultations carried out to develop the Concept Note

Six sets of community consultations were carried out between April and June 2022 in six gewogs (blocks), two gewogs each in Paro, Punakha, and Dagana districts, as per the table below.

	Paro: Tshento Gewog	**Paro: Naja Gewog**	**Punakha: Esuakha Kabjisa Gewog**	**Punakha: Chhubu Gewog**	**Dagana: Dorona Gewog**	**Dagana: Lajab Gewog**
Date	April 8, 2022	April 9, 2022	June 8, 2022	June 9, 2022	June 20, 2022	June 21, 2022
No. of women	5	7	12	10	15	7
No. of men	5	5	13	14	20	23
Total participants	10	12	25	24	35	30

While the intention had been to cover a broader range of gewogs, repeated delays in carrying out the community consultations due to numerous COVID-19 restrictions and lockdowns led to these gewogs being selected by the DoA based on what was feasible. The objectives of the consultations were to better understand the basis of livelihoods of the farmers, their challenges in the agriculture sector, perceived impacts of climate change, their responses and coping strategies, access to climate services and finance, and understanding of insurance. The community consultations included 80 men and 56 women, with a total of 136 participants, and included representation from all segments of the communities, including the poorest and most vulnerable households. The Gewog Agriculture Extension Officers of the DoA took the lead in organising and facilitating the consultations, guided by the WFP project team. For consistency, each community received the same set of questions, focused on their livelihoods, perceptions of climate change, roles and responsibilities of community members, and adaptation needs.

The main sources of income of the farmers include sale of crops, vegetables, and fruits. The dominant crops, vegetables, and fruits are (i) in Paro: potatoes, wheat, paddy, cabbages, chillies, beans and apples; (ii) Punakha: paddy, wheat, mixed vegetables, and apples; and (iii) Dagana: cardamom, maize, mandarin, mixed vegetables, and paddy. Farmers also earn additional income from sale of non-wood forest products and livestock products (butter, cheese, milk, and manure) and wages from construction works. Women are in higher demand for planting than men since in general women are more skilled at this task. In case cash is paid for labour, for agricultural works, the rates for men and women are in the same range.

A summary of the key issues raised during the community consultations is provided on pages 34-35 of the Concept Note main text. A 12-page report of the outcomes of the community consultations for the Concept Note is also available.

5.2 Summary of local and community consultations carried out to develop the Full Proposal

Annex 5.2 contains the executive summary of the local and community consultations conducted to develop the full proposal. The full report, which consists of a 81-page main report and 13 annexures, could not be included here due to the page limitations, and is available upon request.

Executive Summary: Community consultations report for the Bhutan AF Large Innovation Grant project

Background

In 2022, WFP and RGoB submitted a successful concept note titled 'Innovative adaptation financing to build the resilience and adaptive capacity of smallholder farmers in Bhutan', to the Adaptation Fund Large Innovation Grant funding window. The project's main goal is to enhance the resilience of smallholder farmers in Bhutan to key identified climate risks and enhance their food security by rolling out innovative index-based microinsurance through an integrated resilience-building approach.

As WFP and RGoB work to develop a full proposal, detailed, disaggregated, and gender-responsive community consultations in targeted districts are required. The objectives of these consultations are to examine the findings of a climate risk assessment; understand the disaggregated livelihoods, climate, and other risks faced by local community members with a particular emphasis on vulnerable groups; and gather

further information required to complete the insurance feasibility study to be carried out by WFP specialists. The process will include consultations with relevant sub-national authorities and service providers, including relevant NGOs such as microfinance providers. Community consultations are essential to develop a targeted and detailed full proposal.

Methodology

The primary approach adopted by the team for the consultations involves active participation at the community level by the participants. This is done through the introduction of the “What If” game that allows the gathering of data required by the project. The data obtained from this game give us the information required to process a gross marginal analysis and to identify potential gaps or opportunities for designing an effective product for the community that is both effective and efficient. For the stakeholder consultations, the groups were separated into three main categories; the local government officials, the technical support team (Agriculture, Forestry, and Livestock), and the business community. Prior to the start of any discussions, we seek consent from all community participants.

A total of 12 community consultations in 12 Gewogs of four Districts (Trashigang, Lhuentse, Tsirang, and Dagana) were conducted. There were 194 people with 105 females (54.1%) and 90 males (46.39%). Among them, there were 21 youths with 11 women and 10 men. Only 1 female mentioned herself as a Person with a Disability. Along with the community consultations, 133 stakeholders were consulted, consisting of 27 females (20.3%) and 106 males (79.7%) men.

Community consultations

In Trashigang, there were 41 participants comprising 19 women and 22 men. The majority of the respondents (78.04%) belonged to the age group 26 to 59 years. There were 5 elderly people above 60 years old and 4 youths under the age group of 18 to 25 years. 74% of the respondents had no formal or non-formal education. Only 8 respondents (25.8%) had primary and high school levels of education. Fourteen respondents (45.16 %) represented household composition of 4-6 members, followed by 12 respondents (38.7%) with household composition of 1-3 members. None of the households mentioned having a Person with a Disability as a household member.

In Lhuentse, there were 29 participants comprising 18 women and 11 men. The majority of the respondents (70%) belonged to the age group 26 to 59 years. There were 3 elderly people above 60 years old and 6 youths under the age group of 18 to 25 years. Thirteen respondents out of the 29 (44.8 %) did not have formal or non-formal education. The rest of the respondents had primary to high school level education. Sixteen respondents (55.17 %) represented household composition of 1-3 members, followed by **10** respondents (34.48%) with household composition of 4-6 members. None of the households mentioned having a Person with a Disability as a household member.

In Tsirang, there were 63 participants comprising 29 women and 34 men. The majority of the respondents (69.8%) belonged to the age group 26 to 59 years. There were 12 elderly people above 60 years old, and 7 youths under the age group of 18 to 25 years. Thirty-three respondents out of the 63 (44.8 %) did not have formal or non-formal education. Twenty-nine respondents had primary to high school level education. One respondent had an undergraduate degree. Twenty-nine respondents (46%) represented household composition of 1-3 members, followed by 28 respondents (44.4%) with household composition of 4-6 members. None of the households mentioned having a Person with a Disability as a household member.

In Dagana, there were 61 participants comprising 39 women and 22 men. The majority of the respondents (78.6%) belonged to the age group 26 to 59 years. There was 1 elderly female above 60 years old and 12 youths under the age group of 18 to 25 years. Twenty-six respondents out of the 57 (45.6 %) did not have formal or non-formal education. Thirty respondents (52.6%) had primary to high school level education. One respondent had an undergraduate degree. Thirty-three respondents (54.09%) represented household composition of 4-6 members, followed by 21 respondents (34.42%) with household composition of 1-3 members. Seven participants (11.47%) represented a household composition of 7+ members. None of the households mentioned having a Person with a Disability as a household member.

Share of male and female headed households - Among the 4 Districts, Trashigang has the highest number of households (5,984) and Lhuentse has the lowest number (1,890). 70% and 80% of the households in Lhuentse and Dagana respectively are headed by females, whereas in Tsirang and Trashigang male headed households are 75% and 65% respectively. At the country level, 52% of the households are headed by female

Crop production and trend

The main cereals cultivated in 2021 include paddy rice, maize, wheat, buckwheat, barley, millets and quinoa. Among the 4 Districts Dagana has the highest rice production with 2,451 MT, followed by Tsirang 1,855 MT. The highest maize production is in Trashigang with 3,493 MT followed by Dagana 2001 MT. Compared to

rice and maize, wheat production is low and ranges from about 3 MT in Lhuentse to 17 MT in Trashigang. Dagana has the highest buckwheat production with 86 MT. Trashigang leads the barley production with 37 MT. Dagana leads in millet production with 79 MT followed by Tsirang with 65 MT. The highest oilseeds production in in Dagana with 24.58 MT followed by Tsirang 18 MT. Trashigang leads in the production of rajma beans with 75 MT followed by Tsirang 24 MT.

The vegetables cultivated include chillis, potatoes, cabbage, cauliflower, broccoli, tomatoes, asparagus, cabbages, and radish. Among the 4 Districts, Trashigang produces the highest quantity of chillis 399 MT, followed by Tsirang with 381 MT, Lhuentse 303 MT, and 271 MT. In the production of potatoes, which is a major cash crop, Trashigang leads with 3,368 MT, followed by Lhuentse 803 MT.

Tsirang leads in the production of cabbages with 220 MT, followed by Trashigang 192 MT and Dagana 137 MT. Tsirang leads the production of cauliflower with 314 MT, followed by Dagana with 138 MT. Tsirang District also tops the production of broccoli with 105 MT. Dagana and Tsirang are the main producers of tomatoes producing 42 MT and 38 MT respectively. Asparagus production is quite limited, Trashing produces the highest quantity with 4.0 MT. Tsirang and Dagana are the main producers of carrots with 15 MT and 10 MT respectively. Trashigang produces the highest quantity of radish with 168 MT followed by Tsirang and Dagana that produce 146 MT and 108 MT respectively.

Among the 4 Districts, Tsirang and Dagana are the main producers of cardamom with 267 MT and 250 MT respectively. Dagana and Tsirang are also the main producers of mandarin orange producing 2,792 MT and 2,148 MT respectively.

There is a declining trend in the production of all the cereals in 4 Districts. Rice production shows a decreasing trend. In 2017 rice production in all the Districts was around 4000 to 5000 MT. In 2022 the rice production decreased to 1500 MT to 2000 MT in all the Districts. Overall, the rice production has declined at the country level from around 53,000 MT in 2017 to 40,744 MT in 2022. In a similar way the production of maize and wheat has decreased over the years. On the other Quinoa being a newly introduced crop there is production increase over the years, though the quantity produced is insignificant.

There is also a declining production trend in mustard, which is a edible oil (Table 10). In 2017 Trashigang and Dagana were the major producers among the 4 Districts. In 2022, the production has drastically reduced in all the four Districts, production decreased from 108 MT in Dagana, 30 MT in Tsirang, 44 MT in Trashigang, and 19 MT in Lhuentse in 2017 to less than 20 MT in all the Districts in 2022. It is noted that there is a corresponding reduction in production of mustard from 969 MT in 2017 to 223 MT in 2022 at the country level.

The production of Rajma beans is mainly in Trashigang and Dagana. Over the years Dagana has maintained its production level of 2017, 2019, 2020. In Trashigang, there is a reduction in production in 2021 and 2022 compared to 2017, 2019, and 2020.

Chili production has also reduced over the years in all the Districts, almost by half in Trashigang and Lhuentse and by more than half in in Tsirang. At the country level, the production of chili reduced from 13,606 MT in 2017 to 5,557 MT in 2022. The production of potatoes, which is a major cash crop in eastern Bhutan has declined over the last few years. In all the districts, the production has reduced by about 50%. At the country level, potatoes production reduced from 57,223 MT in 2017 to 31,145 MT in 2022.

Tsirang and Dagana are the major cardamom producers. Over the years the cardamom production has not changed much, and was maintained at around 200 MT in Dagana and Tsirang. At the country level, the production has remained within 1500 MT to 2000 MT during the last five years.

Dagana and Tsirang are the main producers of mandarin oranges. In both the Districts, the production over the years was around 3000 MT annually. However, a declining trend is emerging. Most of the orchards consist of old trees and are rapidly declining with reduced production every year. The Department of agriculture is promoting diversification of fruit culture with introduction of kiwis and avocados.

Livestock Production and trend

The major livestock products in the 4 Districts include milk and milk products, various meat products, poultry eggs, honey, and wool. Trashigang leads in the production of milk, butter and cheese with 5,332 MT, 232 MT, and 341 MT respectively, followed by Tsirang and Dagana. Tsirang and Dagana are the main producers of pork, chicken, chevon, and fish. Trashing is the highest producer of beef and yak meat. Poultry eggs are produced in all the 4 districts. and Tsirang is the largest producer of eggs among them producing 18.39 million eggs in 2022, which is 18.20% of the total eggs produce in the country.

Milk production has been consistent over the years. Trashigang is the lead producer production ranging from 5,332 MT in 2022 to 6,819 MT in 2021, which produces about 12.30% of the country's total milk production in 2021.The beef production has increased in 2022 as compared to 2018 for Dagana, Tsirang, and

Trashigang. Yak meat is produced in Trashigang and Lhuentse only among the 4 districts. Yak meat production in Trashigang declined in 2019, 2020, 2021 and picked up in 2022 to reach at 58 MT that is slightly over the 2018 figure of 51 MT.

Tsirang and Dagana are the two main producers of pork. The production of pork in Tsirang has increased from 139 MT in 2018 to 433 MT in 2022. Similarly, pork production in Dagana increased from 92 MT in 2018 to 335 MT in 2022. However, pork production has decreased in 2022 in Trashigang and Lhuentse as compared to 2018 figures.

Dagana and Tsirang are the main producers of chicken. Tsirang is the highest producer of chicken with an annual production of around 300 MT, followed by Dagana that produces around 150 MT annually. The production trend in both the districts is quite consistent over the years.

Farming works and Labour

In Bhutan, traditional farming methods are still prevalent, with manual labour being the primary means of cultivation. Farmers typically rely on their own physical effort, using hand tools and basic agricultural equipment such as hoes, sickles, and plows, to till the land, sow seeds, tend to crops, and harvest their produce. However, Bhutan has also seen some modernization in agriculture in recent years. The government has introduced mechanization initiatives to enhance agricultural productivity and reduce labour-intensive processes. This includes the use of machinery like tractors and power tillers for plowing and transportation.

During peak farming seasons, such as planting and harvesting, communities often engage in collective labour practices, where farmers come together to help each other on a rotational basis. This cooperative approach helps to share the workload and complete tasks more efficiently.

Traditionally, the farming calendar is influenced by cultural and religious events that are significant in Bhutan, as agriculture is intricately tied to the country's culture. The MoAL, provides guidance and support to farmers by disseminating information on optimal planting times, crop varieties, and agricultural practices tailored to the local conditions. The agriculture cropping calendar in Bhutan varies based on the region, altitude, and prevailing climatic conditions. It's important to note that the cropping calendar depend on the specific crops, agro-ecological zones, and local farming practices. Additionally, Bhutan's diverse microclimates and altitude variations contribute to crop-specific regional variations in planting and harvesting times.

Products Market Chain (Agriculture and Livestock)

The agriculture and livestock product market chain typically involves several stages. Here's a simplified overview:

(1) Input support for farming in Bhutan – agencies involved Gewog extension officials, agriculture and livestock sector heads in Districts, divisions and Central programmes of the Departments, BFDR.

(2) Producers: Commercial and subsistence farmers in Bhutan. They cultivate a diverse range of crops, depending on the region and altitude. Subsistence small holder farmers follow traditional and sustainable farming methods. They rely on organic fertilizers, traditional irrigation systems, and traditional seed saving practices.

(3) Commercial farmers in Bhutan are farmers who cultivate crops or rear livestock with the primary goal of generating income through the sale of agricultural products. Farmers typically operate on a larger scale compared to subsistence farmers and have larger land holdings and use farm machinery and equipment to enhance productivity and efficiency. Cash crops are grown with the intention of selling them to domestic or regional markets. They often seek market connections, establish supply chains, and negotiate contracts with buyers to ensure a steady market for their products. Government provides support and incentives to promote commercial farming.

(4) Farmers' Groups/cooperatives emerged as an important aspect of the agriculture market in Bhutan. These groups/cooperatives bring together farmers, providing them with a collective platform for marketing their agricultural products. By pooling resources and negotiating collectively, farmers can access better market opportunities and ensure fair prices for their produce.

(5) Transportation- The transportation of fruits and vegetables is mainly by road. Trucks, boleros, and other vehicles are used to transport vegetables from the villages to various local and regional distribution centers. The farm roads connect the villages with the gewog roads and national highways. Where there are no farm roads, transportation is done using horses, mules, and yaks. In some rural areas, manual transportation is also practiced.

(6) Markets - Agriculture markets in Bhutan include farmers markets in each district, regional markets such as auction yards in Samdrup Jongkhar, Gelephu and Phuentsholing, and local markets. Bhutan also engages in the export of certain products like oranges, apples, cardamom, and

vegetables to neighboring countries like India and Bangladesh. With the advancement of technology, online platforms play a key role in connecting farmers and consumers in Bhutan. They are mainly WeChat, Telegram, WhatsApp and Facebook. The agriculture markets not only provide a platform for farmers to sell their produce but also contribute to promoting local food culture, supporting rural livelihoods, and ensuring food security within the country.

Women's role in agriculture- the latest trend

Women's engagement in the agriculture sector has not resulted in gainful employment (*Kuense*l August 05, 2023). She is considered employed under the employment status 'contributing family worker in agriculture'. The trend over the years (2018, 2020, and 2022) from LFSR shows that women are highest employed in the agriculture sector under "contributing family members". Based on the data from LFSR 2018, 2020, and 2022, there has been a noticeable increase in the number of regular women employees in rural areas. However, there has been a noticeable decrease in women's representation among skilled agricultural and forestry workers, with figures dropping from around 89,000 in 2020 to 65,700 in 2022.

Access to financial services

Most avail credit from financial institutions mainly Bhutan Development Bank Limited followed by other banks such as Bank of Bhutan, and Bhutan National Bank. Informally, communities prefer to borrow money from their family members, friends, and business people in the community. Business people lend money on an interest basis that is slightly higher than bank rates. The main reason they avail loans from business people is easy access. During emergencies, the formal mode is not convenient. Most of the participants maintain their savings with banks (BDBL, BOB, and BNB), but this are short term savings as they use these money as and when they need for daily expenses. They use their savings to purchase agriculture and livestock inputs, while women purchase jewelry items or weaving materials.

Income and Expenditure

Among the 12 Gewogs the overall monthly income is Nu 37,629.96 (approx. US$ 460) and the monthly expenditure is Nu 38,374 (approx. US$ 470). The income may be understated as participants were not willing to share their true income, while they did not hesitate to share their expenses. Major sources of income include the sale of agriculture and livestock products and off-farm incomes including remittances. Income source from remittance is after off-farm income and remittances are received from family members working abroad or in towns (mainly Thimphu). They receive remittances through bank transfers. Major types of expenditure include the purchase of food items, clothing, schooling expenses, religious rituals, utilities, etc.

Major expenses, as expected, were for education for children, household essentials like food and other groceries, and for the religious rituals and local festivals that happened either once annually, or 2-3 times a year.

Monthly HH income and expenditure by gender

In Trashigang, Bidung and Radhi men's income is higher than women, whereas in Phongmey Gewog women income is higher (Table 12). The income of women ranges from Nu 4,958.33 to Nu 9,252.00 in the 3 Gewogs. In terms of expenses, men spend more than women in Radhi and Phogmey, whereas women spend more than men in Bidung. In Kurtoe Gewog of Lhuentse District, women earn Nu 12,966.67 per month, which is more than men who earn Nu 1,416.67. Men earn more than women in Minjey Gewog, and youth earn Nu 1,173.00 per month. Women spend more in Kurtoe and youth spend more than women in Tshenkhar Gewog.

The household monthly income of women in Tsirang ranges from Nu 4,423.83 in Barshong Gewog to Nu. 23,237.83 in Tsirang-toed Gewog. In Tsirang-toed Gewog, women earn more than men and youth, while in Sergithang and Barshong Gewogs, men earn more than women and youth. The monthly household income for men ranges from Nu. 6,129.83 in Tsirang-toed Gewog to Nu. 24,836.6 in Barshong Gewog. In terms of expenditure, women tend to spend more than men and youth in Sergithang Gewog.

In Khebisa Gewog of Dagana, the income of women is Nu 10,385.21, which is lower than men who earn Nu. 28,909.67 per month. The income of youth in Dorona Gewog is Nu. 9,275.75, whereas women earn Nu 15,120.35 per month. In terms of expenditure, men tend to spend more with Nu 5,416.00 compared to women, who spend Nu 2657.38 per month in Khebisa Gewog.

Generally, the income sources for men are more varied when compared to the women. From all the gewogs, a common trend is that women typically do weaving works, run a grocery store or restaurant as alternative source of income. The men would typically do contract works in a construction, work as daily wage labour, operate power tillers, undertake transportation works like operating taxi services or vehicle hire in order to diversify their income sources. In Dorona the men do work in construction sites doing masonry and carpentry works.

Consultations with District Agriculture Sector (DAOs)

Plans and strategy to develop commodity include:

A focus on high-yielding and high-value crops, facilitating efficient irrigation and resilient crop management practices, and market-led agriculture production. In Lhuentse- high-value crops (2 cereals, 1 legume, 5 vegetables) and 12 fruit crops are planned. Dagana plans to promote new high-value crops like: asparagus, kiwi, and avocado. Commercial plantation of avocado, kiwi, strawberries, and green gram is planned in Tsirang. Quinoa is promoted as a new crop and gaining popularity in Bartsham and Shongphu gewogs of Trashigang. In Lhuentse Adzuki beans are promoted. Marketing continues to be a constraint.

Common risks that result in crop failures are: damage by wildlife is a serious threat, pests, and diseases, prolonged drought, increased temperatures with high-intensity sunshine, heavy rainfall, landslides, and flash floods.

The crop production data is updated annually by NSB. It has been observed that the data collection methods involving local people may not produce good results. The data generated is not complete and accurate. The enumerators do not have the capacity to obtain proper data through the household interviews.

Programmes implemented to help farmers to manage these risks include:

(1) Support with climate resilient agriculture production materials/ interventions like electric fencing, water harvesting, efficient irrigation techniques like drip irrigation, promotion of climate resilient crops – drought tolerant and best adapted native varieties. (2) Plans to widely share weather forecasts and alerts. demonstration on climate resilient crop production technologies. Farmers are made aware of possible disease outbreaks owing to weather conditions. (3) Adoption of anticipatory actions- Use of mulching for soil moisture conservation, changing cropping times as per the weather and seasonal changes, encouraging water use efficiency through water harvesting

Type of inputs provided to farmers includes - seeds, planting materials, fertilizers, plant protection inputs, greenhouses, HDPE pipes for irrigation, fencing poles and materials, inputs to support sustainable land management, land development on cost sharing basis 80:20 (20% farmers will pay). The costs of transportation of inputs are subsidized. Farm machinery is provided at a 50% subsidy.

Environmental impacts on farming due to climate change include:

Decline in staple food production. And reduced production of oranges, prolonged drought, increased temperature, appearance of new insect pest species and diseases, land degradation, soil fertility loss, crop failures and low yields, increased production costs.

Other initiatives on financial inclusion in the District include:

Farmer's group formation and group saving schemes and management. Most farmer groups have some common group savings accounts. Farmers need better access to savings products. BDBL is the only source to access to loans and it is not farmer friendly. There is no dedicated financial institution for agriculture loans. BDBL is not agriculture friendly and smallholder farmers can't access it. The interest rates are high and the procedures are complex.

Past and present livelihood programmes include

Crop production coupled with farm infrastructure development, crop production inputs, capacity building and awareness. Capacity development includes technical support on crop production, protected agriculture techniques, climate resilient production practices, efficient water management techniques, post-harvest and marketing support, product standards and product quality for marketing, and user of groups formation.

Challenges and Need

Climate and disaster risks – crop damage due to heavy rains, flash floods, soil erosions, landslides, prolonged droughts, wild life damage on crops, new diseases and insect pests attack.

Experiences of implementing these programmes in terms of success and challenges - Farmers are forthcoming, but labour, financial resources, and availability of appropriate inputs at an affordable price are the main issues. The main focus is on climate-smart technologies: SLM, piped irrigation, micro-efficient irrigation, greenhouses, environment-friendly farm roads, and adaptive crop varieties. The main challenge is the lack of sufficient budget to implement planned programmes.

Climate risk insurance needs in the next few years - A suitable risk insurance mechanism needs to be instituted. It is about time to implement a pilot scheme on crop insurance. This could be a welcome initiative provided there is government support on insurance premium. It may prove to be successful program with a

low turnout at the beginning but with awareness and time it could be a popular scheme with the farmers provided the implementation challenges are overcome through a suitable smart approach.

Consultations with Livestock Sector (DLOs)

Plans and strategy to develop commodity include

Dagana District has plans to produce value added yogurt & panner cheese, pork (*shikam*), chicken pickles, local honey; free range egg production, produce riverine fish. Tsirang District has plans to diversify and value add dairy products, chicken, eggs. Lhuentse Dzongkaag has plans to produce winter fodder using improved techniques and promote use of improved cattle breeds.

All DLOs responded that the livestock data is updated on a regular basis through monthly, quarterly, half yearly reporting system. Annual livestock census surveys are conducted.

Outbreaks of animal diseases, contamination of animal feed & rapidly rising price of animal feed are considered as the most common risks that result in production failure. Farmers are helped to manage these risks providing training, creating awareness, providing medical support, and supplying live inputs to farmers from reliable and safe sources. Others services include annual cattle vaccination and advocacy program and disease outbreak control. Farmers are also assisted in marketing their products.

Inputs provided include: piglets, day-old chicks for layer and broiler production; fodder seeds and seedlings free of cost for fodder production, dairy equipment through a cost sharing mechanism, fingerlings are supplied in Tsirang for fish production. There is a transportation subsidy for all inputs.

Typical price of purchased livestock products in all the 3 Districts are: Pork: Nu.350/kg; Chicken Nu.350/kg; Eggs Nu.380 for 2 dozen eggs, butter Nu.450/kg; cheese Nu.350/kg; milk Nu.50/litre, honey Nu 1200 per 750 ml bottle,

On the possibility of partnership to expand the reach of agricultural insurance through district, Dagana and Lhuentse DLOs responded by saying yes. However, DLO Tsirang responded that the livestock insurance does not seem attractive as the depreciating value is very high while claiming.

Environmental impacts due to climate

Wind storms and floods that damage farm houses and affected livestock, outbreak of diseases that were not prevalent in the last 10 years. Diseases like - FMD, ASF, Rabies, LSD, Bird blue, NCD and IBD. It is also noted that livestock farms generate greenhouse gas.

Other initiatives on financial inclusion include –

Saving schemes for farmers groups on different livestock commodities. Farmers need more access to saving products according to DLOs of Lhuentse and Dagana. The Tsirang DLO thinks farmers do not need more access to savings products. All DLOs believe that farmers have capacity to save. On access to loans – The BDBL does provide agricultural loans to farmers, but due to high interest rates of BDBL farmers are not able to access it.

Experience In providing technical know-how to farmers –

The past and present livelihood programmes are designed to enhance socio-economic development in rural areas through improved livestock farming- with provision inputs and animal health services, facilitating product processing, product development and marketing.

Capacity development activities provided to farmers include: Farmers training on improved livestock management practices including prevention and control of animal's diseases, product development value addition, group formation, marketing. Farmer study visits to other progressive area for exposure, motivation and skill development.

Climate and disaster risks – related programmes in the District

There is a Disaster Management Committee (DMC) to coordinate disaster mitigation plan in the District. Awareness on fire, earthquake and other flood related measures are created. Dagana DLO experienced encountering a serious problem due to contaminated feed of Karma Group of company. Based on their feedback, the feed company corrected the quality of feed.

As per DLO Dagana, the disaster risks are increasing every year and there is a need for insurance scheme to cover the loss. The DLO Lhuentse suggests to introduce climate risk insurance schemes to protect livestock for food and nutrition security, As per the DLO Dagana, the sector considers climate risk insurance as a valid intervention for livestock management in the District.

Gender perspectives –Agriculture

Men and women are sharing the same work in the farm. In addition, women are involved in house hold chores, weeding, collection of leaf litters, manure application, post-harvest and marketing. Crop guarding is done by both men and women. Normally, most manual tough works like digging, ploughing, and transportation are done by men. Men lead the farm works and women are also engaged in weaving and knitting works. Women are more of light manual works (weeding, transplantation) where as men engaged in heavier work (ploughing).

The risks faced are different – Men and women work equal time, but women are paid less, have other obligation such as to manage house and families. The women headed households have no choice but do take the more demanding farm works like digging, guarding crops, land preparation, harvesting, transportation and marketing.

The risk mitigation strategies are different for women and men under some situations but could be same for some of the households. The particular needs to be able to manage their risks include the resource position of households, the available land holding size and incomes.

Both men and women access credit and savings accounts with the banks, BDBL, BOB, BNB, and life insurance is covered through the Gewog offices Women have access to RENEW microfinance schemes, if it exists in a Gewog. In Tsirang and Dagana), women group of Khebisa were very keen on insurance schemes, asking us about other possible schemes aside from the compulsory life and property insurances.

It has been noted that women are actively involved in farmers' groups. There are several farmers' groups across the Districts formed by women. However, in general, women are less involved in marketing of Agricultural products.

Gender perspectives – Livestock

In Dagana and Tsirang, both men and women are involved on farm establishment, cleaning, feeding, milking, processing (milk products, chicken and pork) and marketing. Some women are involved in transporting livestock products or sell products in a market outlet. Men specifically do the slaughtering of animals for meat purpose. In Lhuentse, major livestock activities are undertaken by woman. Most of the time men are out of home for off-farm activities.

According to the DLOs, the risks faced by men and women are not different. Therefore, the mitigation strategies are same for men and women. The particular needs of men and women to be able to manage their risks include: family support, capacity development through training, advocacy, and awareness.

Experience on past crop insurance – Agriculture Sector

The DAOs have expressed that they are new to the crop insurance system and do not have any past experiences on crop insurance as this was never tried or implemented. There are no farmers currently covered by crop insurance. There is no compensation mechanism through insurance at present. They are neither aware of the type of crop insurance products nor have any experience partnering with the RICBL They are also not aware of any Government subsidies on crop insurance. The DAOs feel that it may not work against the crop damages by wild animals. Moreover, they expressed that farmers may not be able to afford to pay the insurance. Since the awareness is limited among farmers, there may be resistance from farmers on crop insurance implementation. However, they expressed that they will provide full support in their capacities during implementation if planned.

Experiences on past livestock insurance- Livestock Sector

In Dagana, Jersey cow insurance was offered to farmers with the support of the REP project in 2013 to 2014. Farmers could not afford the insurance as the premium on live animals was too high. In Tsirang, farmers are aware on livestock insurance but they have not adopted due to high cost of insurance. In Lhuentse, cattle and poultry farm insurance were offered in the past but it did not work.

Dagana and Tsirang Districts do not have any farmers covered by the insurance at present. In Lhuentse, it is estimated that there may be around 10% farmers who have insured farm animals. There was no active partnership with RICBL on livestock insurance according to the DLOs.

The DLOs are not aware of the claims process for insurance policies. They have no idea how livestock insurance scheme is supported or funded. There is no Government subsidy or support for livestock insurance. Only livestock inputs are subsidized.

Main challenges when delivering the crop insurance - The premium is too high for Livestock and farmers cannot afford. Its not attractive and has very lengthy procedure.

Potential risks and challenges associated with implementing new crop insurance policies – There are high chances of false claims of insurance. There should be a spot verification by a committee on claims. The cause of the death should be determined. There is a need to create awareness among farmers.

Consultations with Gewogs

Radhi Gewog, Phongmey, and Bidung Gewog, Trashigang

Climate change projects implemented in the Gewogs are**:** CARLEP project, wildlife protection (solar fencing), SMART irrigation: drip irrigation and sprinkle water - focuses on saving water, crop diversity to substitute crops needing more wate, minimize pest infestation, promote sprinklers and drips irrigation techniques. RGoB: water flagship program including dairy shed and biogas construction., and dairy processing technologies.

Risk perception and management

The environmental issues in the Gewogs are: erratic rainfall (heavy rainfall when it rains), Irrigation problems, strong winds destroying maize crops, Pest infestation on maize, water shortages, untimely rainfall, wildlife conflicts (wild boar, deer, monkey, birds), windstorms, hailstone, landslide, extreme heat and cold, soil erosion, snowfall, floods, landslides, even snowfall in higher elevations. These issues are managed by: seedling distribution, maintenance of irrigation channels, solar electric fencing, in-person guarding crop, tree plantation, solar fencing against wildlife damages. Pests and crop diseases are managed by using pesticides, rituals and tree plantation, introducing new varieties of maize seed and fruits Land replacement in case of loss of land, the construction of dairy sheds and biogas facilities, providing essential dairy processing technologies lessons learned from previous projects

In Phogmey, pest infestations are addressed through the careful application of pesticides. Wildlife conflicts are managed through a combination of electric fencing and solar fencing, complemented by on-site guarding to protect crops. Furthermore, cultural rituals and tree plantation initiatives are used as preventative or coping mechanisms for the different issues

The ability to pay insurance premium is assessed mainly from their income and expenses - reviewing communities' income, they seem to have the ability to pay for insurance, but this may be possible for commercial farmers only. It will be difficult for smallholder farmers to pay the premium.

Challenges to implementing insurance include: current mindset and past experiences of individuals revealed a level of dissatisfaction with insurance companies, particularly in cases where full compensation was not provided for their losses, regardless of the severity of the disaster or the extent of damage. This resulted in a lack trust in the insurance system and a perception that the claims process is complex and lengthy. Initially, people might be reluctant to invest in crop insurance because of the lack of knowledge and benefit of crop insurance and there are chances that only people with more productive land will insure their crops.

Addressing this issue requires a two-fold approach. Firstly, an effective strategy to implement insurance schemes must be devised. To begin, raising awareness among the population about the purpose, benefits, and mechanics of insurance is essential. An intensive awareness campaign can help dispel misconceptions and instill confidence in insurance as a reliable safety net during times of crisis.

Secondly, tailoring insurance offerings to different types of land sizes can enhance inclusivity and relevance. An example of this could be the categorization of houses into types, this approach would involve the creation of distinct insurance packages—such as type 1, type 2, and type 3—based on the size of the land. This approach acknowledges the diversity of needs within the community and offers flexibility in coverage, ensuring that individuals can select the plan that best aligns with their circumstances.

The introduction of different varieties of maize seeds and fruit varieties aim to enhance crop resilience to changing weather patterns and water availability. CARLEP's study on water shortages promises potential solutions to alleviate water-related challenges. The installation of solar fencing, coupled with on-ground guarding and tree planting efforts, look towards addressing conflicts with wildlife.

Pest infestations are managed through the use of pesticides. Cultural rituals (puja/rimdos) and tree plantation efforts are used for potential management or coping mechanisms when facing the different environmental issues.

Lessons Learned - Awareness of insurance is crucial and much needed, among men about 70% of the participants are welcoming about crop insurance and they look interested in insuring both crops and livestock. Amongst them, 2 men with Jersey cows and piggery frequently asked when will it start and are even ready to insure. Water shortage and wildlife conflict are found to be major concerns and without solving this, even looks more difficult to implement if an insurance schemes. In Phogmey and Bidung Gewogs, the key lesson learnt is that the bio gas construction proved to be a failure because people are not using it anymore.

Kurtoed, Minjey, and Tshenkhar Gewogs; Lhuentse District

Climate change projects implemented in the Gewog are**:** CARLEP project, water flagship program, electric fencing and greenhouse (cost-sharing: 80-20%), group formation and equipment supplies, fodder and fencing support; RGoB projects include- dairy and poultry shed, bio-gas construction (got damaged in 2021 and not functional now in Phogmey Gewog), farm road construction and maintenance, irrigation maintenance, GEF project (ongoing), post-harvest facility construction, land development, equipment for irrigation channels. Water flagship program not successful in Tshenkhar because there are no water sources. HANAS Project: livestock group insurance. watershed management, solar and electric fencing, fodder seed distribution and barbed wire, provided livestock tools (cost sharing),

Risk perception and management

The environmental issues in the Gewogs are: wildlife conflicts, erratic rainfall, floods and landslides, extreme heat and cold, diseases and pests, hailstones, water shortage problems, windstorms, forest fires, irrigation problems, avoiding going to rinchen bumpa area (scared place) in Kurtoed. These issues are managed by: electric fencing, solar fencing, use of pesticides, religious rituals, solar fencing, in-person guarding crops, tree plantation, exploring new water sources, use of pesticides. Presence of proactive local adaptation strategies include using local shrubs like khempa as manures to keep away pests, land replacement and land repair in Tshenkhar Gewog

In Minjey Gewog, under the CARLEP project, several initiatives have been undertaken. A water flagship program has been introduced, promoting responsible water management. Electric fencing and greenhouse construction, with a cost-sharing arrangement of 80-20%, aim to mitigate wildlife conflicts and enhance agricultural productivity. They have also initiated the formation of farming groups and provided various equipment supplies, along with fodder and fencing support. The Royal Government of Bhutan (RGoB) has also contributed through the construction of dairy and poultry sheds, bio-gas facilities (despite facing damage in 2021), farm road construction, and irrigation maintenance. The ongoing GEF project focuses on constructing post-harvest facilities to enhance food security

In Kurtoed and Minjey Gewogs, based on their income and expenses, the farmers do not seem to have the ability to pay for insurance as the majority are self-subsistence farmers. However, In Tshenkhar Gewog, the community members ability to pay the premium appears viable, especially given the number of commercial farming opportunities that contribute to their income. However, obstacles to insurance adoption include a historical mistrust in insurance companies' compensation practices, coupled with concerns about the cumbersome documentation processes

In Kurtoed Gewog, the lessons learnt from previous projects is that the Livestock insurance group was not successful because the seed money was taken back by the government. In Minjey Gewog, the Bio-gas construction got damaged in 2021 and is not functional anymore.

Challenges to implement insurance

In Kurtoed Gewog, past experiences have left a lingering mistrust in insurance systems. A livestock insurance group wasn't successful due to government recalling of seed money without any particular explanation. There are also challenges that arise in regards to the community's financial capacity, with many being self-subsistence farmers and unable to afford premiums. Another challenge is the perception that insurance companies provide inadequate compensation and the often-inefficient documentation process further hinder adoption.

To overcome these barriers, suggestions to implement insurance involve persistent awareness campaigns and thorough consultation meetings, enabling people to comprehend the insurance scheme better. Furthermore, customizing insurance types based on factors like land size, location, livestock, crops, and subsistence/commercial farming could enhance inclusivity.

In Minjey Gewog, the challenges to implementing insurance**:** old mindset and experience of people that the insurance company doesn’t give full compensation for their disasters despite the level of disaster or damage. Moreover, the long process of documentation in getting the insurance money. Transportation is costly to take products to the nearest market. Moreover, there is a lack of market for some products and they do not produce. Suggestions to implement insurance is: There is a lead farmer in the village whom villagers look upon as a perfect example of a leader in agriculture work. Thus, getting them to ensure their product will be good; need to make people understand the insurance scheme by creating awareness campaigns constantly and need thorough consultation meetings; make different criteria for insurance types depending on land size, location of land, types of livestock and crops, and types of farming (subsistence/commercial).

Tshenkhar Gewog grapples with multiple similar environmental issues to a majority of the Gewogs, including wildlife conflicts, erratic rainfall, pests, hailstones, irrigation problems, extreme temperatures, windstorms, and

forest fires. To manage these challenges, the community employs or have attempted strategies such as electric and solar fencing, pesticide usage, local rituals, and crop/tree plantation. Land repair has also been undertaken by the Gewog in an attempt to reinforces their land. To promote insurance uptake, the Gewog or any implementing agency must offer pragmatic suggestions, such as continuous awareness campaigns about insurance and thorough consultation meetings where there is a level of information to familiarize the community with insurance schemes. Furthermore, differentiating insurance types based on factors such as land size, location, livestock, crops, and farming types can cater to varying needs and circumstances.

In terms of what lessons have been learnt in Minjey Gewog, previous experiences have highlighted how bio-gas facilities are not as effective. Challenges to insurance implementation include the financial limitations of self-subsistence farmers, skepticism stemming from prior negative experiences and concerns about lengthy documentation processes. Transportation costs and market limitations also hinder economic productivity which are also major reasons for the financial limitations.

Sergithang Gewog, Tsirang Toe Gewog, and Barshong Gewog Tsirang

In Sergothang Gewog, the climate change projects implemented are: UNDP supported with Drinking and Irrigation water supply for Sergithang Mae, crop Diversification (now started growing Avocado, early chili and litchi), million fruit tree projects, GEF project on Advanced Climate Resilience of water in Bhutan in the area of watershed assessment, water discharge and biodiversity assessment, electric fencing, irrigation channels

Climate change projects implemented in the Tsirang Toed Gewog are: rain water harvesting. As maize cultivation area is large, rain harvesting is not sufficient; the upcoming 2 projects in line are Tarayana support for water supply and the Government Water flagship project. The climate change projects implemented in Barshong Gewog (2013- 2015). International Centre for Integrated Mountain Development (ICIMOD) project implemented include: Land management, Rainwater harvesting, Construction of cowsheds, Nubian goat supply (the community supplied goats amounting to around Nu. 900,000 to date, Farm Road. Construction, Beekeeping, Training with the help of experts from outside. ICIMOD chose Barshong because of income and poverty level amongst other Gewogs in Tsirang. The ICIMOD project was a success because the project provided financial and technical support.

Risk perception and management

Environmental issues in Sergithang include: drying water sources both for drinking and irrigation, Due to farm road construction in many locations, the people are worried about the number of trees being cut. Other issues include: human-wildlife conflicts, insect pests and birds affecting crops, especially maize and beans. The chirpine trees absorb more water and release less water. Drying of water sources may even be associated with the type of trees in the forest. The other issues are erratic rainfall, extreme heat and cold, hailstones, windstorms, and forest fires. The above issues are managed by: constructing electric fencing, guarding crops, performing rituals, using pesticides. Drinking water is managed at individual Chiwog levels with a committee formed. Irrigation basically depends only on rainwater. Providing seeds and seedings, and planting new trees at the water source area. The local adaptation strategies taken are: introduction of new crops and fruit trees (Azuki beans), crop diversification (avocado, planting chilies earlier and litchi, sensitization for the cultivation of mixed crops due to climate change, The Gewogs 13th FYP priority areas are: more drinking/irrigation water and farm roads to connect all the households, livestock (Piggery, fishery,) poultry farming, and Agriculture products (early chilli, water Mellon and other fruits) in general.

In Tsirang Toed Gewog, environmental issues include: communities impacted due to the lack of water, human-Wildlife conflicts, pests impacting the crop, especially maize, oranges and beans, untimely rainfall, these issues are managed by water sharing among chiwogs, using rainwater, pests' management using cow urine and car engine oil and grease, guarding crops from wildlife, supplying seeds/seedlings.

In Barshong Gewog, key concerns in the Gewog include water shortages for both irrigation and drinking purposes across all five Chiwogs. There is also the case of a lack of ownership for initiatives that has hindered project implementation. The issue of "Gungtong," or empty households, contributes to fallow land and in recent years an increase in the wildlife presence near the community. In order to address these challenges, various strategies have been attempted, including personal crop guarding, seedling provision by agriculture officers (as compensation), and an attempt at continued data submission for disaster assessment (despite this is not having any impact and resulting in the farmers losing confidence. These are managed by: guarding their crops in person to protect from wildlife and agriculture officers supply seeds and seedlings for the impacted crops. In terms of crop damage and disaster, a Tshogpa shared that they submitted the data to the relevant sector heads like the Agriculture and Livestock, but since impacted people did not receive any benefits till date, they are not keen to collect similar data again.

In Sergithang Gewog, in the past affected households received compensation as *Kidu* in the form of seeds and seedlings. But such compensations are rare. At present damage reports are compiled but there is no

compensation. A pasture development project was implemented in one shared group land and it was nor successful. In Tsirang Toed Gewog, electric fencing project was implemented, but it was not a success because it was implemented in common land property.

The challenges faced In Sergithang Gewog are that the people perceive insurance companies do not give full compensation for their disaster despite the level of disaster or damage. Moreover, the long process of documentation in getting the insurance money is difficult. Tsirang Toed community feel that the challenge is to do the timely assessment of damages. Challenges in Barshong Gewog are water shortages both for irrigation and drinking in all five Chiwogs. Without addressing these basic needs, it looks difficult to implement crop insurance. Besides, in absence of a proper crop protection mechanism like proper fencing, implementing insurance scheme is difficult.

Insurance for selected livestock and cash crops for Tsirang Toed include poultry and piggery, cardamom and oranges. Overall, people are positive about insurance schemes. However, there is a need to conduct a detailed awareness program about crop insurance. In Barshong Gewog, people are more interested to insure higher income products such as for piggery, cardamom, and oranges.

Lajab Gwog, Khebisa Gewog, and Dorona Gewog, Dagana

In Lajab Gewog, various climate change projects have been implemented to address environmental challenges and enhance resilience including Initiatives such as the IKI project implemented through the Tarayana Foundation across 5 Chiwogs, provision of greenhouses under the GCF, projects by SGP UNDP, and endeavors financed by the Bhutan Trust Fund for Environmental Conservation

In Khebisa Gewog, climate change projects implemented in the Gewog are: GCF- Green Climate Fund through District- focused on Land development, Community Engagement Program (CEP) (JICA)- Ownership, Water management, west management, disaster, among the community,

The climate change projects implemented in Dorona Gewog are: Green Climate Fund (GCF)- Targeted for irrigation, and green house, million fruit tree plantation programme, Tarayana support for drinking water

Risk perception and management

In Lajab Gewog - Nothing so far besides data collection and submission to the District, electric fencing as a solution, pheromones trap for insect control. The main environmental issues in Khebisa Gewog encompass landslides that have negatively affected cultivation and homes, road construction and issues with drainage has impacted homes and agriculture, there has been water shortage, earthquakes, landslides, windstorm threats, and various cattle diseases. The risk perception and management when considering these issues primarily involve responses to livestock-related diseases such as a temporary halt in livestock product sales which has negatively impacted the farmers' income. They stopped selling livestock products due to livestock related diseases. This negatively impacted income of the farmers. In terms of risk perception and management, the Gewog administration and community have attempted to engage in data collection and submission to the District which has not necessarily helped. Other strategies such as electric fencing and the use of army pheromone traps have been employed to attempt to mitigate risks, particularly wildlife conflicts and pests with no real substantial benefits.

The environmental issues in Dorona Gewog are: human-wildlife conflict. Beginning this year, Tshalabji and and no compensation has been received, shortage of drinking water, heavy rainfall which Nimtola chiwog have been affected by elephants. The Areca nut (Doma) tree was destroyed by the elephant damages the road connectivity. Risk perception management - The community first informs the Tshogpa, and through Gewog it comes to a technical person like Agri/livestock and a report is submitted to the District. In 2017 to 2018, due to windstorm, maize got damaged and got cash compensation as Kidu from His Majesty., windstorm damaged houses are repaired potential donations and Gewog functionaries. Compensation is a difficult part because Gewog has to do the damage assessment but there is no follow up support to provide proper help.

In Dorona, human wildlife conflict is a bigger issue, due to warming effects the crops they grew before are not suitable, due to the closure of the FCB shops, farmers are impacted now. The household having paddy field are less and many of them depend on purchase of imported rice.

Challenges to implement insurance

In Lajab Gewog - The community acceptance is important, crop management skills are required, farm labour availability in the field especially given a greater number of empty households in the Gewog, improperly fenced crop areas and wildlife conflict management. In Khebisa Gewog, there is a lack of proper middlemen for selling produce which leads to a lack of interest in what might be marketable, an issue of limited knowledge of insurance schemes aside from life insurance, and challenges with a lack of land or access to cultivatable

land. In Dorona Gewog – There is no large-scale farming, no proper fencing and ways to stop wildlife, half of the income just comes from roadside work and labour in different places, and hence crop insurance is difficult.

In Lajab Gewog, the middleman is actively marketing agricultural and livestock producers to Thimphu and other places, especially for dairy and livestock products, The agriculture and livestock producers are less because the Gewog was connected via road only from 2017, the community school feeding is not fully benefiting the community vegetable groups because vendors bring vegetables from Thimphu.

The Gewog's 13th Five-Year Plan focuses on road connectivity as a priority, promoting ecotourism in Laja, encouraging quinoa and asparagus exports, improving electric fencing, and establishing a food processing unit in a relative location. Large-scale farming communities will be interested to do the insurance.

Insurance products in Khebisa include produce that gives farmers higher income such as cardamom, oranges, and varieties of beans. Prioritization of the 13th Five-year plan are: have drinking water supply 100%, scaling up production levels, targeting specific groups, developing human resources in the gewog.

Key findings in Khebisa: The community mostly talks about market issues. Fruits and vegetables have shorter shelf live and does not interest farmers for insurance. No middlemen involvement in marketing. Therefore, many farmers do not take interest in production. Besides life insurance schemes, there are no other insurance mechanisms in the villages. Some households do not even have enough suitable land for cultivation. The land exchange is encouraged but the process is too lengthy

In Dorona Gewog, farmers are aware only of life insurance and house insurance, vehicle insurance is not much trusted and they consider it a burden, only few farmers seem interested on crop insurance. The higher income produces such as areca nut, paddy, maize, oranges, and cardamom are potential farmers for insurance. The 13th five-year priority areas are: GI wiring or fencing through cost sharing - mainly to focus on the commercial part, chili production, mulching, promoting Jersey cows, farm Roads: Zhingchu farm road, drinking and irrigation water supply.

Other key findings from the consultations in Dorona indicate labour shortages that affect the larger-scale farming individuals, heavy summer rainfall impacting vegetable growth, human-wildlife conflicts, confusion caused by the changing crop suitability due to temperature increases, and the closure of FCB shops impacting rice cultivation.

Risk Mapping

The primary focus of the consultations was on climate-related risks only. However, during the consultations, human-wildlife conflicts came up as the primary cause of production losses in agriculture and livestock. The other major risk to crop production in the recent years is the damages caused by insect pests and diseases in all the gewogs. The appearance of the armyworms is thought to be due to prolonged drought and warming up due to delayed rainfall. The damage to crops appear to be as extensive, especially for the Gewogs that focus on maize, paddy, potato, pulses, and vegetables as their primary food crops.

The most common climate risks across all Districts came in the form of prolonged drought, erratic rainfall, and extreme heat. These are reported to occur frequently and with a heavy impact on most crops. All Gewogs experienced this risk anywhere from the last 1-2 years in Dagana and the last 5 years in Trashigang and Lhuentse. One of the major issues at present caused by climate change is the lack of timely rainfall for crops. The normal rainfall pattern has been observed to be disturbed over the last few years. Moreover, the rainfall behaviour has changed and observed to be erratic. If at all it rains, it rains too heavy and everything is washed down causing soil erosion, landslides, and floods. The lack of timely rain delays sowing and planting of crops, it prevents proper crop growth of crops and affects the yield.

Risk coping mechanisms

The primary and the most common coping mechanism against wildlife is guarding, by setting up a structure in the middle of fields and guarding their crops all day and night. Women guard during the day and men guard during the night. Despite this continuous effort of guarding, they still lose a good percentage of crops (20-30%). The amount of labour used in guarding is significant. All the Gewogs have tried using electric fencing but these have not worked well as wildlife get used to it. Therefore, the local government in Trashigang, Lhuentse, and Dagana are trying chain-link fencing, which is much costlier but may keep the wildlife away. Due to continuous huge pressure from wild life, many farmers in Lhuentse, Tsirang, and Dagana have chosen to leave their fields unattended. They are focusing on a small area around their homes that they can protect. As a result, food security and livelihood of these farmers has been put at great risk.

Another issue raised during the consultations is the occurrence of crop diseases and insect pests more frequently. The farmers relate this to warmer and prolonged dry weather conditions due to lack of timely rainfall. The army worms frequently invade and cause extensive damages to the annual crops. Use of strong

pesticides is not encouraged by the government due to adverse impact on the environment. The commonly available pesticides do not seem to work against these army worms in all the Districts. The pests may have developed resistance against the pesticides that are available in country. Even the livestock officers in all Gewogs confirmed this. The local remedial attempts include using cow urine and gasoline to prevent the pests, but this has not been effective either.

The most common coping method for lack of rain is religious rituals. All Gewogs conduct prayers either at the start of the year or at the start of the crop season in hopes to have timely and sufficient rainfall. This practice is believed and practised for years mainly by elderlies, while the youth are more sceptical about it. However, all age groups (male and female) cite this as their primary coping mechanism in absence any viable alternatives.

One of the coping mechanisms on crop damages is compensation provided by the local government in the form of seeds. In absence of proper compensation schemes on crop damages, the local government resorts to provide seeds to affected farmers. Most farmers are not happy with this arrangement citing that there is no point in getting new seeds as the crops get damaged again.

Recommendation here includes a need for change in the timings and systems for sowing, planting and harvesting. Crop diversification and use of climate smart technologies including tolerant varieties seem to have good potential in managing the risks. There is also a need to assess the status of water sources for drinking and irrigation purposes, and how impactful are the present efforts on this.

Preparation and adaptation mechanisms

Farmers in all Gewogs cited that when it comes to the climate issues, they believe that there really is not much that can be done to combat these problems. The farmers often resign themselves to being somewhat helpless and overly reliant on their local government leaders to solve the problems. This is where awareness or advocacy might be required in order to have the farmers consider possibilities of change. The government is taking a proactive stance to testing new technologies like of the chain-link fencing to protect crops. Other government efforts include looking at alternative water sources for the Gewogs that are in desperate need of water for drinking and irrigation.

The Buddhist calendar is often referred to for the right planting and harvesting seasons. The timings in recent years have not necessarily aligned and farmers often do not get timely rain as in the past and are unable to harvest a good yield. All farmers have access to the weather forecast either through BBS TV, radio or smart phone but they do not consider these to be reliable source for their local setting as the forecasts are primarily District-wise and not specific to their location. Most of the respondents are aware and avail housing insurance services form the RICBL All participants reported that they have life insurance coverage with the RICBL. In times of disasters and need, it is not easy to claim the insurance because of lengthy assessment procedures. There are mixed responses on willingness to pay based on their past experiences on housing and vehicle insurances. For the crop insurance, people do not have much experience. Therefore, there is need to create awareness.

Main Challenges

1. Several risks have been identified caused due to wild life conflicts and climate change impacts on crop and livestock production in the gewogs. However, the coping mechanisms to address these issues have not come out clearly.
2. Insurance is not understood well - To many members of the community in all Gewogs, insurance is seen as another form of tax. Even the Dzongkha word used for insurance and tax is similar ("*Tey"* or "*Tre").* This misconception is because they have not seen the results (insurance claims)
3. Sustainability of insurance products- Most of the smallholder subsistence farmers think that insurance does not make sense and they are not willing to make such investments for non-cash crops. For commercial farming it may make sense, they think.
4. Data on crop damages by wild life is limited - A common finding is that farmers are unwilling to report damages or impacts of external forces to their farms unless they receive something in return. The Gewog technical staff do gather information on crops and livestock damages but this is often limited to keeping records and not for compensation.
5. Lack of Labour - All Gewogs cited the aging population and a lack of farm labour. This also has resulted in a decrease agriculture and livestock production.
6. Lack of water- All Gewogs indicated the lack of water is a major problem for farming. In Gewogs such as Tsirang-Toe, agriculture solely depends on rain water, which has also become erratic.

7. Insurance products for vulnerable households - Families coming from vulnerable households do not have the ability and capacity to pay insurance premiums.

Lessons learned (consultation meetings)

1. For the community consultations, there is a need to simplify and adapt the game to make sense for the people and to maintain interest/concentration. The initial steps took a long time to explain. The field team was able to organize a new structure for use to potentially simplify the game.
2. During the consultation introduction, a mention of insurance influences the responses from the people. Hence, there is a bias where they attempt to respond according to what they think we want to hear.
3. Some of the community consultation conversations were dominated primarily by the Gup, LG officials, and business people. The community participants seem to allow them to take control of conversations and agree with what these people have to say or recommend.
4. The field visit timing coincided with the busiest farming period. This means that many people were out in the fields doing their work and were unable to attend the consultations. The ones who were available could not adequately represent the farming household. During the season women were heavily involved in farming activities and other works. This implied lower women representation.
5. The participants in the consultations were often those who were not working on the farm. This is true in most of the community consultations. In Khebisa a concern was raised by a member of the community who claimed that these kinds of meetings were often quite frustrating as they felt like all they did was attend for the sake of attending and often times there were no real results or changes coming out from these events.
6. Due to the huge amount of information needed, the one-day consultations proved to be very challenging in terms of gathering data especially when confronting with the consultation process itself. Some of the participants could not understand the process and could not contribute much. However, there was some positive feedback from the Agriculture Officers, that the tool applied kept the communities engaged and interactive.
7. For a feasibility study for insurance, it is best advised to conduct both qualitative and quantitative methods of data collection.

Key Findings and Recommendations

General

1. Most farmers have access to the daily weather forecast either through BBS TV, radio or smart phones but they do not consider these to be reliable source for their local setting as the forecasts are primarily at the District level and not specific to their location. The communities report that the weather forecast for crop production is not adequate and reliable. A more precise weather forecast for at least a week to 10 days in advance will be useful.
2. Networks and Finances – People trust within their community such as their family members, relatives, neighbours, if they are part of any group in the village. The support is from LG members and officials (Livestock, Agriculture). Other support networks are CSOs in the Gewogs such as RENEW, Tarayana Foundation, Ability Bhutan Society, and others.
3. Types of Expenses - Non-negotiable expenses - are essential food items, schooling, utilities (electricity, television), loan, life insurance, and imported jersey tax. Ad hoc expenses are incurred for funerals and medical emergencies. Expenses with potential for substitution are materials for weaving (silk), clothes, savings, mobile data, doma, alcohol, sports, and gas cylinder. Women normally incur higher expenses than men.
4. Use of cultural and traditional knowledge - Usually, farmers perform rituals and pujas. This is also the coping mechanism implemented by the farmers.
5. Adaptation and preparedness mechanisms - communities contact the Gewog agriculture officials
6. Farmers who are older adults and are illiterate do not know how to work their banking apps and transactions through the smartphones. These farmers prefer to use cash. This should be noted if an insurance deposit is established online.
7. Experience- Senior adults/elderly who are farmers are skeptical about crop insurance.

Specific Findings - Crop and Livestock Insurance

8. Understanding of insurance - The communities have no prior experience with crop-livestock insurance. They are aware of house insurance and life insurance. Some business members have vehicle insurance. Some members did not have good experience claiming house insurance because of lengthy procedures and delayed payments. Some groups consider insurance to be similar to a form of taxation.
9. Land size and type – determine the extent of potential crop production or the ability to produce. If commercial-scale production is not possible due to small holdings, there won't be any interested farmers for crop insurance. Farmers in all the Gewogs cited that their priorities are self-sustenance. Due to several production and market-related problems, farmers resisted taking up commercial-level production.
10. Difficulties on insurance claims- Insurance claims are perceived to be difficult due to delays and lengthy procedures. A participant in Kurtoe, Lhuentse mentioned that the insurance claims don't make sense to them since the transport costs to get to the claims are more than the insurance claims themselves.
11. Youth perceptions - They seem to be more accepting and understanding of insurance, one group (Phongmey) said it was a level of security, while another group (Tsenkhar) felt that they did not have enough experience with insurance to share their opinion.
12. Insurance products - If the farmers are not producing enough to make a substantive income, then they are not interested in insuring their fields as a result.

Recommendations

In relation to crop insurance, the following recommendations are made:

1. Crop insurance is new in Bhutan, and all implementers lack the capacity, expertise, know-how of it. Therefore, for them to advocate and implement insurance, they need to know about it, and also their support in the field is essential and valuable. Involvement and capacity development at local level is important.
2. Strong advocacy and understanding of insurance. It is important to provide advocacy in order to develop an understanding of crop insurance at all levels. Without proper understanding, people may not take up insurance.
3. Market access to agricultural and livestock products is essential for farmers to avail crop insurance scheme. For instance, the market access for farmers in remote Kurtoed and Minjay Gewogs is limited. Therefore, even if farmers are interested in crop insurance in Kurtoed, it will be a major challenge, unlike for farmers in Radhi, Bidung, and Phongmey Gewogs.
4. The farm labour shortage is a big challenge in all Districts for farmers to increase production. This is mainly due to rural-urban migration, as well as the migration of youth to other countries for better opportunities. If the farm production and yields are primarily for subsistence farming purposes, farmers will not be keen to do insurance.
5. Influencing people in the communities- There are key people (power brokers) in the communities having great exposure to the market and networks with other people within and outside the Gewogs. Therefore, they are important stakeholders who need to understand the concept of insurance and procedures for other communities to take up the idea. Lead or progressive farmers are important stakeholders whom other farmers look up to so getting them to avail insurance is important.
6. The insurance products should be carefully developed or some farmers may take advantage of insurance. *"If there is crop insurance, people may not bother to guard their crops nicely as they will think- "We have insurance so even if crop is damaged, we will be compensated."* This ties into the recommendation that the farmers should feel a "pinch" or a sense of ownership otherwise they take services for granted and are unwilling to put in the full effort.
7. Sustainability of insurance products- Due to the prominence of subsistence farming, there may not be many opportunities for insurance in the sense that the farmers are often not willing to make that investment as it does not make much financial sense to them. It may make more sense for commercial farming only. There is a need to have insurance products for poor and vulnerable households.
8. Financial security is important for households to be able to take up crop/livestock insurance. Though there are quite a few examples of good income sources like weaving, selling livestock products, fresh

vegetables, and other value-added products, much more needs to be done to raise the income levels of rural households in the light of wild life pressures, climate related risks and disasters.

For crop insurance to be a success it will depend on many factors. The following recommendations are proposed:

1. Affordability: To encourage farmers to participate in insurance schemes, it is important that the premiums are affordable for farmers, especially smallholder farmers.
2. A Government subsidy support through a cost sharing mechanism may help. This will greatly enhance the success and outreach of crop insurance initiatives. There is also a need to develop the capacities of the implementers at all levels of insurance.
3. Public Awareness and Education: Farmers need to be aware of the benefits of crop insurance and educated about it so they can make informed decisions regarding their participation. This should be done through a consultative participatory approach.
4. Effective Risk Assessment: The risk assessment needs to be conducted properly and accurately. A proper risk assessment will help to ensure that insurance payouts adequately cover farmers' losses without burdening the insurance provider.
5. Transparent, Clear, and Simple Process: The insurance application process, documentation, and claim settlement process need to be transparent, clear, and simple so it is easy for farmers to participate.
6. Timely Payouts: This is essential so that farmers could recover from losses promptly and are able to continue their farming activities without experiencing financial difficulties.
7. Customization and Flexibility: Crop insurance needs to be customized according to specific areas' needs, risk, production (crop type), and market accessibility. For instance, cash crops are mostly sold to auction yards in Samdrup Jongkhar or Gelephu. Assessing these factors while preparing crop insurance products can increase the relevance and effectiveness of the program.
8. Partnerships: Collaboration between governments, insurance companies, CSOs can lead to more comprehensive and sustainable crop insurance schemes. Some CSOs to partner with are RENEW Micro Finance Private Limited (RMFPL) and Ability Bhutan Society. RMFPL is active in Tsirang, Dagana, Trashigang and Ability Bhutan Society is active in Tsirang with a focus on empowering People with Disabilities in the District. Ability Bhutan Society has rich experience empowering People with Disabilities in Trashigang and Dagana.
9. Crop diversification and market for the produce: Need to encourage farmers to diversify crops in their areas as due to climate change crops that are grown in their areas do not grow anymore. With this, farmers need to be provided to explore market options for the new crops. If there is good demand, they will be encouraged to produce more and thus, probably more demand for crop insurance in the long run.
10. Weather forecast data and technology: The present weather forecast is inadequate and not reliable. There is a need to build capacity for handling and management of agro-met data in order to provide timely forecast services to farmers through the use of modern technologies. This will also help improve the risk assessment and verification process.

Annex 6 Summary overview of insurance landscape and experience in Bhutan

There are two insurance companies in Bhutan, the **Royal Insurance Corporation of Bhutan** (RICB), and **Bhutan Insurance Limited** (BIL), which have a country-wide reach as set out below. Both of these local insurance companies have been pre-identified for and have indicated their interest in being involved in the project. They have actively participated in all relevant stakeholder consultations during the CN phase and will be central and active participants in the detailed insurance feasibility study during FP development and subsequent design of the insurance product.

The **RICB** was instituted under the Royal Charter of His Majesty the Fourth Druk Gyalpo Jigme Singye Wangchuck on the 7th of January 1975. The RICB aims to offer premier insurance, credit and other social security services, delivering personalized services at affordable cost by professional employees through a comprehensive network. RICB provides insurance services and investment avenues through Life Insurance, General Insurance, Reinsurance, Credit and Securities products and services. It provides insurance for life, property, saving, well-being, retirement, motor, and children's education. Its corporate office is located in Thimphu. It has two main branch offices in Thimphu and Phuentsholing; 12 Category A branches and 13 category B branches. In addition, RICB operates through individual agents who register with RICB and promotes the insurance schemes with the public. The **BIL** started operations on 20th August 2009 and today has a countrywide network connected through the latest technology for quick communication and response in over 17 districts. It provides non-life insurance products for individuals, corporate bodies, small & medium size enterprise throughout Bhutan. The Head Office is located in Thimphu with branch Offices in Phuentsholing, Paro, Wangduephodrang, Gelephu and Samdrup Jongkhar; Extension Offices in Bumthang, Mongar, Tsirang, Tashigang, Trongsa, Samtse, Zhemgang, Nganlam, Khuruthang, Gedu, Haa, Trashiyangtse, Dagelapela, Babesa, City office Main Town Thimphu and Paro Extension at Paro Lango.

The **Priority Sector Lending (PSL) Insurance scheme** is the only crop insurance in place at present in Bhutan. It was launched in 2017 through a collaborative process between the insurance companies, DoA and the Royal Monetary Authority (RMA). The main objectives of the PSL insurance scheme were as follows: (i) To promote cottage and small-scale industry; (ii) To cover the associated risks for people who have availed PSL loans; (iii) To encourage commercialization of farming and encourage youth in taking up agricultural enterprise to negate unemployment. The PSL Insurance scheme is issued by the RICB, co-insured between the RICB and Bhutan Insurance Limited (BIL) in the ratio 60:40 respectively for both claims and premium. PSL insurance is only applicable to those farmers who have taken loans from the PSL. The PSL Insurance Scheme came about upon the request of the banking institutions to provide security to the lending part. The PSL faced challenges with recovery and the process was found tedious as it required verification at the district and the bank. The premium rate is 2.9 percent per annum and the sum insured is calculated as the amount of expenditure per acre/the cost of production. Between 2018 and 2021, a total of 386 policies were issued; the total sum insured is 37,534,676.00 Ngultrum; and the total premium is 3,519,161.47 Ngultrum. Out of this, the total claims paid is 4,217,572.80 Ngultrum which is 119.84 percent. The crops covered under the PSL insurance scheme are: Cereals (rice, buckwheat, maize, and quinoa); Oil seed crops (sunflower mustard, groundnut, and soya beans); Vegetables (chili, onion, tomatoes, beans, cauliflower, asparagus, peas, broccoli, and carrot); Fruits and nuts (apple, pear, persimmon, avocado, kiwi, litchi, banana, passion fruits, strawberry, blueberry, raspberry, dragon fruit, pineapple, walnut, pecan, and mangoes); Floriculture; Medicinal and aromatic plants (MAPS): cardamom, ginger, turmeric, herbs, garlic; Mushrooms (Shiitake and oyster); Legumes and pulses (kidney beans, peas, and lentils); Plantation crops (tea, coffee and green tea); Nurseries (in horticulture and floriculture). The perils covered are: Any physical damage or loss due to weather-rainfall, storm, tempest, flood and inundation, hailstone; Landslide/rockslide/subsidence; Pest and Diseases; Forest Fire; Damage to Crops by wild animals.

Several **MFIs** that are operational throughout most of Bhutan, namely RENEW Microfinance Private Limited (RMFPL) and Taryana Microfinance Limited (TMFL), have also participated in the development of the CN and have expressed interest in playing a role in project implementation

Other initiatives to institute crop insurance that have not materialised: The then Ministry of Agriculture and Forests submitted a proposal on indemnity crop insurance to the Cabinet but was not approved. The proposal was to have about 40% of the premium supported by the government which was not feasible with the economic constraints the country is facing post COVID. A few years back, through the Least Developed Countries Fund (LDCF), US$ 1 million was allocated as an endowment fund for indemnity crop insurance. However, this did not materialise and later the fund was allocated for other purposes. **Statistics on other non-life insurance products**: A higher proportion of rural households (36.2%) have insured their property (property insurance includes assets, livestock, housing, vehicle), compared to urban households (19.0%). The reason for this could be that more rural households own their dwellings (87%, table 7.2). Also, housing insurance is compulsory in rural Bhutan.

The above indicates familiarity with the concept of insurance in rural Bhutan, although not with the concept of index insurance. Thus, the proposed project will include ongoing sensitization activities (Output 1.1.2) as well as identifying and empowering climate champions for effective peer-to-peer learning and project outreach (Output 1.2.2).

Annex 7 Environmental and social screening and Environmental and Social Management Plan

This annex contains the following sections:

1. Summary description of the project
2. Screening and Categorization of the project
3. Environmental and Social Management and Monitoring Plan

1. Summary description of the project

The project's **main goal** is to enhance the resilience of smallholder farmers in Bhutan to key identified climate risks and enhance their food security by rolling out innovative index-based microinsurance through an integrated resilience building approach.

The project will achieve its goal through the following *three* **objectives**:

- Strengthen climate-resilient agricultural practices to underpin integrated climate risk management by smallholder farmers;
- Roll out innovative climate risk transfer mechanism and build smallholder farmers' resilience through integrated approach; and
- Institutionalise innovative climate risk management for long-term sustainability.

The project will meet these objectives through three interlinked components as detailed in Part II.A of the Full Proposal that will deliver an integrated package of interventions to address key causes of vulnerability to climate change and food insecurity for vulnerable smallholder farmers in selected dzongkhags in Bhutan.

Component 1 of the project entails facilitating linkages to climate services and enhancing access to climate resilient agricultural technologies such as conservation agriculture and organic production, supported by GAPs, as well as sensitising stakeholders on index insurance and climate risk management, and empowering women and youth climate champions. Component 2 activities will develop financial incentives and risk transfer mechanisms for sustainable resilience building and adaptive capacity developing, while Component 3 activities will institutionalize the innovative approach to climate risk management through index-based microinsurance. These are intrinsically risk-averse with respect to social and environmental impacts. The project contains unidentified sub-projects (USPs) because the exact localities to be covered under the insurance have not yet been identified. Until this happens, the exact recipients, secondary innovations identified at the community level, and exact nature of livelihood activities cannot be fully specified. The project districts have been identified based on the outcomes of the in-depth vulnerability assessment and climate risk-based crop suitability assessment, as well as the detailed insurance feasibility study conducted during FP development.

The specific crops to be promoted through the climate-resilient value chain development and marketing support (output 2.1.3) will be identified during implementation once the project gewogs (localities) have been selected, informed by the best available crop suitability assessments under the changing climate, as well as WFP's CLEAR tool.

Potential activities for component 2, as well as excluded activities, are listed in Table A7.1.

Table A7.1 Potential activities and excluded activities

Category	Potential activities	Excluded activities
Sustainable land management and soil fertility enhancement	Farm-level contouring and terracing on sloping land e.g. contour grass hedgerows Small springshed protection Bio-composting, vermi-composting, organic soil nutrient management	– Introduction of alien crop species/ invasive species – Hillside terraces at a scale above the smallholder farm level – Land expropriation
Traditional and cultural varieties and knowledge	Cultivation of heritage grains and legumes such as foxtail millet, finger millet, small millet, amaranths, soya beans, lentils, buckwheat, etc. Promotion of indigenous crop varieties over hybrid	– Introduction of alien crop species/ invasive species – Large-scale monocultures (>2ha of contiguous land with 1 culture) – No activity in conservation areas and/or natural reserves

Improved resilient varieties	Provision of improved resilient varieties e.g. heat-tolerant maize Other resilient fruit and vegetable varieties Improved organic seeds – open pollinated varieties (OPV seeds)	– Introduction of agrochemicals – Introduction of GMOs – Introduction of alien crop species/ invasive species – Large-scale monocultures (>2ha of contiguous land with 1 culture) – No activity in conservation areas and/or natural reserves
Plant protection and animal health	Bio-pesticides – on-farm production Test and improve farmers' own methods for plant protection – e.g. fermented cow urine for red ant; and Jholmal[241], which can be used as a bio-fertilizer and as bio-pesticide depending on raw materials used Pest and diseases control detector / sensor	– Introduction of agrochemicals
Organic farming and management	Adoption of organic farming management practices (use of compost, local seeds /breeds, etc.) Model should be modern organic agriculture for increased yield and income	– Introduction of alien crop species/ invasive species – Large-scale monocultures (>2ha of contiguous land with 1 culture) – No activity in conservation areas and/or natural reserves
Financial instruments to promote climate-resilient agriculture	New loans for organic farmers Green loans to promote climate-resilient agriculture	– Loans for input-intensive or energy-intensive farming practices
Livestock-related	Extension advice on integrating livestock into the farming system (for organic manure) Biogas for cooking and organic slurry/ manure	– The project will not supply any livestock but will provide extension advice on integrating livestock into the farming system for resilience
Water-related	Improved rainwater harvesting Drip irrigation	– New water wells – Boreholes
Additional GAPs (Good agricultural practices) not mentioned above	Good farm design Good orchard management, fruit tree pruning and training, etc. Diversified crop rotation, crop combination, etc.	– Introduction of agrochemicals – Introduction of GMOs – Introduction of alien crop species/ invasive species – Large-scale monocultures (>2ha of contiguous land with 1 culture) – No activity in conservation areas and/or natural reserves
Post-harvest and value chain development	Post-harvest storage facilities for groups / cooperatives Small-processing machinery e.g. milling machines	– Large storage facilities (>100m3 OR surface <25m2) – Large-scale production units (>100t per year)
Automation	Smart automation for irrigation systems – e.g. automation of micro-irrigation technologies such as drips and sprinklers	

[241] See https://www.icimod.org/jholmal-a-chemical-free-solution-for-farmers-in-kavre last accessed 07 September 2023.

	Automated soil testing with recommendations for action	
		– Any activity involving child labour of children below the age of 14 year; – Any activity that will lead to involuntary resettlement

2. Screening and Categorization of the project

The project was screened against the 15 Environmental and Social Principles of the Adaptation Fund, using the screening tool presented below. This screening tool consists of a list of around 20 general level 1 questions (indicated with two digits, e.g. 3.1) and around 60 detailed level 2 questions (indicated with three digits, e.g. 3.1.1), corresponding to the 15 principles of the Adaptation Fund Environmental and Social Policy. The level 1 questions need to be answered first and they need to be answered ALL. If a level 1 question is answered with a 'yes', it leads to more detailed questions of level 2. All level 2 questions under a level 1 question that triggered a 'yes' need to be answered. If a level 1 question is answered with a 'no', then the corresponding level 2 questions do not need to be answered.

Answers to the detailed Level 2 questions result in one of three degrees of concern. If any Level 2 question is answered with a 'yes', the indicated degree of concern will determine the degree of concern for the whole activity. This means that if a single question indicates a high degree of concern, the activity is classified as an activity of high concern and appropriate measures must be taken. If no question is answered with a high degree of concern, but at least one medium-level concern is raised, then the activity is a medium concern activity. If no Level 1 or Level 2 questions are answered with a 'yes', then the activity is of low concern and no further action is required.

It is possible that a level 1 question is answered with a 'yes' and all associated level 2 questions are answered 'no' as they are more detailed and specific questions of the same issue. If all the level 2 questions are answered 'no', then this area will be of low concern, even if the level 1 questions was answered with a 'yes'. If a potential impact is not covered by any of the L1 or L2 questions, it can be added in the empty box at the end of each of the sections.

Table A7.2: AF Screening Questionnaire

1. Compliance with the law				
1.1 Is there a risk that the activity would not comply with an applicable domestic or international law?			NO	As UN entity, WFP abides by international and national law. WFP's partners and contracted service providers are equally obliged to do the same. Moreover, relevant national, departmental and district authorities have been consulted during the proposal development process and will be partners in the project implementation. This facilitates compliance with all relevant laws and regulations. An exhaustive list of laws and regulations the project must ensure compliance to is provided in Section K above.
	1.1.1 Is there a risk that the activity would not comply with an applicable international law?	High		
	1.1.2 Is there a risk that the activity would not comply with an applicable national or local law?	High		

2. Access and Equity				
2.1 Could the activity lead to changes in local tenure arrangements for existing resources or resources created by the activity?			NO	Project activities are not expected to lead to changes in tenure arrangements as such. The RGoB has addressed issues related to youth's access to land for farming through the formation of youth groups who access state land through land User Certificates (LUCs).
	2.1.1 Could the activity lead to changes in tenure arrangements that potentially could put groups or individuals at a disadvantage or could lead to disagreements and conflicts?	High		
2.2 Could the activity create or exacerbate intra- or inter-community conflicts?			**YES**	Economic benefits from the project implementation could unintentionally potentially put groups or individuals at a disadvantage or lead to disagreements. However, the implementer is implementing this project with the coordination of relevant government entities and relevant/affected stakeholders (at institutional and community level) to ensure avoidance of foreseeable exacerbation of intra-or-inter community conflicts and to ensure targeting of beneficiaries is fair and aimed at vulnerable groups (youth, women, etc). A grievance mechanism (CFM) will ensure continuity in capturing, resolving and monitoring possible grievances/ incidents/ accidents/ suggestions during the implementation of the project.
	2.2.1 Could activities lead to opening up of existing or creating new minor conflicts or disagreements within or between groupings or communities?	Medium	NO	Project activities to enhance access to microinsurance and microfinance will result in enhanced livelihoods diversification for the most vulnerable HHs. The project will put in place adequate measures to ensure equitable access to activities and assets by women, youth and vulnerable groups in project areas. Further in-depth consultations with communities and stakeholders have been conducted throughout FP development and will be conducted during implementation to ensure that any barriers to access and equity can be overcome in line with the AF's ESP.

	2.2.2 Could activities lead to opening up of existing or creating new conflicts or disagreements within or between groupings or communities which potentially could become entrenched, violent, or spread to additional groups or communities?	High	NO	As above. There is no existing evidence of entrenched or violent conflict or disagreement within or between communities in Bhutan, which the project could exacerbate.
	2.2.3 Could the activity bring unequal economic benefits to a limited subset of the target group?	**Medium**	**YES**	Economic benefits from the project implementation could potentially put groups or individuals at a disadvantage. To mitigate against this foreseeable risk, the implementers will ensure strengthened coordination with relevant stakeholders (government, and at community level) especially in the selection criteria of the beneficiaries to ensure inclusion. A grievance mechanism (CFM) will ensure continuity in monitoring possible grievances/incidents/accidents/suggestions during the further design and implementation of the project.
	2.2.4 Could the activity lead to increased un-employment that would not be absorbed by other sectors or activities?	Medium	NO	Project activities have been designed to generate increased employment in the rural areas, through increasing the income from farming activities and stimulating related entrepreneurial opportunities – for example in agricultural value chains.
2.3 Could the target beneficiaries or stakeholders be dissatisfied due to limited consultation during activity design or implementation (including due to inadequate Complaints and Feedback Mechanisms)?			NO	In-depth consultations were carried out at CN and FP stage and will continue throughout project implementation. An independent complaint and feedback mechanism will serve the project and project beneficiaries and other stakeholders. Information on the mechanism will be widely disseminated so that stakeholders can easily access this. The Grievance Mechanism is described in Annex 8.
	2.3.1 Could the activity lead to dissatisfaction or negative impacts due to lack of beneficiary or other stakeholder participation in planning, design, implementation, or general decision making?	Medium		
	2.3.2 Is there a risk that not all relevant stakeholders, and especially marginalised or vulnerable groups, have been identified and consulted or that they have been exposed to internal or external pressure or coercion or not able to comprehend the consultations?	Medium		
	2.3.3 Could there be negative impacts due to an inadequate Complaints and Feedback Mechanism during project implementation?	Medium		

3. Marginalized and Vulnerable Groups			
3.1 Could the activity imposing disproportionate adverse impacts on marginalized and vulnerable groups?		NO	There are no displaced people or official refugees in the country. The project targeting approach ensured that marginalised and vulnerable groups, identified as women farmers, households headed by women, and rural youth, were afforded due consultation during the project design phase and will do the same during implementation. The activities to be implemented under all components (particularly under Component 2) aim at: i) empowering vulnerable groups to make informed adaptation decisions, thus decreasing vulnerability to climate-related impacts while taking into consideration their traditional and local knowledge; ii) increasing availability, quality of and access to resources of marginalized groups. Concrete

				adaptation and value chain activities will be supported in which both women and men can participate, as well as female and male youth. The project will also implement climate resilient and nutrition-sensitive value chain support targeted to improve the nutritional status of poor people and vulnerable groups. No additional disproportionate distribution of adverse impacts is expected for the marginalized and vulnerable subgroups in this project.
	3.1.1 Is there a likelihood that the activity would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups?	Medium		
	3.1.2 Could the activity potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	High		
	3.1.3 Could the activity aggravate the situation of vulnerable, marginalised, or otherwise disadvantaged individuals or groups?	High		
3.2 Could the activity lead to influx of a temporary or permanent alien workforce?				
	3.2.1 Could the activity lead to influx of a temporary or permanent alien workforce of relatively small size in a relatively isolated or culturally sensitive community?	Medium		
	3.2.2 Could the activity lead to influx of a relatively large temporary or permanent major alien workforce (>10% of existing community) or a smaller group which could be expected to have important cultural, health, or socio-economic impact on a local community?	High		

4. Human Rights				
4.1. Could the activity fail to respect human rights?			NO	The IE and its partners affirm the fundamental human rights of all people. The project and its intended activities do not risk violating any pillar of human rights.
	4.1.1 Could the activity lead to violation of fundamental human rights as defined by international, national or local law?	High		
	4.1.2 Could the activity of partners, contractors, or suppliers, lead to violation of fundamental human rights as defined by international, national or local law?	High		

5. Gender Equality and Women's Empowerment			
5.1 Could the activity lead to gender-based inequality, discrimination, exclusion, unwanted workload, or violence?		NO	The project prioritises women, who form the majority of smallholder farmers in Bhutan, as the primary beneficiaries and will further mainstream gender as set out in Part II.M. The project will ensure that women, men, and female and male youth can equitably engage in and benefit from project activities such as provision of microinsurance and

				climate-resilient value chain development. The project's gender mainstreaming strategy is a central element of the exit strategy, and is set out in Part II.M, and will be further elaborated during project inception. A gender assessment has been conducted and women and women's groups have been consulted during the community and stakeholder consultations. They will continue to be consulted during the implementation of the project. During full proposal development, more detailed information on the differentiated impacts between women and men at the target district level was gathered through community consultations and the project activities have been developed based on this. The Gender Assessment recommendations have been integrated into the FP and will inform the implementation phase. Factors influencing the discrimination against women in terms of land ownership are not expected to pose any risks in Bhutan, in view of the migration out of the rural areas and as women's ownership of land is relatively equitable in many parts of the country.
	5.1.1 Could the activity lead to gender-based violence?	High		
	5.1.2 Could the activity create or amplify conditions for gender-based inequalities?	Medium		
	5.1.3 Could the activity lead to gender inequities in who makes decisions?	Medium		
	5.1.4 Could the activity lead to increased unpaid work for women and girls?	Medium		

6. Core Labour Rights			
6.1 Could the activity fail to respect core labour rights?		NO	The IE and its partners respect international and national labour laws and codes, as stated in WFP's policies. WFP recognizes the principles and international standards on the matter established by the UN and the relevant international legal framework and applies them internally and in its relationships with third parties. In particular, WFP has a zero-tolerance policy for child labour of children below 14 years. Child labour is not common in the targeted areas. Avoidance measures: - Zero tolerance for child labour of children below 14 years; - Promote school attendance.
6.1.1 Does the activity involve support for employment or livelihoods that may fail to comply with national and international labour standards (i.e. principles and standards of ILO fundamental conventions)?	High		
6.1.2 Could the activity, or that of partners, contractors, or suppliers, involve use of child (<14y) or forced labour?	High		

7. Indigenous Peoples			
7.1 Does the activity involve indigenous peoples or could it affect indigenous peoples?		NO	Although Bhutan is populated by different ethnic groups, these are not specifically associated with a territory on which they depend exclusively, and there is generally minimum inter-group friction. The project dzongkhags were selected during FP

				development, while the targeted communities at the gewog-level will be identified during project inception. The Monpa people, believed to be the oldest original inhabitants of Bhutan , do not reside in the project dzongkhags and will not be affected by the project activities. The project will not target the highland gewogs of Merak and Sakteng, where the special interest Brokpa communities in Trashigang reside, as it will focus on the mid- and lower altitude areas. The project will not discriminate against any group and will ensure the widest participation from all different groups during implementation.
	7.1.1 Could the activity negatively affect indigenous peoples, culturally or otherwise, without their specific Free, Prior, Informed, Consent (FPIC)?	High		

8. Involuntary Resettlement				
8.1. Could the activity lead to resettlement?			NO	The project is not expected to lead to involuntary resettlement, neither in physical nor economic terms.
	8.1.1 Could the activity lead to involuntary economic or physical resettlement of households or individuals?	High		

9. Protection of Natural Habitats				
9.1 Could the activity lead to negative impacts on natural habitats?			NO	By implementing conservation agriculture and organic production, as well as GAPs, the project will ensure the protection of natural habitats. The activities of Component 1 are designed to enhance knowledge and awareness on climate change and to implement climate-resilient agricultural technologies and promote either low-external input or organic production. The activities of Component 2 will build financial incentives and risk transfer mechanisms for sustainable resilience building and adaptive capacity. As a result, the project's activities are not expected to have any adverse impact on the environment or natural habitats. Some activities of Component 1, such as those related to agricultural practices, could potentially have adverse impacts on natural habitats, but they will be designed in such a way that their environmental impact is minimal (building upon features of the environment that are already present, without introducing new elements or alien crop/plant species). Moreover, these activities are of small-scale (managed at individual, household, or farmer group level) and any residual impact on the environment or habitats would be negligible and readily remediable. **Avoidance measures**: - No introduction of alien crop/plant species; - No activity in conservation areas and/or natural reserves
	9.1.1 Could there be negative impacts on critical migration corridors of endangered or otherwise or important animal or insect species?	High		

	9.1.2 Could the activity lead to increase in unregulated or unlicensed collecting, hunting, or fishing?	Medium		
	9.1.3 Could a natural habitat be significantly degraded, fragmented, or more than half of extent destroyed?	Medium		
	9.1.4 Could a natural habitat be almost fully destroyed or degraded so that it no longer could function as natural habitat for the original fauna/flora?	High		
9.2 Could the activity lead to negative impacts in protected or internationally recognised areas?				
	9.2.1 Will any major constructions be located close (<200m) to critical habitats, protected areas, or areas of particular or locally recognised ecological significance?	Medium		
	9.2.2 Could the activity lead to negative impacts on protected or internationally recognised areas?	High		

10. Conservation of Biological Diversity				
10.1 Could the activity lead to negative impacts on biodiversity or endangered species?			**YES**	Some activities of Component 1, such as the promotion of new crop varieties, could potentially have adverse impacts on biodiversity, leading to a deterioration of biological diversity if species are not correctly selected (e.g. inadvertent introduction of invasive species) and diversified. To ensure this risk is addressed, the project will prioritize local species and multi-species planting and avoid the use of non-native and invasive species. These activities will be designed in close collaboration with the NCOA of the DoA and other agricultural research institutes. As a result, the project is not expected to have any adverse impact on the environment or foreseeable compromise to the ecosystem and biodiversity. The project is indeed designed to enhance biodiversity through the promotion of organic production and GAPs.
	10.1.1 Could the activity lead to degradation of biodiversity or significant reduction in one or more common animal, insect, or plant species?	Medium	NO	
	10.1.2 Could the activity lead to loss (eradication or removal from local area) of one or more animal, insect, or plant species?	High	NO	
	10.1.3 Could there be negative impact on any endangered or critically endangered animal, insect, or plant species?	High	NO	
	10.1.4 Could the activity lead to introduction of invasive alien varieties or species which could influence local genetic resources?	**Medium**	**YES**	As above.
	10.1.5 Could the activity lead to introduction of invasive alien varieties or species which potentially could eradicate, change, or significantly reduce local naturally occurring varieties or species?	High	NO	

	10.1.6 Could the activity introduce genetically altered organisms?	Medium	NO	

11. Climate Change				
11.1 Could the activity lead to increased exposure, increased vulnerability, or reduced resilience of beneficiaries to the effects of climate change?			NO	The entire project is designed to reduce beneficiaries' exposure and vulnerability to the effects of climate change and increase their resilience. As the project area is highly vulnerable to the impacts of climate change, all project components and activities will be designed to contribute to increasing local capacities to sustainably face climate change in the long-term, and climate variability in the short -and medium-term. The promotion of i) good agronomic practices for better management of soil and water resources; ii) organic production and Integrated pest management techniques coupled with the use of organic fertilizers and pesticides; and iii) the increase of carbon sinks' potential through conservation agriculture, are expected to reduce the emissions deriving from agricultural activities. Plants and crops will be selected to ensure a better adaptability to the current and projected climatic conditions.
	11.1.1 Could the activities result in increased exposure to climate induced hazards?	High		
	11.1.2 Could the activity result in beneficiaries being more vulnerable to climate-related stresses?	High		
	11.1.3 Could the activity lead to beneficiaries having less means or options to withstand shocks resulting from extreme weather events (floods, storms, drought)?	High		
11.2 Could the activity lead to increases in greenhouse gas (GHG) emissions or to reduction of carbon sinks?			NO	The project will not generate any significant emissions of greenhouse gases or reduce the capacity of carbon sinks. Many project activities will be designed to be low-emissions, as well as adaptive – e.g. the promotion of conservation agriculture and organic production.
	11.2.1 Could the activity lead to significant increases in GHG emissions during operation phase?	Medium		
	11.2.2 Could the activity lead to significant degradation or destruction of elements which absorbs and stores carbon from the atmosphere (trees, plants, soils)?	Medium		

12. Pollution Prevention and Resource Efficiency			
12.1 Could the activity lead to significantly increased release of pollution to air, land, or water during construction or operation?		NO	None of the activities in the project will release pollutants into the air, soil or water. Under the project's approach to enhancing agricultural production through GAPs, conservation agriculture and organic production, chemical inputs will be replaced by locally made biofertilizer and pesticides, use of liquid fertilizer for example from manure will be promoted, and the project will encourage integrated pest management. The project will not provide any agro-chemicals to participants. None of the activities will generate waste, either hazardous or non-hazardous. None of the activities in the project involves high

				resource use, as energy efficiency, minimization of material resource use, and minimization of the production of wastes has been embedded into project design.
	12.1.1 Could the activity lead to a dangerous increase in release of pollutants (incl. noise) to air, land, or water during construction or as result of accidents?	Medium		
	12.1.2 Could the activity lead to a dangerous increase in release of pollutants (incl. noise) to air, land, or water during normal operation?	Medium		
	12.1.3 Will the activity lead to any open burning of plastic waste during construction or operation?	Medium		
	12.1.4 Could the activity lead to significant negative impacts on visual aesthetic values?	Medium		
	12.1.5 Could the activity lead to discharge of untreated wastewater to the environment?	High		
12.2 Could the activity lead to procurement, transport, or use of chemicals, hazardous materials, or ozone depleting substances subject to international bans?				
	12.2.1 Could the activity lead to procurement, transport, or use of chemicals or other hazardous materials, including asbestos and ozone depleting gases which will not be handled and disposed of safely by following normal Standard Operating Procedures?	Medium		
	12.2.2 Could the activity lead to procurement, transport, or use of chemicals or other hazardous materials subject to international bans?	High		
12.3 Could the activity lead to increased use of agro-chemicals?				
	12.3.1 Could the activity lead to use of agro-chemicals that potentially could be replaced or reduced by alternative environmentally friendly products or techniques?	Medium		
	12.3.2 Could the activity lead to use of pesticides or other chemicals, which could have an unintended effect on non-target species and environment?	Medium		
	12.3.3 Could the activity lead to use of WHO class 1a, 1b, or Class II pesticides without proper application of the International Code of Conduct on Pesticide Management?	High		
	12.3.4 Could the activity lead to use of pesticides, herbicides or other chemicals or materials containing or polluted by Persistent Organic Pollutants (POP's) as listed by the Stockholm Convention?	High		
12.4 Could the activity lead to very high resource use (such as fuel or water) during operation?				

	12.4.1 Could the activity lead to more than 100,000 litres per year of diesel, in vehicles and/or generators?	Medium		
	12.4.2 Could the activity lead to major use of water from unsustainable sources (bottled and transported, gradual depletion of ground- or surface-water, change of local waterways etc.)?	Medium		
12.5 Could the activity lead to generation or transport of hazardous or non-hazardous waste which could have negative environmental impacts?				
	12.5.1 Could the activity lead to significant increase in generation of waste that will not be disposed of in an environmentally friendly manner (recycled, re-used, or recovered) by WFP, beneficiaries, or third parties?	Medium		
	12.5.2 Could the activity lead to generation of hazardous waste which will not be handled and disposed of safely by following normal Standard Operating Procedures?	Medium		

13. Public Health				
13.1 Could the activity lead to increased risk to community health and safety from use of equipment, materials, transportation, or natural hazards?			NO	The project will not have any detrimental effect on public health. It is designed to be nutrition sensitive, and thus will contribute to tackling the underlying causes of malnutrition through increasing agricultural production and processing, promoting sustainable natural resource management and supporting nutritious value chains.
	13.1.1 Could activities during construction or operation phase lead to increased community risks from e.g. increased traffic, inappropriate design or use of equipment and materials which would not be handled by following normal Standard Operating Procedures?	Medium		
	13.1.2 Could the activity cause community exposure to water-born, water-based, water-related, vector-born or communicable diseases?	Medium		

14. Physical and Cultural Heritage			
14.1 Could the activity negatively affect heritage?		NO	The project will ensure that the cultural capital and traditional knowledge of the smallholder farmers will be valued and integrated into the provision of enhanced localised climate services. The project will identify secondary adaptation innovations to be integrated into the rollout of the primary innovation of index-based microinsurance, which will include resilient traditional varieties, as well as enhancing traditional agricultural approaches by integrating these with scientifically proven approaches. Sensitisation activities under Component 1 will be designed to build on cultural practices in a respectful manner. The project's learning and knowledge management activities (under Component 1)

				will document and share lessons from the integration of culture and traditional knowledge into the project activities. Consultations and engagement with stakeholders and communities during implementation will ensure that any physical cultural heritage present on project sites is identified and potential negative impacts are avoided through project design.
	14.1.1 Could the activity negatively impact any form of physical or cultural heritage?	Medium		

15. Land and Soil Conservation				
15.1 Could the activity lead to negative impacts on soils, groundwater, water bodies, water ways, coastal areas, or the sea			NO	Project activities will not pose risks to land and soil conservation, but rather will be specifically designed to address land degradation and promote sustainable land management and erosion control. Conservation agriculture and organic production activities will additionally support protection and enhancement of lands and soil fertility and soil structure. All activities are of small-scale (managed at individual, household, or community level) and any possible residual impact would be negligible and readily remediable.
	15.1.1 Could there be significant impacts on quality or quantity of surface- or ground-water?	Medium		
	15.1.2 Could the activity lead to major changes in flow regimes of local waterways, conditions of water bodies, or coastal areas?	High		
	15.1.3 Could the activity lead to increased soil erosion, run-off, or significant changes to soil characteristics?	Medium		
	15.1.4 Could the activity lead to serious soil erosion (e.g. major gullies, sheet erosion etc.) or major detriments to soil quality over a large or locally important area?	High		
15.2 Could the activity lead to negative impacts on forests, wetlands, farming or grazing land, or other landscape elements of ecological or economic importance?				
	15.2.1 Could the activity lead to degradation or fragmentation of local forest areas, wetlands, prime farming or grazing land, or other landscape elements of ecological or economic importance?	Medium		
	15.2.2 Could forests, wetlands, prime farming or grazing land, or other landscape elements of ecological or economic importance be almost fully destroyed or degraded or heavily fragmented?	High		
	15.2.3 Could the activity lead to significant increase in consumption of locally sourced fuel-wood?	Medium		

The screening was conducted at project proposal stage and based on information available at this time. Due to the unidentified sub-projects (USPs) of Component 2, some of the screening questions triggered a **"Medium risk" categorization, or ESS category B**. USPs will be further screened prior to implementation to identify potential new risks and adopt appropriate mitigation measures to be captured by relevant ESMPs for implementation, monitoring and reporting.

Indirect, transboundary and cumulative risks and impacts

In addition to the potential direct risks posed by project activities, the environmental and social risk screening process included a consideration of potential indirect, transboundary and cumulative risks and impacts that could result from the project activities. These considerations have been integrated into the risk screening set out above, and in Part II.N of the proposal. The following table provides a summary of the more overarching of the potential indirect, transboundary, and cumulative impacts and risks.

Table A7.3 Indirect, transboundary and cumulative risks and impacts

Risk category	Description	Significance	No further assessment required
Transboundary risks	No terrestrial transboundary risks have been identified as the project activities are localised and of a small-scale. The inland project activities under Component 2 will not result in any coastal or marine impacts that could lead to physical or environmental transboundary risks. Project activities under Component 1 that will lead to enhanced sensitisation on insurance, increased access to climate services, and increased knowledge on appropriate climate-resilient agricultural technologies and approaches; as well as the institutionalisation activities under Component 3, will not lead to physical or environmental transboundary risks.	**No risk; No physical or environmental** transboundary risks	X
Indirect and/or cumulative physical or environmental risks	Due to the small-scale and localised nature of the project activities, as well as the fact that all activities are designed to be positively synergistic, no indirect and/or cumulative physical or environmental risks are expected.	**No risk**	X
Cumulative economic effects	Combining financial literacy trainings with enhanced sensitisation on insurance, increased access to climate services, and increased knowledge on appropriate climate-resilient agricultural technologies, plus access to agricultural insurance bundled with savings to reduce risk, will lead to increased incomes for farmers and have a positive cumulative effect on rural economies. This will be strengthened by value chain analysis and development and enhanced market access for selected climate-resilient value chains. This will improve capacity on the participant side and strengthen and expand markets due to larger numbers of capable market participants. The strengthening of good agricultural practices and planting of climate-adapted local crops might result in positive adaptations in the market to cater to the shifted needs developed in the scope of this project.	**No risk; Positive cumulative effects**	X

3. Environmental and Social Management and Monitoring Plan

Table A7.4: Risk mitigation measures for residual risks identified and related monitoring arrangements

AF ESP principle	Risk identified	Possible impact	Level of Risk	Mitigation measures	Responsibility	Monitoring arrangements and/or indicators
Access and Equity	Potential for unequal economic benefits to a limited subset of the target group	Economic benefits from the project implementation could potentially put groups or individuals at a disadvantage and lead to disagreements and reduced social cohesion	Medium	Targeting and implementation approaches that are highly tailored to each community (no rubber stamp approach for all villages), implemented by local partners that know the context well	Project staff, implementing partners	Community planning workshops Budget already included under Component 1
				Ensure in-depth consultations with communities and stakeholders are conducted throughout project implementation to ensure that there is broad buy-in to the targeting approach and that any barriers to access and equity can be overcome in line with the AF's ESP, as well as operationalisation of the CFM	Project staff, implementing partners	No. of consultations per year Budget already included under Components 1 and 2
				Presence of a local languages' interpreter in all consultations, to facilitate consultations in the language of all community members targeted	Project staff, implementing partners	language used during consultations and documentation of the consultations through minutes. No further budget needed (district staff speak local languages)
				Locally and culturally appropriate sensitisation and financial literacy activities, as well as channels of dissemination of climate services, to be identified in all project localities	Project staff, implementing partners	Sensitisation and training modules Sensitisation activities per year Enhanced gender-responsive mechanisms for dissemination of climate services Budget already included under Component 1

Conservation of biological diversity	Potential for activity lead to introduction of invasive alien varieties or species which could influence local genetic resources	Promotion of new climate-resilient crop varieties, could potentially have adverse impacts on biodiversity, leading to a deterioration of biological diversity if species are not correctly selected (e.g. inadvertent introduction of invasive species) and diversified.		Prioritize local species and multi-species planting and provide training on organic farming and GAPs	Project staff, implementing partners, especially ARDCs and NCOA	Plant/crop varieties used in the project verified during site visits and during the monitoring of the project No further budget needed
				No introduction of invasive species or GMOs	Project staff, implementing partners, especially ARDCs	Plant/crop varieties used in the project verified during site visits and during the monitoring of the project No further budget needed
				No activity in conservation areas and/or natural reserves	Project staff, implementing partners	Project location maps No further budget needed

The National Project Manager, with the support of the EE, the Responsible Partners and WFP, will endeavour to collect and report all available annual data. This will be discussed annually with all stakeholders during the meetings of the project steering committee. The project's M&E system is set out in section III.D.

3.2 Management of the potential risks stemming from USPs under Project Component 2

As mentioned before, the project includes USPs under Component 2. The details of these USPs will be defined during the implementation of the project, on the basis of the outcomes of Component 1. The USPs under Component 2 will be designed by the communities through participatory community consultations, informed by enhanced access to climate services as well as training on climate-resilient agriculture and organic production. Once the USPs under Component 2 have been defined, they will be screened by means of the Environmental and Social Screening Tool (presented in section 2 of this Annex) to ensure that any potential unwanted impacts of these activities are anticipated, avoided, reduced, or mitigated. The screening tool classifies activities into risk categories (low, medium, high), which determine what further action is required. Potential risks, whether social or environmental, will be identified at community level.

Low Degree of Concern (Category C) corresponds to a Category C activity and indicates minimal or no adverse impacts. Small impacts can be readily avoided or mitigated by adhering to WFP's E&S standards and the Adaptation Fund Principles. No further E&S Safeguard action is required beyond the application of the guiding principles, stakeholder engagement, and stakeholder access to complaints and grievance processes.

Medium degree of concern (Category B) corresponds to a Category B activity and indicates that there is expected to be some reversible impacts of limited magnitude and which can be mitigated. The difference between a Category A and a Category B activity is the greater possibility to prevent or mitigate some or all adverse impacts. If the impacts cannot be avoided by design changes, mitigation measures must be implemented. These measures will be included in the environmental and social management and monitoring plan and reported on to the Adaptation Fund.

High degree of concern (Category A) corresponds to a Category A activity and indicates that that highly significant or irreversible adverse impacts can be expected. If the activity design is not changed to avoid or mitigate those impacts, the activity should not be implemented, as it would infringe WFP policies.

Any identified risks will be subject to monitoring and follow-up to ensure that planned mitigation measures are implemented and effective.

Annex 8 Grievance mechanism

Principles of the Grievance Mechanism

WFP has a set of minimum standards and standard operating procedures that apply to all complaints and feedback mechanisms it sets up in countries where it is working.[242] The minimum standards include, amongst others.

- involvement of the beneficiaries in the design of the mechanism;
- ensure that people understand and agree to how the complaint and/or feedback will be processed;
- ensure that the mechanism is accessible;
- ensure confidentiality and professionalism;
- ensure a referral system for protection-related complaints;
- design procedures for high priority cases (fraud, corruption, sexual exploitation and abuse).

The stakeholders in the project agreed on the following additional principles for the grievance mechanisms:

- it should allow for anonymous complaints;
- it should be accessible by illiterate beneficiaries;
- it should be accessible by beneficiaries who have no access to telephone;
- it should include different, parallel channels, to allow for complaints about different aspects of or actors involved in the project (e.g., complaints about mistargeting, negative impacts, underperformance of certain actors, fraud, etc.);
- civil society organizations should be involved in the management of complaints.

Channels of the Grievance Mechanism

Complaints and feedback can be filed through one or more of the following channels:

Toll-free phone number: WFP Bhutan has established a toll-free number. Anyone affected by or involved in the project can call this number or send an SMS to file a complaint or feedback. The complaints and feedback are handled by a call centre that records them in a logbook and transmits them to the Complaints Management Committee CMC (more info in next section). The call centre offers services in the most common languages of the country.

Suggestion/Grievance boxes: Portable, locked suggestion/grievance boxes will be placed in central locations in the communities, such as the community house or the market area, to allow communities or community members without access to phones to provide feedback or file complaints. The locked suggestions/grievances boxes will be collected and opened on agreed times. The keys will be held by different people from identified partners, local leaders

[242] WFP (2017) *Minimum Standards for Implementing a Complaints and Feedback Mechanism*, also available at: https://docs.wfp.org/api/documents/310fde2bfbfa4bc8b3ecabe44c0f0815/download/

and community members who will open them on announced dates. The beneficiaries/aggrieved will be given a chance to suggest the individuals assigned with these tasks. All received complaints and feedback will be recorded in a logbook and will be transmitted to the Complaints Management Committee for resolution.

In addition to the above, the Gups, who are the elected heads of each gewog (block), will act as "grievances recipients". They will act as **help desks** for the beneficiaries: they will provide information about the project and the selection and targeting criteria; but they will also accept and transfer complaints and feedback. This allows illiterate community members to file complaints or feedback. All received complaints and feedback will be recorded in a logbook that will be transmitted to the Complaints Management Committee. Complaints concerning protection, fraud, or sexual abuse or exploitation must be transmitted immediately to the Complaints Management Committee.

Directly with stakeholders: Community members and people affected by the project can also file complaints or feedback directly with the partners that visit the communities, such as NGOs, civil society, WFP field staff, government services, etc. The feedback and complaints received through this channel also need to be logged in the logbook and resolved based on national regulations (responsible: project secretary, partners send him/her by email or telephone the information he/she records- possibility to set up a google-drive document).

Procedures of the Grievance Mechanism

A Complaints Management Committee will be set up. It will include representatives of different stakeholders: WFP country office, executing entity, government representatives, and representatives of the different communities where appropriate. This committee will review all complaints and feedback and will forward them as follows:

- complaints and feedback about the project setup, beneficiary selection, targeting, and implementation are forwarded to the Project Technical Working Group;
- complaints about fraud or sexual abuse or exploitation are directly forwarded to the WFP Country Director; if they involve WFP staff the Country Director forwards them to the WFP Office of Inspections and Investigations;
- protection concerns (clinical, legal, psychosocial, security) are referred to external protection-mandated partners.

Sustainability of the grievance mechanism

The call centre operators, community committees and Complaints Management Committee will be trained on how to handle and process feedback and complaints. They will be recorded in a logbook with limited access to prevent tampering.

Information on the functioning of the mechanism will be widely disseminated among beneficiary communities and other communities that may be impacted by project activities. Communities will be made aware that the grievance mechanism will accept complaints also related to gender equality and women's empowerment. Project visibility materials such as sign boards and brochures will include information about the complaints mechanisms.

Key components of the grievance mechanism will remain in place after the completion of the project:

- the toll-free number is in place and will remain in place for all WFP programmes and activities in Bhutan;
- the digital version of the log book, from which personally-identifying information is deleted, will be retained for 10 years after the closure of the project;
- the data and evidence of any complaints that were escalated to HQ level for investigation by the Office of Investigation will be permanently retained.

Annex 9 Key elements to include in a ToR for the position of Project Technical Specialist

Considering the technically complex nature of the project's integrated agricultural insurance and financial services activities, the PMU will include a full-time national Project Technical Specialist (PTS). This position will be jointly recruited by the PMU and WFP with the oversight of the WFP Climate Risk Insurance team at HQ. This approach will facilitate hands-on capacity strengthening to the government entities and support timely delivery of project activities for the communities. The PTS will be a national expert assigned for the specific purpose of providing technical support to the project. The following are key elements to include in a ToR for this position:

Required experience and competencies of the PTS

- Postgraduate degree in agriculture, rural development, finance or related field
- Minimum of five (5) years of work experience in insurance, agriculture, rural development, or related field
- Specific knowledge of agricultural and climate insurance initiatives in developing countries, at both micro- and macro-level
- In-depth understanding of agricultural insurance and microinsurance and previous attempts to implement this in Bhutan
- Familiarity with the Bhutanese rural development and agricultural policy and implementation context
- Strong programme management and stakeholder management skills
- Experience of microfinance and savings systems would be an advantage
- Demonstrated field experience desirable in distribution, operations and management of risk financing solutions or microfinance, including awareness raising and training and capacity strengthening
- Experience in farmers organizations and cooperatives management and development desirable

Knowledge & Skills:

- Demonstrated ability to present information and ideas and to communicate technical content effectively to non-technical audiences;
- Ability to conduct effective meetings, listen to others and engage in dialogue;
- Demonstrated experience working in developing countries, with a special focus on risk financing solutions;
- Strong interpersonal and coordination skills, ability to work in a team and to communicate clearly and diplomatically with a wide range of stakeholders from diverse backgrounds
- Demonstrated data collection and analytical writing skills;
- Experience in establishing contacts and liaising with partner organizations;
- Ability to take initiative and work independently while in a team;
- Ability to work under pressure and stressful situations;
- Proficiency in Windows, MS Office (Word, Excel, PowerPoint, Outlook

Responsibilities of the PTS

- Provide technical backstopping, including through regular support to the Responsible Partners, on the project's integrated agricultural insurance and financial services activities;
- Together with the PM, liaise with Responsible Partners on the timely; effective, and gender-sensitive implementation of activities;
- Provide technical inputs into the recruitment of specific short-term consultants on a needs basis to carry out microinsurance-related project activities;
- Serve as primary liaison point between the PMU and the WFP Climate Risk Insurance team

Annex 10 Sustainability provisions for all concrete outputs

Outputs	Social sustainability	Environmental sustainability	Institutional sustainability	Economic sustainability	Financial sustainability
Component 1					
Output 1.1.1. Linkages facilitated with **existing climate services**	Dissemination of climate services will proceed through socially acceptable sensitisation and dissemination activities, building on local cultural practices. This, together with the increased accuracy of the climate services, is expected to promote the social sustainability.	Climate services will be delivered together with agricultural advisories. All agricultural advice will be based on an environmentally sound production approach (either organic or LEISA) and thus is expected to enhance environmental sustainability of agricultural production in the project areas.	The project will not create any new structures but will support and strengthen existing initiatives on climate services and will enhance the existing system under the NCHM and DoA. This system is a part of normal government operations and is institutionally stable.	The project will not create a new system of climate services but will enhance the existing system under the NCHM and DoA. The RGoB is committed to providing climate services on an ongoing basis at no cost to smallholder farmers and allocates sufficient budget for this. In due course, it might be possible to commercialise climate services for commercial farmers. This is not envisaged for this project.	As for economic sustainability. In addition, support to digitalised dissemination is expected to reduce the costs of dissemination while also expanding the outreach for the NCHM and DoA.
Output 1.1.2. **Sensitisation** of targeted smallholder farmers on the benefits of index-based microinsurance as part of a package to manage climate risks	The project will train ARDCs, academic/ research institutions, extension officials, and community leaders and influencers, on implementing insurance sensitisation strategy. Their participation will ensure that activities identified in the sensitisation strategy are socially and culturally appropriate. This will ensure ongoing social acceptance for the sensitisation activities, which will additionally be delivered through	The sensitisation activities will not have any environmental impact.	The training of aggregators and distribution and delivery channels on the climate risk insurance and finance product, will be designed to ensure that they are able to continue to issue the insurance and financial products without external support once the project ends, and that they will be able deliver their own training in this regard for new staff, to ensure institutional sustainability.	The sensitisation activities will have a net economic benefit, in that for a small initial investment, there will be a large ROI - for the insurance scheme as a whole, as well as at the household level for smallholder farmers, in terms of increased resilience and income from enhanced climate risk management.	While the project will initially provide the funds for the sensitisation activities, it is expected that by the end of the project, the insurance companies and/or MFIs who will distribute the product will have been able to take over funding of the sensitisation process, as this will generate business returns in the form of commission on insurance premiums, increased savings account holders, and increased credit accounts.

	harnessing cultural capital in a respectful manner. By harnessing social media and influencers, the social sustainability of the actions will be promoted.				
Output 1.1.3 Leverage ongoing **local adaptation planning** to assist smallholder farmers to plan their adaptation responses for increased resilience and income	The project will develop a supplementary gender-responsive training strategy and materials for rapid participatory local adaptation planning, building on existing initiatives. This will be designed to be socially and culturally acceptable and will be co-designed with local community leaders and representatives of marginalized groups. The planning process will be designed to be relatively rapid to reduce the demands on time-stretched rural inhabitants, while still harnessing their perspectives and assisting them in an effective way to plan their adaptation strategies in a proactive manner.	The local adaptation planning process will be designed to incorporate local environmental challenges and opportunities, as well as localized climate risks in the present and as anticipated in the future. Participants will also be assisted to select from a range of climate-resilient agricultural approaches and technologies that will reduce pressure on the environment and in some cases – for example SLM – are likely to help reverse any existing environmental degradation. Farmers who will participate in the insurance scheme will be required to commit to either organic production, or sustainable agricultural production with GAPs. Both of these approaches will enhance environmental sustainability in the project areas.	The main institutional driver for the enhanced local adaptation planning will be the District administration, the planning department, and the DoA. As the project will build on and enhance existing structures and processes for local level planning, there is a strong institutional basis for this activity. Where necessary, TA will be provided for rapid participatory local adaptation planning – in instances where gewog-level adaptation planning has not yet been conducted. The process for this will be developed by the local administrations themselves, supported by the TA, and designed to ensure a coherent approach across Bhutan to local adaptation planning.	Effective, participatory local adaptation planning will assist farmers to enhance the resilience of their livelihoods and increase their incomes from farming by selecting appropriate adaptation actions and implementing these in a participatory fashion. This will generate economic returns for farmers, which will be tracked and reported on by the project.	The existing local adaptation planning process will be enhanced through small financial inputs from the project, which are expected to result in more efficient and effective local planning processes that will be continued by the district administrations. In order to scale this approach up beyond the project, the results of the planning process will be tracked and advocacy will be provided at the national and sub-national levels to motivate for the regular government budgeting for a coherent process across Bhutan.
Output 1.2.1. Consolidate existing **climate-resilient agricultural support** and develop and implement	By enhancing existing initiatives to train extension staff on a recurring basis to develop	The training activities on climate-resilient agricultural approaches and technologies will not	Existing climate-resilient agricultural support in the project districts, delivered through the existing	The project will enhance existing initiatives to train extension staff on a recurring basis to develop	In some cases, once farmers have received the training for specific technologies, they will be

recurring training strategy to fill identified gaps	practical skills on climate-resilient agriculture to increase farmers income, extension officials are likely to have increased respect and develop more social capital in the project areas. The activities to further empower lead farmers and youth agricultural entrepreneurs to be climate advocates for increasing farmers' income through risk layering (under output 1.2.2) will assist with the social acceptability and thus social sustainability of the training activities for enhanced climate-resilient production.	have any environmental impact. On the contrary, these approaches, that will incorporate SLM, soil fertility management, conservation agriculture, organic production, GAPs, and enhanced water availability through for example household rainwater harvesting, will enhance environmental sustainability in the project areas.	system of DoA that involves the ARDCs and district and gewog-level extension services will be consolidated and a localised strategy developed for each district for enhanced technical support. This will bring together existing extension plans and capacity development initiatives and other TA programmes that exist in the dzonghags. Thus the project, by adding value to the existing system and helping it to function better, is likely to enhance the institutional sustainability of the agricultural extension services.	practical skills on climate-resilient agriculture to increase farmers income. Implementation of this enhanced extension strategy, in terms of climate resilience as well as low-cost methods that have demonstrated a return of increased income for farmers when implemented. This is expected to generate economic returns for farmers. In time, enhancing the extension services as well as the farmers income may mean that some extension services could be provided on a cost sharing basis. However, this is not an immediate priority for the RGoB.	able to continue with these without the necessity for further external financial support – for example, through the implementation of conservation agriculture and through preparation of effective homemade fertilisers. Nevertheless, ongoing training to farmers will be provided by the agricultural extension officers at gewog levels – this will be part of their normal, budgeted functions, and no further financial inputs will be required.
Output 1.2.2. Identify and **empower climate champions** for effective peer-to-peer learning to increase resilience and income	When identifying and empowering climate champions, the project will build on the successful CARLEP approach for lead farmers, which has demonstrated social sustainability under CARLEP. The project will additionally factor in the key characteristics identified for progressive farmers by the CNR PEER study, and will include youth entrepreneurs to maximise social	The process to identify and empower climate champions will not have any environmental impact, but rather is likely to promote the dissemination and uptake of environmentally sustainable farming methods.	The project will select individuals who have already participated in the project's sensitisation activities under output 1.1.2 and some of the trainings on climate-resilient agricultural technologies under output 1.2.1 and further empower them to serve as advocates for uptake and scaling out of the prioritised innovation of index insurance, as well as the integrated resilience building approach through which the insurance will be	The lead farmers who will be selected will demonstrate the economic sustainability of their climate-resilient farming methods to the broader population in the gewog. Youth agricultural entrepreneurs will also be selected based on the potentially economically sustainable basis of their ventures.	There will be an initial small financial cost in the form of incentives provided for climate champions – this could be access to some specialised training, and/or provision of some additional tools or inputs to those provided to the farmers in general through the TA packages that will accompany their commitment to organic or LEISA agriculture as conditionality for receiving insurance premium support. These inputs will not be required on a long-

	acceptance for the younger rural population.		delivered. No new institutions will be created and it is expected that if the right (committed) individuals are selected, they would continue to serve as climate champions going forward.		term basis as climate champions in this case will be those most likely to be able to sustain successful enterprises. Advocacy messages will be developed based on evidence generated of these successful enterprises and shared to encourage budget allocation by the RGoB for scaling out of this approach beyond the project areas.
Output 1.2.3 Develop and implement **learning, knowledge management and communication strategy** and feedback loop for learning from activities on the ground	The L, KM&C activities will support dialogues on 'innovation to increase climate resilience' between research organisations and climate-vulnerable communities to engender action as well as a sense of hopefulness in rural areas with empty households and high youth unemployment, supported by specialised services provided by research institutions such as the College of Natural Resources (CNR). These forums for sharing within and between the project districts, to promote farmer-to-farmer learning, farmer/researcher/ extensionist learning, and cross-district learning involving all these stakeholder groups, as well as the agricultural system at different levels,	Implementation of the learning, knowledge management and communication strategy will not have any adverse environmental impacts. Rather, the project's environmentally sustainable approaches will be shared through the L,KM&C activities.	The L,KM&C activities will support dialogues on 'innovation to increase climate resilience' between research organisations and climate-vulnerable communities; this is an area in which the ARDCs and other research institutions such as the CNR are already active. The dialogues will be developed in a way to allow for institutionalization by the ARDCs going forward.	The L,KM&C activities will be essential in generating evidence of the effectiveness and economic return of the project's activities. Knowledge products developed will be shared and used in advocacy, including under Component 3's activities to develop the roadmap for a sustainable insurance ecosystem in the country, as well as a multi-level approach to climate risk management that supports the economic soundness of the insurance scheme.	The L,KM&C activities will require a small percentage of the project's budget that will be essential in generating evidence of the effectiveness and economic return of the project's activities, as well as the need to develop a clear roadmap to deepen the financial sustainability of the insurance scheme. The project will encourage discussions with the DoA to provide ongoing programmatic budget for such activities, building on evidence generated by CARLEP as well as the proposed project.

	can be expected to promote the generation of social capital as experiences are shared and bonds created between groups.				
Component 2					
Output 2.1.1. **Risk transfer mechanism** for smallholder farmers implemented and scaled up	The minimum viable insurance product (MVP) roll-out will include insurance companies, distribution and delivery channels, aggregators, local governments, farmers' groups, and individual farmers, working together through various rounds of sensitisation, capacity strengthening, implementation, and annual review. This extensive and participatory process is designed to enhance social understanding and build trust amongst the different stakeholders, which is expected to lead to an affordable, culturally respectful, and socially sustainable product. The annual M&E and insurance review process will alert the PMU and TWG to any issues mitigating against social sustainability, which will be addressed through adaptive management.	No environmental impacts are expected from the insurance scheme. Rather, premium support will be used as a conditionality to encourage the adoption of environmentally sound and climate-resilient agricultural production through the two main approaches of organic or LEISA, with additional secondary innovations that encompass environmentally sound technologies – as set out in detail in the narrative under outcome 1.2 and Component 2.	Institutional roles and responsibilities of the insurance scheme will be clearly spelled out in agreements with the different members of the insurance ecosystem at the start of the project. All institutions are existing viable institutions, no new institutions will be created. The project will assist the regulatory authority to develop the enabling environment to enhance the functioning of the insurance scheme, so that institutional sustainability is achieved. The agreement between WFP and the insurer will ensure that a member of the insurance company's management team and a Programme Manager will be assigned to the project and a cross-functional support team will be available to support product design input, rollout and capacity development. Implementation arrangements are	The design of the insurance scheme is predicated upon the need to ensure that it is economically and financially sustainable. Thus, it has been designed to start with a MVP, with modular add-ons as farmers increase their income and the insurers and distribution system become more agile. The SMART subsidy scheme described in detail under Component 2 and above assists farmers to gradually take over payment of their own premiums. Supportive climate services, sensitisation, proactive adaptation planning, enhanced climate-resilient agricultural technologies, value chain and marketing linkages, are layered with insurance to ensure farmers can increase their incomes and develop more economically viable business. The roadmap discussed under Component 3 will promote	As for economic sustainability.

			specified in the part III of this FP.	the additional climate risk layering for Bhutan that will further assure economic and financial sustainability of the scheme. The ROI of the scheme and integrated activities will be tracked and used to advocate for any additional support needed.	
Output 2.1.2. Farmers have increased access to **business development support and microfinance**	Business development support and microfinance is not expected to have any negative social impacts. The project will only facilitate access to credit that is socially and culturally acceptable – this will be a specific criterion for support to lending institutions.	Business development support and microfinance is not expected to have any negative environmental impacts. The project will only facilitate access to credit that is environmentally sound – this will be a specific criterion for support to lending institutions.	The project will not create any new institutions in this regard, but will enhance the activities of established institutions such as the MFIs and banks who provide such services in Bhutan. The project will provide support so that these institutions can increase their offerings and enhance their business models, to strengthen institutional sustainability.	By providing support so that the relevant institutions – MFIs and banks – can increase their offerings and enhance their business models, the project will help the institutions to strengthen their economic sustainability. The actions will specifically assist farmers to increase their access to credit and run their farming businesses more effectively, with the end result of greater economic sustainability.	By providing support so that MFIs and banks – can increase their offerings and enhance their business models, the project will help the institutions to strengthen their financial sustainability before the end of the project. The project will advocate to these institutions to continue providing access to credit and business development support for smallholder farmers after project completion, highlighting the clear financial returns for these institutions if farmers can run better businesses and generate more income.
Output 2.1.3 Linkages facilitated to enhance diversified livelihoods through **value chain and marketing support for climate-resilient value chains**	Social sustainability of the value chain and marketing support for climate-resilient value chains will be promoted through working with farmer groups and youth groups that have already been established by the DoA	Only environmentally sound and climate-resilient value chains will be selected for marketing support. Thus this activity will be designed to promote environmental sustainability.	The project will support climate-resilient value chains for which there is already some demonstrated interest and demand on the part of key institutions, such as aggregators and buyers in the export market. The	The climate-resilient value chains will be selected based on their ability to generate increased economic returns for smallholder farmers and other members of the value chain. Only high value crops for which	The small financial input required to enhance existing or support new climate-resilient value chains will supplement regular budgetary allocations for this kind of work provided by the RGoB. As the value

	for value chain development. Where any small processing machinery is provided to groups, for example milling machines, maintenance plans will be developed in a participatory fashion and ongoing guidance provided to implement these.		DoA and the DAMC are playing an existing role in this regard. Thus no new institutions will be formed, and the project will contribute to the efficient and effective functioning of existing institutions, to promote their sustainability.	there is a demonstrated market and capability for environmentally sound increased production will be selected.	chains grow and become self-sustaining, no further external inputs will be required in the project area.
Component 3					
Output 3.1.1. Support stakeholders and develop enabling environment to institutionalise innovative climate risk management	These institutionalization activities are crucial for the long-term social sustainability of the integrated approach to resilience building.	These institutionalization activities are crucial to ensure the environmentally sustainable nature of the integrated approach to resilience building and climate risk transfer becomes an integral part of the programmes of the RGoB.	These institutionalization activities are by definition the modalities for the long-term institutional sustainability of the integrated approach to resilience building. When policy makers understand the need for an integrated and multi-level approach to climate risk management and are supported to develop and implement a clear and evidence-based roadmap, institutional sustainability can be assured.	By promoting the institutionalization of the insurance scheme and integrated climate risk management approach of the project, which as explained above will promote economic sustainability, this overarching goal can be assured for similar activities beyond the scope of the project.	By promoting the institutionalization of the insurance scheme and integrated climate risk management approach of the project, which as explained above will promote financial sustainability, this overarching goal can be assured for similar activities beyond the scope of the project.

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Department of Macro-fiscal and Development Finance
Ministry of Finance
Royal Government of Bhutan

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MoF/DMDF/AF_DA/2023-2024/704 28/09/2023

Mr. Mikko Ollikainen,
Manager of the Adaptation Fund Secretariat,
1818 H Street NW,
Washington DC 20433; USA.

Subject: Letter of Endorsement for the Project: "Innovative Adaptation Financing to build the Resilience and Adaptative Capacity of Small Holder Farmers in Bhutan (InAF-Bhutan)

Dear Mr. Ollikainen,

Department of Macro-fiscal and Development Finance (DMDF) in its capacity as the Designated Authority of Bhutan to the Adaptation Fund Secretariat conveys compliments and appreciations towards the support offered by the AF to realize national climate actions, by helping Bhutan to mobilize investments towards climate change priorities of the country.

In my capacity as the National Focal Point of the Designated Authority to the AF from Bhutan; I confirm that the above project proposal is in accordance with the national priorities in implementation of adaptive mechanisms to reduce the adverse impacts of and risks, posed by climate change in Bhutan. The proposal is submitted for the technical review, prior to the upcoming board in March 2024.

Accordingly, I am pleased to fully endorse the above project to access the Large Innovation Grant from the AF. If approved, the project will be implemented by WFP Country Office as MIE and executed by the Department of Agriculture, Ministry of Agriculture and Livestock.

Thanking You,

Yours sincerely,

(Thinlay Yandon)
Officiating Director
AF Designated Authority

Copy:
1. Secretary, MoAL for kind information;
2. Representative and Country Director, WFP CO for kind information;
3. Director, DoA for kind information and
4. National Focal Points to the Rio Convention.

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. **Record of endorsement on behalf of the government**[1] *Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project / programme. Add more lines as necessary. The endorsement letters should be attached as an annex to the project/programme proposal. Please attach the endorsement letters with this template add as many participating governments if a regional project/programme*

Ms. Thinlay Yandon *National Designated Authority and/or* *Officiating Director* *Department of Macro-fiscal and* *Development Finance* *Ministry of Finance*	Date: 27/09/2023
Mr. Thinley Namgyel Secretary Ministry of Agriculture and Livestock	Date: 28/9/23

B. **Implementing Entity certification**

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (draft 13th Five Year Plan guidelines, National Climate Change Policy, National Adaptation Plan) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Carrie Morrison *Representative and Country Director* *WFP Bhutan Country Office* Implementing Entity Coordinator	WFP World Food Programme Carrie Morrison Representative and Country Director World Food Programme Thimphu: Bhutan
Date:	Tel. and email:+975-2322424 carrie.morrison@wfp.org
Project Contact Person: Mr. Binai Lama, Programme Policy Officer, WFP Bhutan	
Tel. And Email: +975-2322424 binai.lama@wfp.org	

[1] Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities