



## ADAPTATION FUND

# PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

## PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category:	Regular
Country:	Viet Nam
Title of Project/Programme:	<b>Building resilience and improving response to drought and flood in the North Central region of Viet Nam to reduce the impacts of climate change: Inclusive Integrated Management of Drought and Flood</b>
Type of Implementing Entity:	Multilateral Implementing Entity
Implementing Entity:	Food and Agriculture Organization of United
Executing Entity/ies:	Ministry of Natural Resources and Environment
Amount of Financing Requested:	3 580 000 (in U.S Dollars Equivalent)

## Project / Programme Background and Context:

### General context

1. Viet Nam is a low-lying and densely populated country in Southeast Asia, considered one of the most exposed to the impacts of climate change globally. The country has a land area of about 331 212 km<sup>2</sup> and a population of 96 462 106 in 2019. Despite the economic growth between 2002 and 2018 that lifted 45 million people out of poverty, poverty in rural areas is still roughly three times higher than in urban areas (IFAD, 2012; World Bank, 2020)<sup>12</sup>. The rate of household poverty according to the multi-dimensional poverty standards was estimated at 5.7% in 2019. This was 1.2 percent lower than in 2018. The poverty rate shows, however, regional disparity. Urban areas account for 1.2 percent, while rural areas for 8 percent in the same period. Amongst regions, the Northern midlands and mountain areas record the highest rate of household poverty at 16.4%<sup>3</sup>. The Southeast and the Red River Delta regions account for the lowest rates of poverty, at 3.5 and 8.1 percent respectively, while Northeast, Central Highlands and North Central Coast have multiple times higher poverty rates (IFAD, 2011)<sup>4</sup>. Amongst the factors hampering a balanced poverty

<sup>1</sup> IFAD. 2012. Country Programme Evaluation.

<sup>2</sup> World Bank. 2020. Viet Nam Overview.

<sup>3</sup> General Statistics Office of Vietnam. 2019. Statistical Year Book of Vietnam.

<sup>4</sup> IFAD, 2011. Environmental and Climate Change Assessment. Prepared for IFAD's Country Strategic Opportunities Programme 2012-2017 – Viet Nam.

reduction across the country, there are natural disasters, weather shocks, heavy dependency on subsistence agriculture and access to natural resources (World Bank, 2012)<sup>5</sup>.

### **Viet Nam's agriculture and water resource sectors**

2. Almost 40 percent of the total area of Vietnam is agricultural land (FAOSTAT). Production systems are distinguished by agro-ecological zones. Thanks to a steady increase of a 4 percent average annual growth (FAO, 2015)<sup>6</sup>, agriculture substantially contributes to the positive national trade balance, accounting for 16.6 percent of the annual export. Viet Nam is a major exporter of rice, coffee, rubber and cashew kernels. Further agriculture expansion is, however, severely limited by the availability of natural resources, and competing demands for water resources, in particular, are increasing. According to the current development pathways, water stress appears to be the major environmental, social and economic threat, eventually the obstacle to a sustainable development.
3. Agriculture is the largest employer in Viet Nam, providing direct employment for 47 percent of the population (FAO, 2014)<sup>7</sup>. The majority of smallholders, producing on less than average 0.4 hectare, sell their product in local market and through informal channels (FAO, 2018)<sup>8</sup>, while other than smallholders cultivate an average 2.5-hectare land. Smallholders, who generate 56 percent from on-farm activities and 38 percent of their income from crop production, represent the majority of households living under the poverty line. Poverty rate exceeds 59 percent in small farms and 58 percent in others. Although women take equal share in production (51 percent of the labour force), they are underrepresented in farm ownership, as control over production assets are dominated by men.
4. Agriculture shares the 95 percent of total water withdrawal, equivalent to 77 751 million m<sup>3</sup> per year (FAO, 2011)<sup>9</sup>. Irrigated areas are highly concentrated, as two-thirds of the irrigation schemes operate in the two deltas and are originally designed for rice production (World Bank, 2016)<sup>10</sup>. The country has more than 6 000 irrigation reservoirs, 238 hydropower reservoirs, over 200 000 km irrigation canal and 5 500 large drains. Most of the water infrastructure were built between 1960 and 1980, and the initial design disregarded many sustainability-related aspects. The most negative consequences are low climate change resilience, large investment costs, neglected operation and maintenance, fragmented management, and single-serving design for rice production. Water availability is an increasingly constraining factor, and as 60 percent of the water sources originate from transboundary countries, the country is dependent on neighboring countries.
5. Groundwater development has high potential in Viet Nam. Since drinking water is supplied by groundwater, monitoring resources to preserve their quantity and quality is of strategic importance, particularly in rural areas. Community-managed facilities however, are neither well-maintained nor sustainably financed and, although the access to improved water in rural areas has grown rapidly, around 33-48 percent of the piped water schemes currently are out of function or poorly operated (World Bank, 2017)<sup>11</sup>. Contamination and over-exploitation of groundwater is a double-edged sword that adversely affect both the environment and human health.
6. The necessary building block of water resource development is the regular and updated water monitoring, and a more rigorous and integrated monitoring is required to enable policymakers in

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<sup>5</sup> World Bank, 2012. Well Begun, Not Yet Done: Vietnam's Remarkable Progress on Poverty Reduction and the Emerging Challenges.

<sup>6</sup> FAO. 2015. The economic lives of smallholder farmers. An analysis based on household data from nine countries

<sup>7</sup> FAO. 2014. Evidence and Knowledge Gaps on Climate-Smart Agriculture in Vietnam. A review on the potential of agroforestry and sustainable land management in the Northern Mountainous Region.

<sup>8</sup> FAO. 2018. Small family farming in Viet Nam – a country specific outlook

<sup>9</sup> FAO, 2011. AQUASTAT Country Profile – Viet Nam

<sup>10</sup> World Bank, 2016. Transforming Vietnamese Agriculture: Gaining More from Less

<sup>11</sup> World Bank, 2017. Vietnam: toward a safe, clean, and resilient water system

planning and to improve communities' preparedness. The assessment of services and hydrometeorological information identified those sectors related to user needs to support preparedness and the synthesis is compiled in the context of the current project (ISDR, World Bank, WMO, UNISDR, NHMS, GFDDR, 2013)<sup>12</sup>:

- a) Agriculture and food production: improved forecast and clear interpretation, information on climate change scenarios, data sharing.
- b) Water management: risk assessment analysis, real-time hydrological data and forecasts, rainfall estimates, flood forecasting, water quality monitoring.
- c) Disaster risk reduction: monitoring of water levels, site-specific forecasts, real time weather and hydrology data, improved drought and flood forecast, vulnerability assessment, hazard mapping and public awareness.
- d) Climate change: (1) structural measures; (2) non-structural solutions.

### Climate change trends in Viet Nam

7. Viet Nam has both a tropical and a temperate climate zone. In northern regions, temperature ranges between 22-27.5 °C in summer and 15-20 °C in winter, while in southern areas between 28-29 °C in summer and 26-27 °C in winter (World Bank, 2020). Over the past 50 years (1958-2007), the annual average temperature increased by about 0.5 °C to 0.7 °C. According to the climate projections applying multiple General Circulation Models (GCM), the projected anomaly shows significant increase of average daily maximum, daily and daily minimum temperature in worst case scenario, predicting 1.8 °C median increase in 2040-2059, and 3.7 °C in 2080-2099 (World Bank, 2020)<sup>13</sup>. The largest increase is expected in Northern areas, Red River Delta and North Central Coast.
8. Average precipitation trends show opposite directions amongst the regions. Over the 50 years, both negative and positive trends are observed. In northern climate zones, a decrease in annual rainfall is recorded, unlike in southern zones, where an increase is registered. In the overall, rainfall is expected to decrease in dry season and increase in wet season.

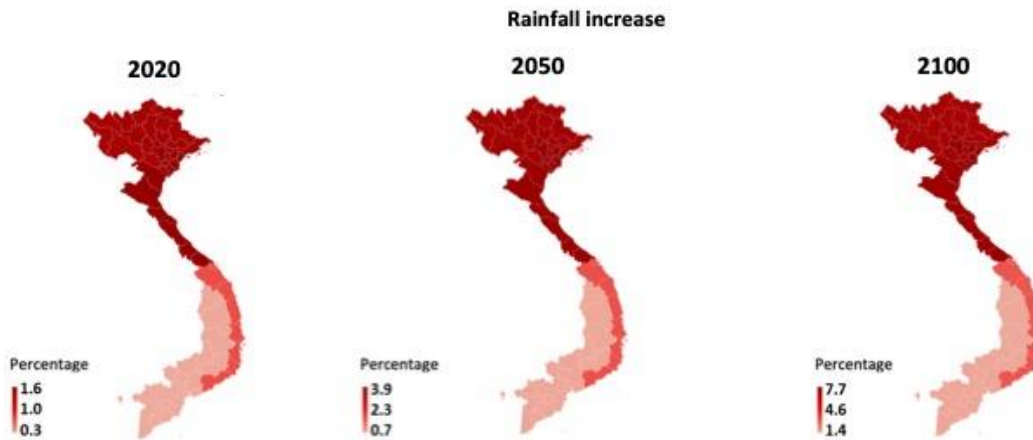


Figure 1: Increase in rainfall amongst regions in 2020, 2050, 2100 (source: Climatic Research Unit of University of East Anglia)

9. According to the National Communication to the UNFCCC, climate change has an impact on multiple sectors:

<sup>12</sup> ISDR, World Bank, WMO, UNISDR, NHMS, GFDDR, 2013. Country assessment report for Viet Nam. Strengthening of Hydrometeorological Services in Southeast Asia

<sup>13</sup> World Bank. 2020. Viet Nam Overview

- a) Water resources: under different IPCC RCP scenarios, annual flows of major river basins are expected to increase. In different rivers basins, changes are predicted with both negative and positive signs in dry and wet seasons respectively. Decrease in average flows is projected in dry seasons. Groundwater is also expected to decrease due to the climate change impacts.
- b) Agriculture: Rising temperatures are expected to cause yield losses and declines in livestock production. Based on IPCC scenarios, temperature increase can cause 1-3 percent yield loss and 1-4 percent livestock productivity loss in 2046-2065. Change in rainfall has an even more dramatic impact, as crop yield can decrease by 10 percent according to both RCP4.5 and RCP8.5 scenarios in 2046-2065.
- c) Community health: different studies correlate the rise of average temperature to hospitalization rate. Sea level rise, high temperature, change in rainfall pattern increase the probability of epidemics outbreak and spread. Furthermore, the climate change indirect impact on food security puts an additional burden on public health in areas hit by poverty.
- d) Gender equality: climate change impacts are even more devastating for women, particularly in rural areas, where most women are engaged in agriculture production and supply chain. The described negative impact on community health, coupled with lack of water for household use in drought periods spills over the women communities.

### National climate change vulnerability and assessment

10. Ranked into the second quartile of 191 countries assessed by EU-INFORM Risk index, Viet Nam is severely vulnerable to climate change and particularly exposed to climate hazards. The country is hit by multiple disaster, mainly flood, tropical cyclones, drought and extreme heat. Regarding the flood risk, the country is ranked 1<sup>st</sup> globally.

**Table 1: Summary of natural hazards per affected population and value of total damage between 1900 and 2018<sup>14</sup>**

Disaster	Total affected population	Total damage in thousand USD
Drought	7 860 000	7 399 120
Flood	32 914 368	4 322 162
Landslide	39 074	2 300
Storm	53 496 361	10 122 810

11. By 2050, a 1–3 percent loss in real GDP is predicted from climate change impacts. Natural disasters have caused average annual economic losses estimated at 1–1.5 percent of GDP in the last two decades, and more than 70 percent of the population is already exposed to significant natural hazard risks.
12. Results of the Viet Nam Household Living Standard Survey (VHLSS), periodically conducted between 2002-2008 clearly underlined that rural households are more likely to be exposed to weather shocks.

**Table 2: Households experiencing natural disasters, percent<sup>15</sup>**

	Drought	Flood, storm	Land-slide	Other extreme weather	Poverty rate, 2006
National	6.7	12.9	0.7	15.2	-
Rural	8.6	15.5	0.9	19.4	18.7
Urban	1.8	6.3	0.1	4.3	3.3
Red River Delta	2.6	10.3	0.4	28.6	8.8

<sup>14</sup> Emergency Events Database of the Centre for Research on the Epidemiology of Disasters, crossref. in World Bank, 2020

<sup>15</sup> Social and Environmental Statistics Department. 2008. Viet Nam Household Living Standard Survey 2008

East Northern Mountains	9.4	7	1.7	23	30.2
West Northern Mountains	8.1	14.3	1.3	22.6	30.2
<b>North Central Coast</b>	<b>15.8</b>	<b>29.3</b>	<b>1.1</b>	<b>30.3</b>	<b>29.1</b>
South Central Coast	7.3	25.9	0.4	7.4	12.6
Central Highlands	19.2	10.9	0.4	4.9	28.6
Southeast	2.9	5.1	0.3	1.3	5.8
Mekong River Delta	3.5	10.2	0.5	1.4	10.3
Poor	14.2	18.9	1.2	22.9	-
Non-poor	5.6	12.2	0.6	14.1	-

13. In the overall report, the distribution of households reporting natural disasters shows geographical imbalances. Droughts are more frequent in North Central Coast and Central Highlands, while households in North Central Coast and South Central Coast have the highest rate of floods and storms. Almost one third of the households experience other forms of extreme weather in North Central Coast and Red River Delta. The same regions characterized by the highest aggregate rate of natural disasters experience also the highest poverty rate, in particular, the North Central Coast. Natural disasters, as primary risk factors of poverty, can result significant setback for the achieved progress in poverty reduction and inequality. Climate change further exacerbates the exposure to natural disaster, which in turn spurs spillover effects on livelihood.

14. According to MONRE analysis (2018), agriculture absorbs most of the losses caused by natural hazards. Poor farmers, mountainous communities, children and women are mostly affected. The vulnerability assessment indicates that the Central-North region is subject to all climate-induced disasters, namely temperature increase, sea level rise, flood, storm, tropical low pressure and droughts. Agriculture and food security, and water resources are indicated as the most vulnerable sectors.

### General overview of target area

15. With a population of 3 337 207 in 2019 (Nghe An Statistics Office, 2019)<sup>16</sup>, the majority of the inhabitants (around 2 846 000) of Nghe An province live in rural areas. The exposure to climate change entails considerable social impacts due to the following main reasons: 1.) 29 percent of the population lives under the poverty line, 2.) highest national migration rate out of experienced labor, 3.) large share of population lives from rainfed agriculture.



Figure 2: Nghe An province and targeted districts

16. Nghe An province is located within the tropical monsoon belt. The province is divided into seven watersheds with a total length of 9 828 km. Ca watershed covers an area of 506 010 hectares, 405

<sup>16</sup> Statistics Office of Nghe An. 2020.

642 of which are located in Nghe An province. The Ca River is the major source of water use and the basis of the economic development. The river basin reportedly suffers from multiple disasters including storms, flash floods, cyclones, drought, tropical low pressure, heat waves landslides, river bank erosion. The total monetary losses by natural disasters amounted over 3 300 billion VND<sup>17</sup> from 1990 to 2010 (World Bank, 2019)<sup>18</sup>.

17. The region is topographically divided into four major zones: coastal plain areas, suburban areas, hilly areas and mountainous area, with extremely diverse cropping patterns. In Nghe An, arable land occupies the 24 percent of the total area whereby rice, maize and vegetables are mainly produced. Both lowland and upland rice are cultivated in the province with larger density in the southern district. The main lowland rice producer areas are surrounded by maize producing districts, similarly to the southern lands of the province. The rest of the crops are concentrated in different districts. Amongst the current production constrains, land consolidation, lack of mechanization, high input prices and market disturbances are the most frequent.
18. The project target area covers Con Cuong and Thanh Chuong districts in Nghe An province in Central North region. The two districts share the same water source of Ca River. As hydrologically contiguous areas, they experience the same level of exposure to climate change impacts. Both districts are hit by flood, drought and temporal water scarcity. The detrimental landscape change in Con Cuong has now a devastating side effect both on the district and the downstream Thanh Chuong. Flood events have become more frequent on one side. On the other side, the water retention capacity of the areas has significantly decreased, thus leading to severe water scarcity and drought events in both areas. In order to adapt the climate change impacts, water resources must be managed in an integrated manner and also consider the upstream-downstream continuum.
19. The two districts account for high poverty rate and experience migration of labour force. COVID-19 further aggravated the situation, as many households relied on remittances. The drastic cut of remittance inflow plunges those families directly into poverty (*detailed in the section H – consultation process*). The population has extremely low resilience to absorb climate-change related damages. Thanh Chuong is typically a maize and tea producing area. While maize is presumably produced for fodder, tea production represents 6-8 million USD annual export value in Nghe An, out of which more than 50 percent is generated in Thanh Chuong. Con Cuong is a mountainous area with lower agricultural potential and covered by mainly forest. In the limited agricultural area, maize, tea and cassava are the most typical crops. Due to their reliance on agriculture, drought occurrence directly impacts the household food security and turns farming into loss.

### **Climate change impacts in the target area**

20. The Nghe An province belongs to the Ca watershed, regularly prone to flood on the major river tributaries, thus, exacerbating the magnitude of flood impacts on livelihood, productive assets and natural resources. Flooding in the province can begin as early as August but occurs most frequently in September, October and November. Major drivers of flooding in the region are tropical cyclones, cold air mass incursions, and active inter-tropical convergence zone.
21. Compounded with changes in the frequency and intensity of flood events, heat waves are becoming more frequent in the province, lasting up to 14 days, concurrent with drought conditions. Together, extreme heat and hot winds accelerate the evaporation, eventually leading to hydrological and agricultural drought. Historical trends mean surface air temperature show a continuous increase over the historical 50-year period with significant interannual variability. Future productions from the

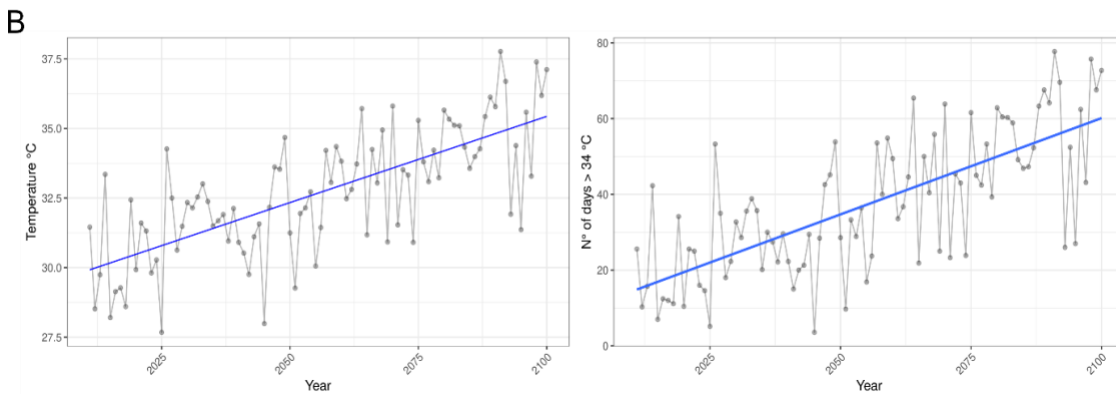
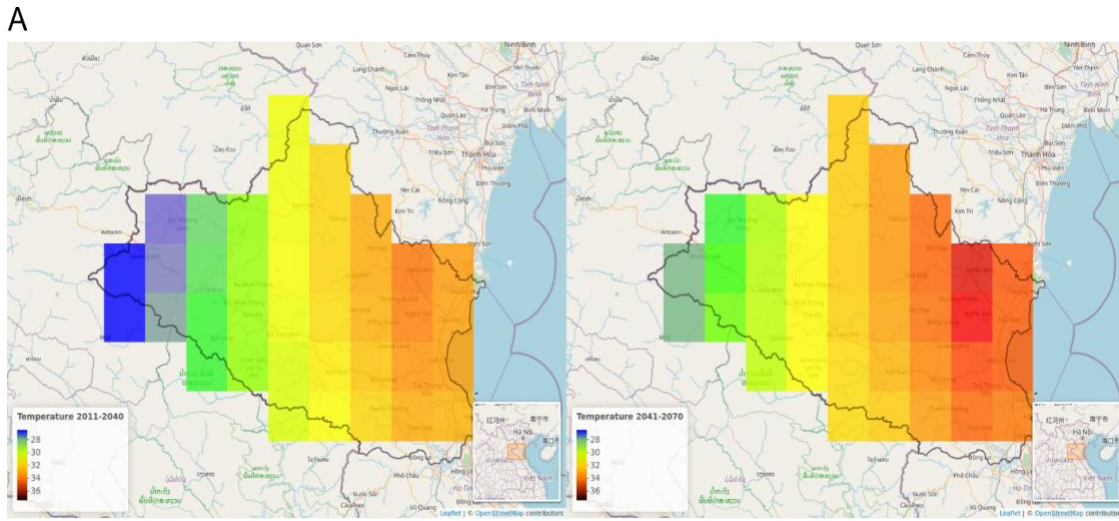
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<sup>17</sup> Equivalent to 142 688 040 USD on the actual exchange rate – December 2020

<sup>18</sup> World Bank. 2019. Climate Risk Country Profile. Vietnam.



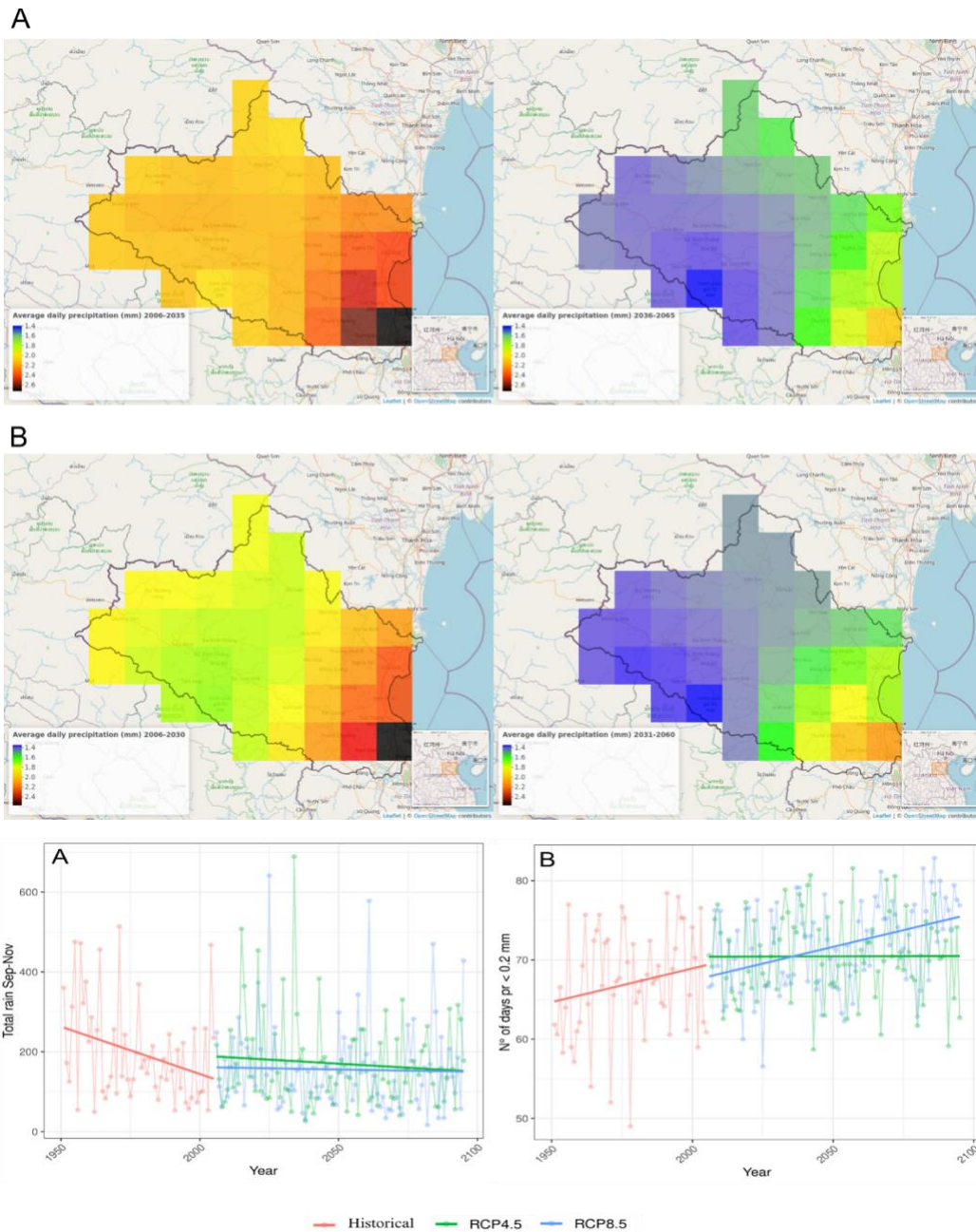
Coordinated Regional Downscaling Experiment (CORDEX) show a continuation of this rising trend until 2050 and beyond, with rates relatively higher in summer than in winter.



**Figure 3: Future projections of daily average temperature (RCP8.5) in summer (June-Aug) (A). Temperature trends of average Temperature (°C) and number of days >34°C for Nghe An Province (B)**

22. Historical precipitation trends (Figure 4) show a slight decreasing trend with large interannual variability. Future projections of average rainfall show a moderate decrease in daily average precipitation values for Nghe An Province. A more detailed analysis, tailored for Nghe An Province, reveals that while total precipitation between September and November (flooding period) will not significantly decrease in the future, there is a large interannual variability and the number of dry days will follow a positive trend. Overall, this indicates a higher risk of both drought and flooding due to increase variability and extended dry periods followed by intense rain<sup>19</sup>.

<sup>19</sup> Institute of Meteorology, Hydrology and Environment



**Figure 4: Future projections of average daily precipitation (mm) in the wet season (Sep-Nov) under (A) RCP4.5 and (B) RCP8.5. Historical (red) and future RCP4.5 (green) and RCP8.5 (blue) projections of total precipitation (mm) in the wet season (Sep-Nov) (A) and**

23. Temperature increase and consequential drought events are further exacerbated by hydrological droughts and the poor adaptive capacity of current infrastructure. The changing flow regime of Ca river is already evident. The lowest flow corresponds to the driest periods (February, March and April), supplying only 7 percent of the total annual flow (Giang et al, 2014)<sup>20</sup>. The average annual flow variation is large, ranging from 2.67 m<sup>3</sup>/s to 9 140 m<sup>3</sup>/s in Upper Ca Watershed. This intra-annual variation poses great challenge to the provincial water network. Based on discharge records of Yen Thuong station, the discharge change is simulated by Giang et al. following the IPCC emission scenarios (B1, B2 and A1). Unsurprisingly, the simulated changes propose even higher seasonal discharge variation in the upper watershed (Yen Thuong hydrological station). The predicted

<sup>20</sup> Giang, Toshiki, Sakata, Kunikane and Vinh. 2014. Modelling climate change impacts on the seasonality of water resources in the Upper Ca River Watershed in Southeast Asia.



discharge is expected to increase in wet season and decrease in dry season. According to the study, the expected increase in wet season is 6 percent (B1), 7.5 percent (B2) and 9.7 percent (A1) by 2090. The expected decrease in dry season is 5.1 percent (B1), 6.2 percent (B2) and 7.6 percent (A1) by 2090.

24. The water network supplies water for agriculture, forestry and domestic use. Only 122 415 hectares are equipped for irrigation, relying on surface water. However, the water regime has lately been affected by the impacts of climate change and weather anomalies, particularly in the dry season. Due to its high-water demand, rice is the most affected crop. Considering the national food security plans, rice production must be secured to the most extent to ensure both domestic and export market stability.
25. The current infrastructure, designed according to seasonal flows, is not prepared to accommodate the decreased level flow, thus disturbing the water diversion. The extended dry periods affect not only the water use relying on surface water, but indirectly the groundwater resources. Access to clean water is still poor and many of the poor households cannot afford the use of wells. Uneven distribution of water in dry seasons, coupled with the climate change induced deviation in flow level leads to conflict over water resources (Phuong, Skielboe and Huong, 2011)<sup>21</sup>, further aggravated by the low involvement of communities into water management-related issues.

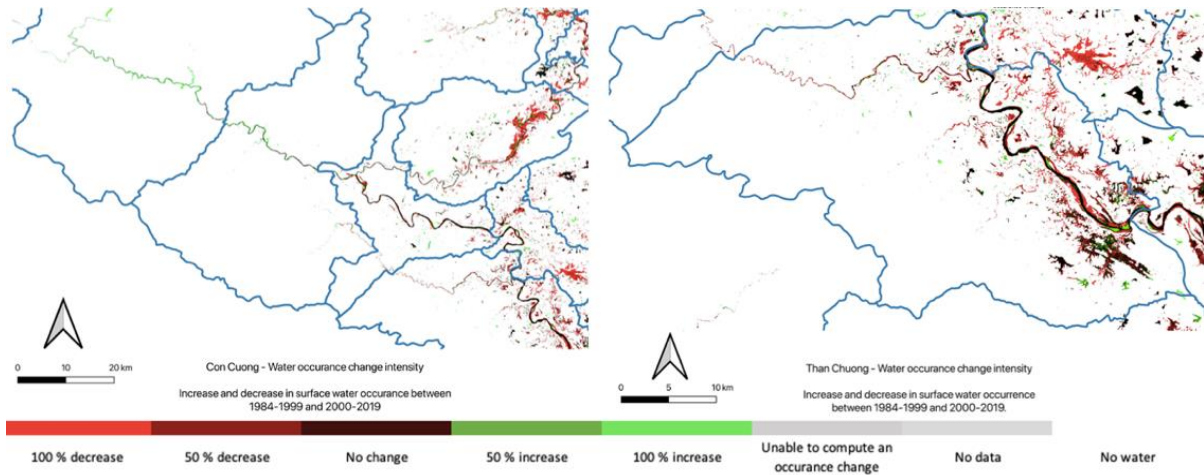
### **Climate change induced hazards in the command area – droughts**

26. The North Central region is severely exposed to climate change, and it experiences longer and more severe droughts and higher temperature, coupled with unpredictable events (off-season rain, sudden flash flood and cyclones). Amongst the impacts are the loss of arable land areas to drought, cropping calendar change, shrinking water resources, yield losses and aquaculture production decrease (IFAD, 2011)<sup>22</sup>. For water resources, the decrease in annual streamflow and decrease in dry season low flows are the most evident direct threats. Further entailed impacts are the slight increase in flood events, decrease in available surface water, increased drought frequency, increased irrigation demand and water allocation conflicts (ISPONRE).
27. Drought had not been considered a frequent natural disaster in Viet Nam previously, although occurring more frequently and with longer duration. North Central area is listed among the regions threatened by the largest yield decline because of drought and farmers in the region already reports loss of lands. FAO and Viet Nam National University conducted a series of drought mapping in the region that helped defining the Temperature Condition Index (TCI), a one-dimension drought indicator looking at the land surface temperature. According to the TCI, the province, as well as the entire North Central region, might be affected by the increased frequency and duration of drought during critical drought events.
28. The current design of the water network is not prepared to adapt to the impact of climate change on water resources, also given the topographical challenges of a territory that stretches along hilly and mountainous areas. Decreased flow levels hamper the water withdrawal by gravity-fed systems in critical dry periods. Detrimental long-term trends of shrinking surface water of small tributaries – as demonstrated in the Figure below – pose enormous pressure on farming communities, particularly on those living on mountainous areas and relying on natural springs.

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<sup>21</sup> Phuong et al., 2011. Understanding water conflict and cooperation in Con Cuong, Nghe An province, Vietnam.

<sup>22</sup> IFAD, 2011. Environmental and Climate Change Assessment. Prepared for IFAD's Country Strategic Opportunities Programme 2012-2017 – Viet Nam.



**Figure 5: Water occurrence change intensity between 1984-1999 and 2000-2019 in Con Cuong and Thanh Chuong districts<sup>23</sup>**

29. These harmful conditions are already prompted, and further impacts of climate change are likely to increase the number of affected farmers, who are increasingly using pumps to lift water to the irrigation systems and extract groundwater to supplement their water demand.
30. Hydrological drought has cascading effect, as it indirectly puts severe pressure on groundwater resources. The adverse effect of supplementary water extraction results in conflict amongst water users, in particular between non-drinking domestic demand and agricultural use. Resolving balanced access to water amongst user is timelier than ever in the light of COVID-19. Based on WHO recommendation, frequent handwashing and cleaning are basic measures to control the spread of the virus. Poor communities having no facilities to extract groundwater are exposed to risk.

### **Climate change induced hazards in the command area – flood**

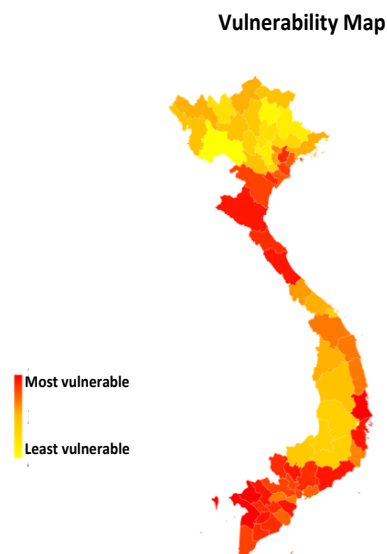
31. Flood has been identified as a long-standing natural disaster in Viet Nam, a major natural hazard causing economic loss and putting population under threat. Poor communities are more vulnerable due to their income primary depending on agriculture, their housing facilities less protected, their low educational level and their poor access to health service (World Bank, 2016)<sup>24</sup>. Unlike the slow onset of drought hazard, flood events are unexpected, more localized and more rapid, making the preparedness even more difficult. According to emission pathways estimated by World Bank (2020)<sup>25</sup>, the occurrence and severity of flood is projected to increase by the mid-century.
32. The vulnerability and risk assessment of Nghe An province is based on the identified driving factors of vulnerability: ratio of poverty, agriculture as primary source of livelihood, access to clean water, education level and stunting. The provincial-level data is obtained from World Bank databases<sup>26</sup>. The composite analysis of these vulnerability indicators is matched to the risk of flood (coastal and riverine flood).

<sup>23</sup> Pekel, J-F.; Cottam, A.; Goerlick, N.; Belward, A.S. 2016. High-resolution mapping of global surface water and its long-term changes. *Natura* 540. 418-422

<sup>24</sup> World Bank, 2016. *Transforming Vietnamese Agriculture: Gaining More from Less*

<sup>25</sup> World Bank. 2020. *Viet Nam Overview*

<sup>26</sup> World Bank, Ministry of Labor – Invalids and Social Affairs of Viet Nam. 2020. *mapVIETNAM*



**Figure 6: Composite analysis of flood vulnerability assessment**

33. Results are in line with the latest researches related to flood disaster damage assessment in Viet Nam. The Central North region is highly exposed to flood, and capacities are not sufficient to cope with the devastating consequences of floods. Nghe An is ranked as one of the most vulnerable provinces. The immense load requires the development or complete replacement of dilapidated and outdated irrigation and flood protection infrastructures, which already have poor capacity (holding less than 10 percent of current annual flows).
34. Between 1989 and 2010, 14 flood events have been registered in the province with growing intensity and severity, as the number of fatalities shows (UNDDR, 2020)<sup>27</sup>. Based on general trends, major floods occur every 9-10 years and result in dike breaches.

### **Rationale for integrated and inclusive approaches to adapt climate change**

35. The multifaceted problem of meteorological and hydrological drought, compounded with flood as frequent natural disaster, make the province severely vulnerable. From one side, climate change induces the intensification of rain and increase of river discharge in wet season, while causing negative departure from average rainfall and decrease of river discharge in dry season. The adverse trends are exacerbated by further climate hazards, such as heat waves. Climate change has multiple impacts, including significant loss of agricultural assets, unsecured livelihoods, increasingly limited access to clean water, growing social tensions and conflicts. As defined in the National Communication of Viet Nam to the UNFCCC, the implementation of integrated water resource management is highly desirable to improve the response to climate change impacts. The province requires urgent measures for climate change adaptation in order to build resilience and improve response to drought and flood in integrated manner. Such development can be achieved only by improving the inclusiveness of disaster and risk management. National Strategy for Natural Disaster Prevention defines the integration of disaster risk management into Socio-Economic Development Plans as a main objective. In line with the national strategy, communities, often neglected from decision-making, must be involved into planning process as first crucial step of resilience building. Also, the NC-UNFCCC highlights the need of a more updated hydro-meteorological observatory and forecasting system and mainstreaming the climate scenarios into such Socio-Economic

<sup>27</sup> UNDRR. 2020. DesInventar Sendai. Viet Nam profile

Development Plans. Preparedness of communities can only be prompted by integrated and multipurpose monitoring systems that provides timely and reliable information.

### Project / Programme Objectives:

36. The overall objective of the project is to build communities' resilience and improve response to climate change through inclusive integrated management of drought and flood. This will be achieved through three components in a four years project implementation period:
- Component 1: Building an institutional framework for inclusive integrated drought and flood management to strengthen adaptive capacities at province level. It foresees the establishment of a province-level integrated model for drought and flood management (in line with AF strategic results framework, notably Output 2.1., Output 7. Under Outcome 2. Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses and Outcome 7. Improved policies and regulations that promote and enforce resilience measures).
  - Component 2: Strengthening climate resilience of the most vulnerable communities in the province to compound drought and flood threats through sustainable access to water resources. It foresees technical solutions for water multiple use and implementation of on-farm technologies for drought adaptation (in line with AF strategic results framework, notably Output 3.1., Output 3.2., Output 4. and Output 5. Under Outcome 3. Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level, Outcome 4. Increased adaptive capacity within relevant development sector services and infrastructure assets, Outcome 5. Increased ecosystem resilience in response to climate change and variability- induced stress)
  - Component 3: Strengthening climate hazard monitoring capacity and knowledge sharing on inclusive integrated drought and flood management in the context of climate change. It foresees the improvement of traditional climate information system into context-tailored climate-hazard monitoring system that extends the delivery of timely information to communities (in line with AF strategic results framework, notably Output 1.2., Output 2.1., Output 2.2. and Output 3.2 under Outcome 1. Reduced exposure to climate-related hazards and threats, Outcome 2. Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses and Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level).

### Project / Programme Components and Financing:

Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
1. Building an institutional framework for inclusive integrated drought and flood management to strengthen adaptive capacities at province level	1.1.1. Current institutional setting and practices for drought and flood management in the region analyzed to enable inclusiveness and integration. 1.1.2. Coordination mechanism on flood and drought management amongst institutions at multiple levels (commune-level, district-level and province-level) strengthened. 1.1.3. Measures for adopting inclusive integrated drought and flood management	1.1. The enabling environment is strengthened at province level through the establishment of an inclusive integrated drought and flood	300 000

	<p>identified</p> <p>1.1.4. A process model for inclusive integrated drought and flood management in the region formulated.</p>	management model.	
	<p>1.2.1. An operation plan for the process model developed.</p> <p>1.2.2. Capacity-building programme for stakeholders on operation and upscale of process model provided.</p>	1.2. Relevant stakeholders are empowered to operate the management model	
2. Strengthening climate resilience of the most vulnerable communities in the provinces to compound drought and flood threats through sustainable access to water resources	<p>2.1.1. A management tool to enhance decision-making on climate-related water interventions developed.</p> <p>2.1.2. Water harvesting structures as an ecosystem-based adaptation measure in flood-prone areas created to increase access to water for multiple use purposes and protect productive assets.</p> <p>2.1.3. Aquifer recharge structures in high-density areas developed to reverse current groundwater exploitation trends.</p> <p>2.1.4. Communities' knowledge on sustainable water management increased and community-centered tool for groundwater monitoring provided in high-density areas.</p>	2.1. Water availability/access for multiple use of the communities most vulnerable to climate change better secured through aquifer recharge, water harvesting and the application of efficient water techniques	2 186 500
	<p>2.2.1 In-situ rainwater harvesting techniques introduced to increase water accessibility at farm level.</p> <p>2.2.2. Climate-resilient agricultural practices with special emphasis on water saving practices and technologies provided to communities.</p> <p>2.2.3. Transition to crop diversification towards water-secure production supported to improve livelihood and reduce climate exposure.</p> <p>2.2.4. Water pricing/sharing system within the communities developed and payment for water saving/water protection applied.</p>	2.2. Vulnerable communities' capacities strengthened to adapt to impacts of drought through adopting best on-farm technologies and practices	
3. Strengthening climate hazard monitoring capacity and knowledge sharing on inclusive integrated drought and flood management in the context of climate change	<p>3.1.1. Scalable climate information system upgraded and integrated into a web-based information hub on inclusive integrated management of drought and flood.</p> <p>3.1.2. Climate-hazard monitoring mechanism established based on upgraded and integrated climate information system.</p> <p>3.1.3. Capacity-building programme on the use and operation of the monitoring system provided.</p> <p>3.1.4. Web-based information hub on inclusive integrated management of drought and flood created.</p>	3.1. Climate-hazard monitoring established and knowledge sharing platform on inclusive integrated drought and flood management established	500 000



4. Project/Programme Execution cost	313 500
5. Total Project/Programme Cost	3 300 000
6. Project/Programme Cycle Management Fee charged by the Implementing Entity	280 000
<b>Amount of Financing Requested</b>	<b>3 580 000</b>

## Projected Calendar:

Milestones	Expected Dates
Start of Project/Programme Implementation	October 2021
Mid-term Review (if planned)	October 2023
Project/Programme Closing	October 2025
Terminal Evaluation	December 2025

## PART II: PROJECT / PROGRAMME JUSTIFICATION

### A. Project/programme components with their focus on concrete adaptation activities

37. The project design fully complies with the Adaptation Fund objectives, notably Objective 1 “Reduce vulnerability to the adverse impacts of climate change, including variability at local and national levels” and Objective 2 “Increase adaptive capacity to respond to the impacts of climate change, including variability at local and national levels”. The project provides both structural and non-structural measures to reduce climate vulnerability through three consecutive components. The project target area, Con Cuong and Thanh Chuong districts, are increasingly facing challenges of concurrent climate hazards, in particular drought and riverine flood. The two districts are hydrologically contiguous areas in the middle stretch of Ca River basin. As Nghe An is the main drain area of the catchment, the province is under constant threat of unpredictable large flows. While the river stream in Con Cuong has relatively well-defined course, it becomes meandering in Thanh Chuong. As districts are located along the main course of Ca river, they are exposed to high-frequency flood. Due to the underdevelopment of current infrastructure, the increasingly frequent droughts further aggravate the climate-induced problems. In order to reach integrated management of flood and drought, harmonized development of upstream and downstream areas is required. The cascading effects span over multiple sectors, including water resource management, agriculture, disaster risk management and livelihood. To respond to climate change impacts in an integrated manner and across these sectors, the project sets scope on adaptation measures that can be achieved in short-term but provide long-standing and sustainable solutions for resilience. After creating enabling environment for inclusive integrated drought and flood management through a reformed institutional framework, the project involves structural measures to improve access to multiple water use by flood water retention and harvesting. Inverting the perspective of flood risk into growth is envisaged through ecosystem-based adaptation measure, consistent with socio-economic, sustainability and financial objectives. Adding to the positive effects of improved access to surface water, the project addresses the current groundwater exploitation practices through aquifer recharge structures. At farm level, the positive effects are reinforced through non-structural measures. The project provides activities to directly involve farmers into water conservation through better on-farm practices and incentives to increase water use efficiency. To tackle the identified defects and/or incomplete coverage of monitoring systems currently in place, the project targets to turn the recent climate information systems into multifunctional climate-hazard monitoring system that provides readily available information directly for communities.

38. **Component 1.** Building an institutional framework for inclusive integrated drought and flood management to strengthen adaptive capacities at province level. The component is phased into two consecutive and complementary outcomes:
- Outcome 1.1.: The enabling environment is strengthened at province level through the establishment of an inclusive integrated drought and flood management model.
  - Outcome 1.2.: Relevant stakeholders are empowered to operate the management model
39. The component focuses on the current institutional framework to create an enabling environment at local level through the introduction of a process model for integrated drought and flood management. The component directly contributes to the targets of National Strategy on Climate Change, namely to the “enhance the participation of the entire political system in interdisciplinary organization and collaboration for coping with climate change; to improve efficiency and validity of central-to-local-level management of climate change issues”.
40. Vertical and horizontal coordination of relevant institutions is strengthened through successive analysis of current institutional setting and practices, review of coordination mechanism at multiple institutional level, measures for adoption, establishment of process model, provision of operation plan and capacity-building for stakeholders. The final product is a process model abstracting key institutional functions for inclusive integrated drought and flood management to strengthen the role of local level institutes through an integrated information flow amongst decision-making level. From bottom, acquisition and systematic compilation of sector-related information facilitates evidence-grounded policy making. From top, policy development better reflects on the need of communities through the access to systematic information base. The component is scaled at sub-national level to strengthen the contribution of local levels in national policymaking.
41. As concluded by the Nationally Determined Contribution of Viet Nam (NDC), the legal framework for integrating climate change into Socio-Economic Development Plans is still limited due to the lack of coordination between ministries, sectors and local stakeholders to address multisectoral issues. Further bottleneck defined by NDC is the institutional capacities, in particular at local level. From one hand, a great concern is that local level institutions are under-sourced to effectively manage adaptation processes. On the other, irrigation and drainage management companies as novel actors of national water management have not been integrated into institutional processes. Information-sharing to support their effective operation has not been established yet, thus making water-management spatially, temporally, institutionally scattered and unharmonized. In the last decades, much has been done at policy development and decision-making level, yet activities related to investment and capacity-building should be dispersed at district and commune level to activate local stakeholders. Equally important in climate adaptation, is the currently fragmented sectoral approaches. Droughts, floods and other climate-related disasters are managed by different authorities, often with overlapping mandates. Intersectoral coordination is increasingly needed to better respond to climate change not only because the impacts are cascading and interrelated in spatial, temporal and sector terms, but also because integrated management can neutralize and reverse each other’s adverse impacts. The current component provides solid bases for participatory and inclusive approach of integrated management of drought and flood through an institutional process model that converge the different levels of stakeholders through better information sharing and its integration into decision-making.
42. The following activities per outputs are proposed accordingly:
- a) *Current institutional setting and practices for drought and flood management in the region analyzed to enable inclusiveness and integration:* Cross-sectoral and cross-institutional analysis will be conducted to review the current institutional setting related to drought and flood management. The activity applies mapping exercise and gap analysis matrix (e.g. Action Matrix methodology by FAO).

The mapping exercise includes the systematic review of institutions, regulations, policies for flood and drought management in the specific context of water resource management, agriculture and disaster risk management. The gap analysis matrix identifies the major bottlenecks of institutional, regulations and policy implementations – as it relates to the direct involvement of communities.

- b) *Coordination mechanism on flood and drought management amongst institutions at multiple levels (commune-level, district-level and province-level) strengthened:* The activity concerns the improvement of institutional mechanism with emphasize on effective communication and administration among different institutions, as well as the definition of flow of information through the establishment of interinstitutional dialogue and mainstreaming into key management functions.
  - c) *Measures for adopting inclusive integrated drought and flood management identified:* Protocol for systematic data collection is to be crafted to determine the sectoral and cross-sectoral groups of measures to create comprehensive databases. From databases, enhanced management mechanisms of information sharing and administration are defined as the basis of bidimensional process model for enabling institutional framework.
  - d) *A process model for inclusive integrated drought and flood management in the region formulated:* Process model will be formulated to mainstream identified measures into institutional mechanisms, in particular in information-sharing and administration. The overall objective of the process model is to converge institutional actors and reinforce the role of communities in management decisions.
  - e) *An operation plan for the process model developed:* Completion of an operation plan will enable the use and regular update of the process model. The operation plan functions as the manual of the process model in the form of a learning module.
  - f) *Capacity-building programme for stakeholders on operation and upscale of process model provided:* Capacity-building programme will be conducted to increase their understanding on inclusive management in the context of climate-change. The capacity-building goes beyond the use of the process model and approaches the topic in more comprehensive manner with thematic sub-topics.
43. **Component 2.** Strengthening climate resilience of the most vulnerable communities in the provinces to compound drought and flood threats through sustainable access to water resources. The component is phased into two consecutive and complementary outcomes:
- Outcome 1.1.: Water availability/access for multiple use of the communities most vulnerable to climate change better secured through aquifer recharge, water harvesting and the application of efficient water techniques
  - Outcome 1.2.: Vulnerable communities' capacities strengthened to adapt to impacts of drought through adopting best on-farm technologies and practices
44. The component incorporates the recommendations on paradigm shift proposed by new national irrigation strategy. This component focuses on the development of water infrastructure targeting two major objectives: to improve water availability and access to water for multiple use at system level; and to increase communities' capacities to adapt drought impacts at on-farm level.
45. At system level, the backbone of the component is an ecosystem-based adaptation technique, which turns excessive flood events to the advantage of the communities. The current spatial-temporal fluctuations of access to water results super-peak and off-peak periods in the form of alternating, successively changing flood and drought. Design of existing reservoirs often neglects the environmental and sustainability aspects, moreover, most of them are close to the end of their lifespan. The particularity of the reservoirs in mountainous areas is that outflows are below the level of fields. According to the consultation with communities (*detailed in the section H – consultation process*), the current decrease in water levels in dry season prevents the water offtake by the existing infrastructure. In order to address this complex issue, water harvesting structures in flood-prone areas will be created on existing facilities to reinforce water retaining capacities, and adjacent

irrigation system will be rehabilitated to improve access to water. The water harvesting structures will be based on ecosystem-based adaptation techniques, which will store flood water for dry periods. On the other side, fluctuating groundwater tables are heavily exposed to human interference, as they are extracted not only for drinking purposes but for household use and supplemental irrigation. The mushrooming wells for supplemental irrigation are severe threats to both ecosystem and domestic water users. In particular, the groundwater use is concentrated to dry periods, when water tables shrink by natural processes anyway. The technology, therefore, is complemented with additional structure for aquifer recharge in high-density areas. The structure is to be constructed to reverse harmful exploitation trends and climate change impacts and preserve groundwater sources. Learning from past failure of rapidly deteriorating infrastructure, communities' knowledge on sustainable water management and O&M of infrastructure will be strengthened through capacity-building programmes in most critical, high-density areas. As the project develops small-scale infrastructure, the management responsibility will remain directly at commune level. This will greatly facilitate the active involvement of communities in O&M and other management roles and keep the water infrastructure "in-house".

46. At farm level, advanced and climate-smart water management and agricultural practices will be introduced to increase farmers' resilience to drought events. Farmers producing in small plots with traditional technologies have yields well-below of the national average. The field visit and consultation with communities proved that a large share of farms produce rice (over 80 percent in Thanh Lam and around 30-40 percent in Binh Chuan). The rice productivity level is extremely low, and the current climate hazards (mostly drought and heat waves) and seasonal water scarcity allow the production only in one season. The consultation with farmers showed extremely low agricultural productivity (*detailed in the section H – consultation process*), which can be attributed to multiple factors, such as: 1) capital-poor production, 2) financial risk of cash crops with high input needs (dominantly tea, beans, maize production and gardening), 3) climate vulnerable and failure-prone irrigation infrastructure, 4) inefficient traditional practices (most importantly lack of proper fertilization plan and soil fertility management, flood irrigation even in water scarce period, etc.), 5) lack of relevant experiences to create adaptation strategies for drought, and 6) low and uneven access to water resources. Based on the consultation, farmers do not attempt to increase the cropping intensity (e.g. double-cropping) due to increasing frequency of drought events, thus falling far below the production potential. From these, climate-related events appear to be the major reason of uncertainty amongst farmers. Better on-farm water management is crucial to increase farmers' resilience to climate events and sustain the pathway towards crop diversification and water-secure production. Despite the fact that the potential and willingness of farmers to increase cash-crop production (less water-intense than rice) is high, the production scale is low and mostly limited to micro gardens (as small as overall 15-20 ha in Thanh Lam commune). In support of this complex issue, the project sets out an evidence-based practice of establishing optimal agricultural practices (OAPs) for both rice and diversified cropping pattern through yield impact simulation in climate change context (AquaCrop climate change module). The OAPs include combined intervention of agronomic, economic and irrigation measures to improve the water use efficiency, water productivity, yield and economic gains. The process of introducing OAPs includes a scientifically established approach trialed and implemented in a number of countries (recently in Uganda, Burkina Faso and Lebanon). This approach involves the phases of monitoring, diagnosis and demonstration, through which the outcomes are robust enough to eliminate the production risks and convince farmers on the implementation of OAPs. Sets of combined in-situ water harvesting techniques (e.g. trash-lines, pitting, contour bunding, water retaining, etc.) and climate resilient agricultural practices (e.g. alternate wetting of rice, deficit irrigation, mulching, etc.) will be developed and disseminated to improve resilience. Such approach is an effective tool to steer away from water-intensive and water-

inefficient production both by improved rice practices and crop diversification, and increase natural resource use efficiency, productivity and profitability of farming. This is particularly desirable amid the current global crisis. COVID-19 significantly impacted the livelihood of the communities, as most of the households make their living from remittances. The crisis resulted a dramatic drop of remittance flows according to the interviews with communities, so increasing the risk of poverty. More productive farming and diversification to cash-crop will be a viable strategy to improve livelihoods. Finally, the component will address the financial sustainability issue of water sector. Currently, public sources for water sector are reduced, and no mechanism is in place to reduce budget deficit. Water fees are well-established instrument to generate resources and promote efficient use of water. However, the past experience of over-pricing and charging poor farmers with over 20 types of different water fees were the syndrome of overall poor transposition and implementation of national strategies. Responding to the national strategy, water pricing mechanisms will be established and tested as scalable best practice, and incorporate financial incentives for water conservation.

47. In order to strengthen climate resilience of the most vulnerable communities to compound drought and flood threats, the following activities per outputs are proposed:
- a) *A management tool to enhance decision-making on climate-related water interventions developed:* investment tool will be developed to support decision-making on climate-related interventions, with an emphasis on ecosystem-based structural measures. Such tool incorporates multi-criteria assessment of investment in climate adaptation. The management tool will be designed for community-level application that can be further scaled-up to sub-national and national level.
  - b) *Water harvesting structures as an ecosystem-based adaptation measure (EbA) in flood-prone areas created to increase access to water for multiple use purposes and protect productive assets:* water harvesting facility is created in flood-prone areas by rehabilitation and stabilization of natural banks, re-naturalisation of dams and ponds in upstream (Con Cuong) and downstream (Thanh Chuong) command areas. The EbAs will be complemented with rehabilitation of outdated and non-functional irrigation systems to provide sufficient water for agricultural purposes. The EbA solutions are effective to control flow, store and slow runoff and river water, reduce ecosystem and land erosion, supply surface water in dry period, increase water level in critical points of gravity-fed irrigation systems and enable groundwater recharge. The EbAs will be equipped with multiple outlets to supply water for different water use (irrigation and livestock). The ultimate goal of EbA structures is to increase access to surface water for multiple purposes (irrigation and livestock) to reduce the impact of water scarcity, protect the productive assets and livelihoods from flood events and decrease the pressure on groundwater sources.
  - c) *Aquifer recharge structures in high-density areas developed to reverse current groundwater exploitation trends:* directly connected to the EbA structures, groundwater recharge structures are constructed to reverse groundwater exploitation in highly populated areas. Re-naturalization of dams and pond beds allow for more intensive infiltration into shallow groundwater tables. To increase the effectiveness, injection wells will be constructed for managed aquifer recharge. The ultimate goal of the recharge structures is to preserve groundwater resources, improve resilience of groundwater sources to drought and heatwave, provide safe water for non-drinking household purposes with positive water balance.
  - d) *Communities' knowledge on sustainable water management increased and community-centered tool for groundwater monitoring provided in high-density areas:* the current adverse trends of groundwater exploitation is partially coming from the insufficient information of communities about groundwater resources. In light of climate change impacts on groundwater sources, groundwater conservation is particularly important. The shift of water use towards surface water resources will be based on increased understanding of communities. While large water user sectors, including



irrigation and livestock in the project context, are supported with improved access to surface water, groundwater use will be re-directed household purposes. In order to augment and revitalize groundwater resources, communities will be trained on groundwater monitoring (including the interpretation of updated groundwater maps) and community-centred tool, namely groundwater counter will be installed to create mass-information source.

- e) *In-situ rainwater harvesting techniques introduced to increase water accessibility at farm level:* in-situ rainwater harvesting techniques (trash-lines, pitting, contour bunding, water retaining etc.) will be introduced in pilot farms and scaled at community level to improve on-farm water management and water use efficiency. Based on practical and scientific methods, sets of water harvesting techniques will be developed, piloted and demonstrated. Techniques increasing and prolonging soil moisture will substantially contribute to yield productivity and natural resource efficiency. Field guide for practitioners will be prepared and community-level information campaign will be conducted to disseminate results.
- f) *Climate-resilient agricultural practices with special emphasis on water saving practices and technologies provided to communities:* climate-resilient on-farm practices, OAPs as introduced before (alternate wetting, deficit irrigation, mulching, etc.) will be introduced in pilot farms and scaled at community level to improve water use efficiency, on-farm natural resource management and agricultural productivity. Based on practical and scientific methods (e.g. AquaCrop), sets of agricultural practices will be developed, piloted and demonstrated. Methods improving water and soil conditions to build resilience to climate change will contribute to yield stabilization and productivity, natural resource conservation, and natural resource efficiency.
- g) *Transition to crop diversification towards water-secure production supported to improve livelihood and reduce climate exposure:* cash-crop production model will be introduced in pilot gardens that is compatible with three objectives: climate scenarios, natural resource intensity and on-farm income. Technology transfer will be introduced to support farmers in transitioning to diversified production in favor for less water intense and higher value crops than rice production.
- h) *Water pricing/sharing system within the communities developed and payment for water saving/water protection applied:* multilevel pricing model will be established that ensures the financial sustainability of irrigation network in the command area. The pricing model does not add additional burden on farmers already paying irrigation fee, but builds on the option of management transfer to commune-level organization. The overall goal of the pricing model is to incentivize environment protection and water resource conservation to ensure equitable contribution to maintenance works. The pricing model will be formulated on the basis of service provision to provide inclusiveness, given the fact that management (operation, maintenance, utilization) of small-scale infrastructures can be transferred to commune-level upon the agreement of relevant authorities by law. Therefore, the management of infrastructure will be envisaged in “in-house” organization at commune-level. This will give the option to create a more equitable financing mechanism building on participatory approach and possible balancing of in-kind and financial contribution (multilevel pricing). Based on the successive steps of estimating O&M costs, making participatory management operational and calculating the possible water saving at farm level, the project will conduct a best scenario analysis of water pricing, consistent with affordability, accessibility and equity. The model will be in line with the new national regulation on water pricing (Law on Irrigation 2017) and will be consulted with relevant authorities (Province-level Committee and Council) defined by the legislation to ensure the full compliance with national policies.

48. **Component 3.** Strengthening climate hazard monitoring capacity and knowledge sharing on inclusive integrated drought and flood management in the context of climate change. The component is based on one outcome:

- Outcome 3.1.: Climate-hazard monitoring established and knowledge sharing platform on inclusive integrated drought and flood management established.
49. This component focuses on strengthening and integrating climate-hazard monitoring system, while building on extensive experiences of FAO pilot monitoring initiative in Viet Nam. Access to climate predictions on drought and flood is a key constraint to agricultural production in the most vulnerable zones and it is continuously increasing together with climate change impacts. Through the timely management of drought and flood hazards the most viable and efficient adaptation strategies can be carried out to protect the livelihoods of people and improve food security. Therefore, the proposed project will implement activities that develop a monitoring system for the target area. This component will be implemented to take advantage of existing efforts on monitoring activities and integrate initiatives. Also, it will increase the positive impact of the project on the socio-economic side through direct access to information and predictions for all involved stakeholders. Furthermore, the system will support the decision-making processes to manage and disseminate easy-to-access information to direct beneficiaries and support the creation and implementation of adaptive measures.
50. Currently, national and sub-national monitoring systems for drought and flood management are still far to be implemented nationwide, due to an approach focused mainly on crisis management and emergency response. The existing information systems are spatially scattered and developed individually for different purposes. Still worse, many of them are no longer functional. There are four meteorological stations and six hydrology stations in Nghe An, of which three meteorological and four hydrology stations are located in along the main stream of Ca River. The stations are connected to the national level observatory. Beyond flood forecasting, there is an urgent need to create updated and integrated monitoring system that can be scaled at sub-national and community level.
51. In order to strengthen climate hazard monitoring capacity and knowledge sharing on inclusive integrated drought and flood management, the following activities are proposed:
- a. *Scalable climate information system upgraded and integrated into a web-based information hub on inclusive integrated management of drought and flood:* scalable tool will be implemented as first step of integrated monitoring system. Based on in-situ devices (e.g. agro-meteorological stations, discharge loggers, soil moisture sensors, groundwater level loggers) and involvement of communities, the command area is to be covered with real-time observation. Via remote communication and communities' reporting, the devices will be connected to central information hub that integrates, processes, analyses and reports climate information, forecasting and risk assessment of flood and drought hazard. As robust information systems have been already introduced and successfully piloted in Viet Nam (FAO ASIS), the project will integrate its results and scale-up its relevant parts.
  - b. *Climate-hazard monitoring mechanism established based on upgraded and integrated climate information system:* based on the achievement of the previous activity, the monitoring system will be integrated into sub-national information systems and complemented with remote-sensed information (including the most relevant agricultural and climate-hazard indicators). Information will be complementary with existing geo-referenced weather stations. On one hand, existing monitoring protocol will be updated with more robust methodologies that delivers information to decision-makers. On the other hand, the reporting function will be extended and scaled to communities.
  - c. *Capacity-building programme on the use and operation of the monitoring system provided:* extensive capacity-building programme will be organized with two main objectives. This activity will focus on building stakeholder capacity to use the implemented monitoring system. It aims at raising awareness and knowledge among decision-makers on an effective management of drought and flood, by creating a collaborative management strategy. The first module of capacity-building will be developed for sub-national and national professionals on the use of integrated information system.

The second module of capacity-building will be organized to local professionals (local authority, extension service and community leaders) as training-of-trainers (ToT). ToT will be delivered to ensure the information distribution to farmers and communities.

- d. *Web-based information hub on inclusive integrated management of drought and flood created:* Lessons-learned will be included in web-based hub to support decision-makers in inclusive integrated management of drought and flood. The portal will be a central repository of quality-controlled data on droughts and floods, where users can browse real-time information on flood and drought management and project related results on adaptation measures at system and farm level. The ultimate goal of such information hub is to keep the relevant information up-to-date and accurate, scale-up the project results for potential replication.

## **B. Economic, social and environmental benefits**

52. The focus of the project in subject is to build resilience and improve response to drought and flood in order to reduce the impact of climate change through inclusive integrated management of drought and flood in Viet Nam, and particularly in the indicated target areas. By implementing a combination of structural and non-structural measures, the project addresses the multiple and combined impacts of climate change and especially the adverse effects of concurrent climate hazards, in particular drought and riverine flood.
53. The beneficiaries have been determined through FAO targeting strategy and in direct consultation with national and regional stakeholders in the country. Within the Nghe An province, the FAO targeting strategy adopted at this stage aimed at evaluating the communities most vulnerable to climate change impacts, particularly flooding and drought, in order to best identify potential project beneficiaries among the most affected villages. As a result, around 2 152 inhabitants (485 households) from the commune of Thanh Lam, and around 1 822 (411 households) from the commune of Thanh Choung are indicated as potential beneficiaries, for a total of around 3 974 individuals and 896 households. The project will pay particular attention to ensuring equal distribution of benefits among identified beneficiaries. Therefore, right at the initial project formulation stage, the representatives of vulnerable groups, most importantly Women Union, village leaders, farmers at downstream areas, low-income and largely remittance-dependent households (most recently the ones hit by the large decline in remittances flows) are involved into the process and their needs are properly consulted and assessed. To further extend the number of beneficiaries, the capacity-building and knowledge materials are designed in a way that provide a large-scale accessibility and replicability (on-farm practices, support for diversification, access to climate hazard monitoring and weather information). This will further add to the number of direct and indirect beneficiaries by Component 2 and 3. Through the three project components, beneficiaries are expected to receive significant economic and social benefits, in line with AF environmental and social policy objectives, while project activities have been formulated also with the scope to reduce the existing gender gap in water resources' access and management. Project beneficiaries will strengthen their adaptive capacities through a capacity development programme on tailored process model for inclusive integrated drought and flood management, the adoption of best on-farm technologies and practices, and the establishment of a climate-hazard monitoring and knowledge sharing platform.
54. Additional socio-economic and environmental benefits will come from improved access to surface water and the resulting improved water distribution, better reflecting the different demands of water users. Such an improvement is expected to increase farmers' commitment for water conservation, also through the implementation of improved on-farm practices and incentives to increase water use efficiency. Furthermore, the improvement of existing groundwater monitoring systems into multifunctional climate-hazard monitoring systems will produce not only environmental benefits, by halting unsustainable practices for groundwater exploitation, but it will also have socio-economic

advantages, by ensuring direct access to the users' communities. Strongly related to socio-economic benefits, the project will establish a robust pricing/sharing system that is also in line with social, economic and sustainability objectives. The small-scale infrastructure together with the right of management, operation and utilization will be transferred to the commune as eligible grassroots-level institutions by the new Law on Irrigation, thus increasing the productive asset of the communities directly. Therefore, it is crucial to introduce an equitable, inclusive and sustainable pricing mechanism to maintain the system at local level. As farmers already pay irrigation fees, the current pricing mechanism will not add to the current fee, but replace it with a more efficient payment modality formulated and accepted by the community. To define such payment modality, the Component 2 is designed with successive activities. Each activity stems from the outcomes of the previous activity. It will start with development of small-scale structural measures. The project will implement a capacity-building programme on O&M in order to enable the active participation of communities. The monitored O&M costs and participatory measures will provide an accurate estimate on the balance between expected in-kind and financial contribution to maintenance. Such profiling of the degree of farmers' participation in management measures has been already successfully examined and piloted in Uganda and yielded positive results regarding the concrete benefits of participatory management. This will also significantly lower the required monetary contribution of farmers (e.g. system for accounting in-kind contribution, such as labour force). In next step, the project will develop optimal agricultural practices (OAPs) with substantial emphasis on updated irrigation and agronomic practices in each production system (rice, tea, maize, beans and garden crops). This will shift the current supply management to demand management, thus allowing water saving. Farmers engaged in water saving practices, then, will be provided with incentives (e.g. fee deduction). In order to close the gap between water demand and supply, the current water infrastructure is suitable for being gauged in an inexpensive manner. This will improve the equity amongst farmers as irrigation supply will be adjusted to the actual demands. Based on the results of these successive steps of estimating O&M, profiling farmers by their contributions, shifting to on-demand water distribution and optimizing the water use, the project will establish a multiobjective pricing model that will provide the best scenario for an inclusive pricing mechanism. A more detailed description will be also provided in the full-proposal, whereas the full diagnosis of current pricing mechanisms and the added-value of the activity to resolve the current institutional barriers will be discussed.

55. According to the UNDP Gender Inequality Index, between 1999 and 2008, Viet Nam has risen from the middle-rank to the upper middle-rank group. Vietnamese women enjoy a system of rights particularly advanced even as compared to some developed countries, which includes proactive policies for political participation, maternity benefits and freedom on reproductive decisions. Nevertheless, traditions still strongly shape the social structure and women are often expected to reduce their aspirations, and even health, to support families; and deference to male authority is often considered the norm. The level of economic participation of women, moreover, is among the highest rates in the world (83% of women between the ages of 15 and 60<sup>28</sup>). Due to the existing disparity in accessing productive resources, however, opportunities for women to take share from the rapid economic growth are often hampered. Particularly at local level and in rural environments, gender inequalities are still common. Female-headed households, on average, are more vulnerable, thus more prone to poverty; women face limited access to land resources, participation in agriculture extension programs, property, formal credit and job training; working hours are longer and less paid for women; decision-making positions are often reserved to men and women are underrepresented, particularly in local government. Also from a gender perspective, climate change is an emerging issue in Viet Nam, which not only hampers the country's development capacity, but could increase

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<sup>28</sup> Asian Development Bank, Viet Nam Gender Situation Analysis. 2015

the existing gender gap. Sensitivity and adaptive capacities to climate change, as much as exposure, define the level of vulnerability of individuals and households. The higher reliance of women on natural resources to secure household subsistence often forces women to remain in rural locations, while men have higher opportunities to obtain off-farm, and higher-paid, employment. Stronger position of women in agriculture is particularly timely, as the province experience the highest migration outflux consisting mostly of men, thus leaving women and families even more vulnerable and exposed. The feminization of agriculture is an on-going trend in Viet Nam, with 63 percent of working women engaged in agriculture compared to 57 percent of working men<sup>29</sup>, and traditional male’s tasks (e.g. spraying pesticides, plowing) are ever more often taken on by women. The effects of climate change, whether slowly onsetting or suddenly impacting, pose an additional burden for women, engaged in disaster preparation and recovery tasks. An initial gender assessment is included in the Annex II, providing a basis for the integration of GP in the project.

56. In light of these considerations, project activities will result beneficial also from a gender perspective. Under Component 1, the establishment of institutional frameworks for drought and flood management at province level will promote equality by narrowing the decision-making gap and bringing the institutional level closer to field activities, where women are directly involved. The implementation of water multiple use solutions and on-farm technologies, indicated under Component 2, will facilitate access to water resources, thus reducing the difficulties, particularly of women households, to invest in water infrastructure for production, in line with the Resolution No 26 of the Viet Nam Communist Party on agriculture, rural areas and farmers (2008). The improvement of traditional climate information system and knowledge sharing mechanisms foreseen under Component 3, finally, will enhance equal access to climate information, thus contributing to reduce the knowledge gap, also through the provision of gender-sensitive design and implementation of communication activities. A more detailed and quantified component-benefit estimation will be provided in the full proposal.

Type of benefit	Baseline conditions	Target conditions
Economic/ Institutional	<ul style="list-style-type: none"> <li>• Striking disparity, in terms of economic conditions, between rural and urban areas. Rural poverty rates three times higher in rural contexts as compared to urban ones.</li> <li>• Significant percentage of population with incomes close to poverty line and particularly subject to the effects of climate change on rainfall and temperatures, as well as to human and animal pandemics.</li> <li>• Natural disasters and weather shocks among the most impacting factors to hamper a balanced poverty reduction across the country, also given the heavy dependency on subsistence agriculture and access to natural resources.</li> <li>• Significant amount of households relying on remittances, which have been sharply dropping since the outbreak of COVID-19</li> <li>• Low education level and lack of modern, updated agricultural practices to improve productivity</li> <li>• Low level of agricultural profitability (currently annual 120 USD per ha in rice producing areas) due to low productivity in the target areas</li> <li>• Low cropping intensity due to lack of access to water and droughts, enabling only one season production</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced disparity between urban and rural areas thanks to improved agricultural production through the increased availability of water resources for key sectors (agriculture)</li> <li>• Enhanced resilience to the effects of climate change through improved decision-making and coordination mechanisms for drought/flood integrated management to overcome sectoral approaches.</li> <li>• Direct inclusion of final beneficiary communities promoted through enhanced participatory approaches and vertical institutional coordination</li> <li>• Increased income by alternative cropping practices (gardening) and improved productivity</li> <li>• Increased income by improved productivity envisaging at least 5-fold yield increase in rice areas (at least 2.5 tons per hectare in pessimistic scenario), equivalent to minimum 600 USD per ha per season in rice producing areas (500 ha)</li> <li>• At least 80 percent increase in cropping intensity through double-cropping due to enhanced access to water in previously uncultivated land in drought and hot seasons</li> <li>• Extending irrigation potential to farms located at the canal tails, supporting at least 117 additional households previously managed only through rain-fed farming</li> </ul>

<sup>29</sup> United Nations, Viet Nam Gender Briefing Kit. 2016



	<ul style="list-style-type: none"> <li>Large share of farms at canal tails left rain-fed due to infrastructural deficiencies</li> <li>Traditional farming practices continued with highly inefficient input and water use and low productivity</li> </ul>	<ul style="list-style-type: none"> <li>Updated farming practices of the 5 main crops (rice, tea, beans, maize, groundnut) and the requested garden crops, involving directly the 896 households, and demonstrating results to large number of indirect beneficiaries (&gt; 5 000) through knowledge and dissemination materials at province level</li> </ul>
Social	<ul style="list-style-type: none"> <li>Smallholders consistently more affected by poor socio-economic conditions (59 percent in small farms).</li> <li>Lack of clean water for domestic purposes and increasing cost of groundwater extraction due to shrinking groundwater resources</li> <li>Women underrepresented in farm ownership. Control over production assets dominated by men.</li> <li>Women take equal share in production, 51 percent of the labour force.</li> <li>Groundwater extraction remains uncontrolled and harmful due to lack of drilling and withdrawal regulation, thus resulting a significant drop in water tables (to 35-40 m in some places)</li> <li>Households merely depending on groundwater for domestic purpose (around annual 70-140 m<sup>3</sup> extraction per household) remain exposed to shrinking groundwater resources</li> </ul>	<ul style="list-style-type: none"> <li>Reduced exposure to natural disaster</li> <li>Improved socio-economic conditions of smallholders and vulnerable livelihoods through strengthened adaptive capacities at province level.</li> <li>Increased participation of women groups in resource management through improved decision-making processes</li> <li>Enhanced availability of water resources, also for domestic use, and reduced burden on women through multiple-use approach</li> <li>Recharge of approximately 130 000 m<sup>3</sup> groundwater per year for household purposes directly from water harvesting structures to allow multi-use in respect of environmental standards</li> <li>Based on the quantification of additional ecosystem need, managed aquifer recharge allowing the restoration of aquifer</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>Severely vulnerable to climate change and particularly exposed to climate hazards. Hit by multiple disaster, mainly flood, tropical cyclones, drought and extreme heat. Ranked 1<sup>st</sup> at global scale for its exposure to flood.</li> <li>The already limited availability of natural resources hampers the expansion of key sectors (agriculture). Competing demands for water resources continuously increasing.</li> <li>Water availability an increasingly constraining factor, 60 percent of the water sources originate from transboundary countries.</li> <li>Ecosystem degradation (erosion) due to natural disasters</li> <li>Water withdrawal even in scarce period both from surface water and groundwater resources</li> <li>Lack of quantification of water needs (environmental, livelihood, agriculture) and contingency actions in critical periods (well drilling, pumping at low water level in streams in downstream target area, etc.)</li> <li>Severe deforestation nation-wide (ranked as 2<sup>nd</sup> in the world) and close to the project area due to lack of alternative income, slow execution of payment for forest ecosystem services (FEPS), low level of incentives (as small as 1 USD per hectare in the project area)</li> <li>Direct correlation of low agricultural productivity and high deforestation rate due to farmers seeking for alternative income in case of low yield or yield failure</li> <li>Increased frequency and magnitude of flood induced by climate change and coupled with deforestation at catchment level</li> </ul>	<ul style="list-style-type: none"> <li>Reduced vulnerability to climate hazards through the deployment of a web-based information hub on inclusive integrated management of drought and flood.</li> <li>Reduced soil and river bank erosion</li> <li>Increased sharing of information for proactive management of drought/flood</li> <li>Enhanced access to available water resources for vulnerable communities through aquifer recharge, water harvesting and application of efficient water-use techniques</li> <li>Reduced climate change impacts through the establishment of climate-hazard monitoring mechanisms based on integrated climate information systems</li> <li>Improved knowledge and awareness on available water resources, uses, and needs through assessment studies and monitoring (e.g. groundwater map and repository etc.), and introduction of balancing approach involving the need for sustaining and protecting ecosystem</li> <li>Agricultural water use shifted to surface water resources through flood water harvesting (excess water use) that is consistent with ecosystem needs</li> <li>Steering away from deforestation activities thanks to enhanced awareness on scalable and replicable agricultural practices, which are more productive and resilient, through enhanced access to water (in target areas), introduction of best practices (scalable at sub-regional level), increased preparedness by climate monitoring system (covering areas at province-level)</li> <li>Enhanced solutions for flood water retention through natural process decreasing the magnitude and consequence of flood events, also counter-balancing the general trend of deforestation in the catchment</li> </ul>

### C. Cost-effectiveness of the proposed project

57. The project involves hard and soft components, whereas concrete hard components outweigh the amount of soft components as detailed in the project framework. However, soft components are designed in a way that they reinforce and elevates the benefits per dollar (e.g. capacity-building,

improved institutional mechanisms, increased planning capacities, etc.). During the full proposal, each activity will be measured in quantitative terms, involving a multidimensional cost-effectiveness analysis and the measured return on investment per project indicators. The cost-effectiveness of project approach and scope is assessed against two possible scenarios: without-the-project and alternative-adaptation-project.

58. It is estimated that around 3 900 people, averaging 890 households, will be the direct beneficiaries of the project hard components. Calculating the average 560 USD investment cost per direct beneficiary of hard components, the project can be considered cost-effective. However, this figure will further decrease through the soft components of institutional development and climate hazard monitoring, as these components extend to district and provincial level. In addition, the enhancement of agricultural production and crop diversification can be scaled out to reach potential beneficiaries in similar agro-ecological zones. This will be achieved through the knowledge products and capacity-building programmes. The project will ensure the cost-effectiveness by considering also the sustainability of the selected scope:

- Minimize variable costs associated to the operation and maintenance of the infrastructure: the project develops low-cost, long lifespan and self-sustaining ecosystem-based infrastructure that represents low technology complexity, low repair cost and low re-investment need. It is estimated that the total cost of traditional irrigation management of gravity-fed infrastructure by irrigation management companies is around 110 USD per ha, amongst which salaries, water supply from reservoir and administration share the majority of the cost. The project developing ecosystem-based solutions, which has direct impact on the cost of water supply and can save up to 20 percent of total cost through the low maintenance cost. *(this paragraph is strongly related to and complementary with the Inclusive Management and Ecosystem-based solution and Brownfield investment in the summary table below)*
- Maximize the benefits and return on investment: the current extremely low productivity level in the target areas (reported 0.5 ton per ha rice and production limited to one season in 420 ha area of Thanh Lam commune, and similarly low yield in 75-80 ha in Binh Chuan) is due to the recurrent droughts, extreme heat and poor access to water. Increased water access and improved agricultural practices will multiply the productivity. Considering only rice, the current farm gate price ranges around 240 USD per ton<sup>30</sup>, therefore, the project intervention of combined enhanced water distribution and on-farm practices has the potential to reach a minimum 5-fold increase through improved productivity and enabled double-cropping involving dry and wet season (based on expert field observation). Considering the current rice producing areas and the productivity level in the target areas, the current 60 000 USD annual production value can reach up to minimum 450 000 USD based on a pessimistic scenario. This increase is even higher in the case of cash crops, therefore the project also includes activities in support of crop diversification. The profitability of the crops can be further improved by decreasing the production cost. Farmers seek for supplemental water resources, they currently use diesel pumps, thus making the production more expensive. The project proposes gravity-fed distribution that does not entail energy cost, which is currently a serious concern in the downstream Thanh Chuong. *(this paragraph is strongly related to and complementary with the Multilevel development in the summary table below)*
- Reduced management fixed costs: The project develops small-scale infrastructure, therefore the infrastructure will be commissioned directly to the commune by the new Law of Irrigation (Chapter VII) upon the acceptance of commune-level People's Committee and under the supervision of Ministry of Natural Resources and Environment. In order to increase the sustainability of the

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<sup>30</sup> Tran, D.D., Auang, C.N.X., Tien, P.D., Tran, P.G., Long, P.K., Hoa V.H., Giang, N.N.H., Ha L.T.T. (2020). Livelihood vulnerability and adaptation capacity of rice farmers under climate change and environmental pressure on the Vietnam Mekong Delta Floodplains. *Water*. 12. 3282.

management, the project strengthens the stakeholders' capacities at commune level to allow a smooth management transfer and increase the active participation of farmers in O&M activities. Based on country experience, the labour cost represents the 30-55 percent of the total cost of traditional irrigation management (non-participatory)<sup>31</sup>. By involving farmers and their in-kind contribution, at least 30 percent of the labour cost can be saved (mostly by allocating the responsibility of water level monitoring, distribution arrangement, regular and non-mechanized maintenance activities and administration). The project scope provides a significant advantage in terms of cost-effectiveness and sustainability, as the payment is issued and administered directly by the commune. *(this paragraph is strongly related to and complementary with the Inclusive Management and Ecosystem-based solution in the summary table below)*

- Increased performance of existing infrastructure: The NbAs in floodplains and around the irrigation infrastructure will be connected to the current conveyance infrastructure (irrigation conveyance, micro storage reservoirs in cascades, groundwater wells) and act as natural, gravity-fed water intake and water retainers at the river banks. By improving the access to surface water, the performance of current infrastructure will be significantly improved in terms of adequacy, reliability and most importantly equity. A common problem of the communities is the disadvantage of downstream farmers, whereas irrigation canals often run completely dry (currently around 117 households crowded out from irrigation). The project will remedy this problem, thus increasing not only the individual but aggregate benefits of the projects. The infrastructure development also includes inexpensive on-farm practices, such as in-situ water harvesting techniques to maintain sufficient soil moisture. As current wells are the only existing source of clean water for household purposes, the groundwater augmentation will help supply sufficient amount of water for the households while complying with the need of ecosystem functions. The project will create a good balance between water supply and different water needs. *(this paragraph is strongly related to and complementary with the Integrated approach, Brownfield investment and Ecosystem-based solution in the summary table below)*
- Improved modalities of self-management: The project will propose a new inclusive pricing mechanism, stemming from project findings, that builds on the successive steps of estimating O&M, profiling farmers by their contributions, shifting to on-demand water distribution and optimizing the water use. The proposed novel mechanism for irrigation fee will be merely covering the direct costs of the water service, as well as it will include incentives (e.g. fee deduction) to increase water saving practices. O&M and management measures involve both physical and non-physical works, thus allowing the involvement of vulnerable groups equally. It is expected that minimum 800 people can contribute to the any management measure. As result, the project will release the financial burden on farmers, improve the monetary water productivity and increase the cost-recovery of the infrastructure. The elaboration of the pricing mechanism will take into due account existing regulations and will be agreed upon with relevant authorities, following technical consultations to thoroughly illustrate the applied evaluations. *(this paragraph is strongly related to and complementary with the Inclusive Management and Ecosystem-based solution and Brownfield investment in the summary table below)*
- Demonstrated positive externalities: NbAs entail several positive externalities, such as the reduced probability of disaster consequences (flood and drought), biodiversity conservation and protection of natural habitats. *(this paragraph is strongly related to and complementary with the Integrated approach and Ecosystem-based solution and Brownfield investment in the summary table below)*

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<sup>31</sup> Davidson, B., Malano, H.M., George, B.A. (2005). The financial viability of irrigation management companies: a case study at Cu Chi, Vietnam. *Irrigation and Drainage Systems*. 19(2):129-143

Approach	Rationale	Without-project scenario	Alternative adaptation scenario
<b>Integrated approach</b>	Climate change related hazards and disasters are alternating in time, which means that the command areas under the risk of flood damage are also exposed to severe shortage of water. Managing the risk separately would require individual adaptation measures designed for flood on one hand, and for drought on the other. Integrated management, however, is not only desirable from strategic point of view but from cost-effectiveness perspective.	<ul style="list-style-type: none"> <li>• The area would be further imposed to flood and drought, thus keeping productive assets under threat.</li> <li>• A drought event similar to the recent one in 2020 would continue to affect the communities, and they would be further forced to crop only in one season.</li> <li>• Groundwater abstraction would increase in peak periods, thus depleting groundwater tables and put them to decreasing trends.</li> </ul>	Separate management of flood and drought by reinforced embankment and dams: <ul style="list-style-type: none"> <li>• Flood management structures would be deployed in critical stretches to protect houses and lands. This would require the reinforcement of river banks</li> <li>• At the same time, small-scale water dams would be constructed nearby agricultural lands to provide irrigation water in drought periods, from which groundwater would be augmented only through more intensive infiltration. By disconnecting the flood control structure from dams, canals should be constructed to connect the river with the dams.</li> </ul>
<b>Inclusive management</b>	The management of natural resources is layered into different institutional levels now. Communities are not sufficiently involved into management that undermines the overall effectiveness. Even though larger water infrastructures are operated by companies now, the lower level and small-scale structures are the responsibility of the communities. Empowering communities with more inclusive management model improves the management quality and reduces the need for outsourcing management activities. Evidence shows that participatory approaches improve the sense of ownership from farmers' side and decrease the management budget.	<ul style="list-style-type: none"> <li>• The management of irrigation infrastructure would remain shared amongst different institutional levels without effective harmonization.</li> <li>• In lack of involvement, ownership of communities and transfer of management responsibilities would not be established.</li> <li>• The management and financing of current infrastructure would remain with public and private entities.</li> </ul>	Centralized management and zero management transfer: <ul style="list-style-type: none"> <li>• Top-down hierarchical management model would be created with higher expectations on farmers' contributions.</li> <li>• The farmers would be service-receivers and management responsibility would be allocated to public or private entities.</li> </ul>
<b>Ecosystem-based solution</b>	Ecosystem-based solution: Water resource development in the country had its "golden era" in the 1970s, when the sector underwent a rapid growth and structural change. The primary objective was to support the socio-economic development, both in terms of alleviating flood related disaster risk and making the best use of water resources (mainly for irrigation and hydropower). However, environmental and climate concerns were not sufficiently emphasized. Water infrastructure design followed the	<ul style="list-style-type: none"> <li>• Ecosystem would further degrade, in particular soil and river stream erosion would occur more intensively.</li> <li>• Outdated infrastructure would pose further risk on the ecosystem, in particular in flood-prone areas.</li> </ul>	Grey infrastructure retrofitted to adaptation structures: <ul style="list-style-type: none"> <li>• Flood management structures and irrigation dams would be constructed from materials such as concrete, cement and metal. Due to the increased maintenance requirements,</li> </ul>

	<p>principles of grey investment. Its drawbacks have become apparent since then. Ecosystem-based investment, however, is in line not only with sustainability objectives, but with cost-effectiveness. Ecosystem-based approaches have significant advantages in both investment and O&amp;M expenditures, compared to grey infrastructure.</p>		<p>farmers would be requested to pay higher fees.</p> <ul style="list-style-type: none"> <li>Participatory approach would be limited, as only those farmers could contribute to the management, who have engineering experience.</li> </ul>
<b>Brownfield investment</b>	<p>The command area is suffering from rapid depreciation of current infrastructure due to the shortcomings of initial design, long-time neglected O&amp;M, structures close to their end of lifespan, complete lack of repair works. Re-engineering of existing infrastructure is of urgent need to avoid consequences of failure, restore and complement their functionalities, and re-construct them towards nature-based and climate-proof design. On the other hand, Viet Nam has developed large number monitoring systems that are currently working scattered without being harmonized or integrated. The project, therefore, builds on existing systems that can be integrated and scaled-up. Enhancing current infrastructure is highly cost-effective as it does not require potential costs, what green investment would entail (most importantly: land acquisition, baseline assessment and preparatory studies, landscape construction, etc.).</p>	<ul style="list-style-type: none"> <li>The current water infrastructure would further entail depreciation cost, while cost of repair works and re-investment would proportionally increase.</li> <li>Further critical costs such as cost of failure and condition-based maintenance costs would arise more frequently.</li> <li>Farmers should be higher irrigation fees for decreased performance and more limited water.</li> <li>Dams in critical conditions and not complying with dam safety regulations would be out of operation by of leaving farmers without irrigation water.</li> </ul>	<p>Green-field investment</p> <ul style="list-style-type: none"> <li>New infrastructures would be constructed in high-density areas, entailing potential re-settlement of communities and land acquisition.</li> <li>If not investigated well, the project would require in-depth preparatory studies in the new area.</li> <li>The new structure would be harmonized with existing infrastructure to avoid negative effect on existing infrastructure. Therefore, preparatory studies on the impact of current infrastructure would be required.</li> </ul>
<b>Multilevel development with structural and non-structural measures</b>	<p>Nghe An province is characterized by severe labour outflux. According to International Organization of Migration, the number of people migrating abroad ranges between 11 and 16 thousand annually. In less than 5 years, over 50 thousand workers, mainly men moved abroad, thus leaving almost the same number of families to be dependent on remittances and the work of other family members. Nghe An has the highest rate of migration in the country due to multiple causes such as average salaries do not exceed the one-third of the salaries in the cities and the natural disasters pose continuous risk to productive assets. In order to address this issue, the project includes suites of structural (water harvesting structures etc.) and non-structural adaptation measures (capacity-building etc.) also at farm level that target the productivity and profitability of farmers. Farmers realizing higher profit are more likely able to ensure financial sustainability of structures.</p>	<ul style="list-style-type: none"> <li>The farmers would be further exposed to climate-change impact without technical support in adaptation and transition.</li> <li>Farmers would further exploit groundwater resources in drought periods to supplement irrigation water.</li> <li>In lack of successful transition, more farmers would abandon the sector and leave lands behind.</li> <li>Rice would be produced predominantly, so farmers could not exploit the profitability potential of agriculture sector, namely gardening and cash-crop production.</li> </ul>	<p>Climate-adaptive monoculture of paddy rice production:</p> <ul style="list-style-type: none"> <li>The farmers would be supported to improve paddy rice production, and rice farming would be put on the basis of economies of scale.</li> <li>Farmers would have access to stable market through wholesale companies.</li> <li>Despite the large-scale production, farmers' income would not improve.</li> <li>Paddy rice would remain water-intensive compared to other crops. Production would remain dependent on water availability.</li> </ul>

#### D. Consistency with national or sub-national sustainable development strategies

59. Addressing climate change and natural disaster is a high priority under Viet Nam's sustainable development strategies. The aims and objectives of the proposed Project are fully consistent with and built on the recommendations of **Third National Communication to UNFCCC (2019)**, particularly two of the priority actions, regarding the proactive response to natural disasters and improvement of climate monitoring, and the assurance of social security. In addition, the AF project is consistent with the **Updated National Determined Contribution (NDC, 2020)** that underlines all the efforts conducted by the Country and identifies further strategic tasks for climate change adaptation, in particular to priority action of "respond pro-actively to disasters and improve climate monitoring", and "ensure social security".
60. In addition, AF proposed Project will contribute towards achieving the objectives of the following strategies and plans:
- a. **National Adaptation Plan-NAP (2020)** was approved on 20<sup>th</sup> July 2020<sup>32</sup> with the general objective of *reducing vulnerability and risk to the impacts of climate change through strengthening resilience, adaptive capacity of communities, economic and ecological sectors; promote the integration of climate change adaptation into strategic and planning systems*. There are also three specific objectives of (i) Improving the effectiveness of climate change adaptation through strengthening state management on climate change, including climate change adaptation, and promoting adaptive integration into socio-economic development strategies and plans; (ii) Increasing resilience and enhancing adaptive capacity of communities, economic sectors and ecosystems through investments in adaptation actions, science and technology, and awareness raising for is willing to adapt to climate changes; and (iii) Disaster risk reduction and damage reduction, preparedness to respond to natural disasters and climate extremes increase due to climate change. Further alignment with the project can be found in the Annex I.
  - b. **National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020 (NSNDP, 2007)**. The strategy addresses disaster mitigation and management actions, especially floods and droughts. It integrates disaster risk reduction into national socio-economic development plans and harmonizes it with livelihood improvement.
  - c. **National Target Programme to Respond to Climate Change (NTP-RCC, 2008)**, backed by the creation of the **Support Program to Respond to Climate Change** by JICA during the following year, in order to support the development and implementation of climate change policies and strategies based on the NTP-RCC. The overall objective of this strategy involves all the sectors and field, in terms of legal documents, mechanisms and policies, to be developed in three different periods. It sets out to elaborate feasible action plans to effectively respond to climate change for each period.
  - d. **Action Plan on Climate Change Response of Agriculture and Rural Development Sector in the Period 2011-2015 (2011)** which targets to strengthen the capacity for climate change response of agriculture and rural development sector in order to mitigate the climate change negative impacts. It is articulated in 7 actions, of which the second is closely related to the project objectives. It prompts the formulation of appropriate projects to respond (adapt and mitigate) to the climate change, in particular in water sector. Activities in this project respond to multiple priorities, including the development of irrigation measures to ensure water security, the implementation of irrigation measures with special attention to water saving techniques (surface irrigation, sprinkler irrigation, etc), the definition of procedures on management and the construction of hydraulic structures operation and regulation to avoid negative impacts and risks derived from climate change.

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<sup>32</sup> Decision No. 1055 / QD-TTg dated July 20, 2020 of the Prime Minister) in which water was among the priority



- e. **National Strategy on Climate Change (2011)**. It is a multi-phase strategy, through three periods. The proposed Project is well aligned with one of the specific targets, that aims at assuring food security, energy security, water security, poverty reduction, gender equality, social security, public health, and better livelihood as well as protect natural resources in the context of climate change. Particularly, the strategic mission regarding food security and water resource highlights specific actions as the improvement of water resource management, as well as the improvement as following: *“upgrade, repair and build irrigation works, hydroelectric plants, and systems of river dike and breakwaters which can effectively cope with floods, droughts, sea level rising, and salt contamination in the context of climate change; and the set up and perfect standards and regulations for effective and multi-purposed exploitation and use of water resource in conformity with climate change and sea level rising”*. At community level its purpose is *“to strengthen communities’ capability and participation in activities of coping with climate change; to place importance on experience of on-site response and the role of local governments and grassroots-level mass organizations.”*
- f. **National Strategy on Environment Protection to 2020 (2012)**. Its general objective targets the control and minimization of environment pollution, resource deterioration and biodiversity degradation; the improvement of habitat quality; the raise of the capability to respond to climate change, striving for sustainable national development. Out of the four directions and solutions for environment protection, the third one is fully aligned with the proposed Project since it aims at effectively and sustainably exploiting and using natural resources, while preserving nature and biodiversity. Particularly, it considers the solution of increasing water use efficiency and reducing the seasonal and regional water scarcity, through:
- *Strictly management of the exploitation of surface and underground water, especially in dry season; application of quotas for underground water exploitation in specific regions;*
  - *Review and readjustment of planning schemes for socio-economic development and industrial crop development in conformity with specific regions’ surface and underground water potential; and*
  - *Renovation of the regime of water irrigation for agricultural activities in order to improve efficiency of water exploitation and use in these activities.*
- g. **National Green Growth Strategy (2012)**: the overall objective of this strategy is to achieve a low carbon economy and to enrich natural capital; to reduce GHG emissions and increase the capability to absorb them. The 9<sup>th</sup> solution of the strategy is strongly related to the proposed project, since it refers to the development of key sustainable infrastructure, including irrigation and water infrastructure. Specifically, it aims to:
- *Enhance investment in irrigation systems with modern operation equipment to ensure efficient regulation and protection of water resources, adequate supply of water for agricultural production including the development of fruit plantation areas, aquaculture and salt making with better irrigation, drainage and flood control;*
  - *Increase investment for adequate water supply for industrial and urban development with special focus on areas with water scarcity.*
- h. More recently, Viet Nam endorsed the **National Action for the implementation of the 2030 Sustainable development agenda (2017)**. Among other activities, the National Action Plan addresses various development goals to the effective management and utilization of natural resources, as well as a proactive response to climate change. The proposed Project is closely aligned with this national action, since it will pursue the goals of *“Ensure availability and sustainable management of water and sanitation for all”* and *“Develop eco-system services”*
61. Finally, the project is in line with a number of additional legal, policy and institutional efforts, directly linked to climate change:

- i. The resolution of Active response to climate change, improvement of natural resource management and environmental protection (2013)
- j. Law on Water Resources (2012)
- k. Law on Natural Disaster Prevention and Control (2013)
- l. Law on Environmental Protection – Law No. 55/2014/QH13. (2014) (*replaced by newly approved LEP on 17<sup>th</sup> November 2020 and come into force from 1<sup>st</sup> January 2022*)
- m. Law on Irrigation - Law No. 08/2017/QH14 (2017)

**E. Relevant national technical standards and compliance with the Environmental and Social Policy of the Adaptation Fund.**

62. The screening of relevant technical standards per sector, as well as the Environmental and Social Policy principles per concrete outputs are summarized in the Table.

Sector of intervention	Concrete output (CO) and ESP principle (ESP)	Relevant Rules, Regulations, Standards and Procedures
Water	<ul style="list-style-type: none"> <li>• (CO 1.1.1. - ESP 1, 2, 3, 5), (CO 1.1.2 – ESP 1, 2, 3, 5), (CO 1.1.3– ESP 1, 2, 3, 5), (CO 1.1.4. – ESP 1, 2, 3, 5), (CO 1.2.1. – ESP 1, 2, 3, 5), (CO 1.2.2. – ESP 1, 2, 3, 5),</li> <li>• (CO 2.1.1. – ESP 1, 2, 3, 5), (CO 2.1.2. – ESP 1, 2, 3, 5, 9, 10, 11), (CO 2.1.3. – ESP 1, 2, 3, 5, 9, 10, 11), (CO 2.1.4. – ESP 1, 2, 3, 5, 9, 10, 11), (CO 2.2.4. – ESP 1, 2, 3, 5),</li> <li>• (CO 3.1.1. – ESP 1, 2, 3, 5, 11), (CO 3.1.2. – ESP 1, 2, 3, 5, 11), (CO 3.1.3 – ESP 1, 2, 3, 5, 11), (CO 3.1.4. – ESP 1, 2, 3, 5, 11)</li> </ul>	<p>Law No. 17/2012/QH13 on Water Resource, Law on Irrigation - Law No. 08/2017/QH14 (2017) , Decree No. 149/2004/ND-CP, Ordinance on the exploitation and protection of irrigation works No. 32/2001/PL-UBTVQH10, Decree No. 43/2015/ND-CP, Decree No. 54/2015/ND-CP, Decision No. 1590/QD-TTg, Decree No. 120/2008/ND-CP, Decree No. 115/2008/ND-CP amending and supplementing a number of articles of the Government's Decree No. 143/2003/ND-CP, Decree No. 112/2008/ND-CP, Decision No. 197/2007/QD-TTg approving the master plan on socio-economic development of Nghe An province till 2020, Decision No. 05/2003/QD-BTNMT, Circular No. 134/1999/TT-BNN-QLN, Directive No. 03/1999/CT-Ttg, Decree No. 143/2003/ND-CP</p>
Environment and Climate Change	<ul style="list-style-type: none"> <li>• (CO 1.1.1. – ESP 1, 2, 3, 5), (CO 1.1.2. – ESP 1, 2, 3, 5), (CO 1.1.3. – ESP 1, 2, 3, 5), (CO 1.1.4. – ESP 1, 2, 3, 5), (CO 1.2.1. – ESP 1, 2, 3, 5), (CO 1.2.2. – ESP 1, 2, 3, 5),</li> <li>• (CO 2.1.1. – ESP 1, 2, 3, 5), (CO 2.1.2. – ESP 1, 2, 3, 5, 9, 10, 11), (CO 2.1.3. – ESP 1, 2, 3, 5, 9, 10, 11), (CO 2.1.4. – ESP 1, 2, 3, 5, 9, 10, 11), (CO 2.2.1. – ESP 1, 2, 3, 5, 11, 15), (CO 2.2.2. – ESP 1, 2, 3, 5, 11, 15), (CO 2.2.3. – ESP 1, 2, 3, 5, 11, 15),</li> <li>• (CO 3.1.1. – ESP 1, 2, 3, 5, 11), (CO 3.1.2. – ESP 1, 2, 3, 5, 11), (CO 3.1.3. – ESP 1, 2, 3, 5, 11), (CO 3.1.4. – ESP 1, 2, 3, 5, 11)</li> </ul>	<p>Law on Environmental Protection No. 55/2014/QH13, Decree 40/2019/ND-CP, Circular 25/2019/TT-BTNMT, Decision No. 19/2007/QD-BTNMT, Decision No 819/QD-BNN-KHCN Circular No. 04/2012/TT-BTNMT, Decree No. 102/2008/ND-CP, Decision No. 179/2004/QD-TTg , Circular No. 27/2015/TT-BTNMT, Law on Hydro-meteorology (No. 90/2015/QH13)</p>
Disaster Risk Management	<ul style="list-style-type: none"> <li>• (CO 1.1.1. – ESP 1, 2, 3, 5), (CO 1.1.2. – ESP 1, 2, 3, 5), (CO 1.1.3. – ESP 1, 2, 3, 5), (CO 1.1.4. – ESP 1, 2, 3, 5), (CO 1.2.1. – ESP 1, 2, 3, 5), (CO 1.2.2. – ESP 1, 2, 3, 5),</li> <li>• (CO 2.1.1. – ESP 1, 2, 3, 5), (CO 2.1.2. – ESP 1, 2, 3, 5, 9, 10, 11), (CO 2.1.3. – ESP 1, 2, 3, 5, 9, 10, 11), (CO 2.1.4. – ESP 1, 2, 3, 5, 9, 10, 11),</li> <li>• (CO 3.1.1. – ESP 1, 2, 3, 5, 11), (CO 3.1.2. – ESP 1, 2, 3, 5, 11), (CO 3.1.3. – ESP 1, 2, 3, 5, 11), (CO 3.1.4. – ESP 1, 2, 3, 5, 11)</li> </ul>	<p>Law on Natural Disaster Prevention and Control, Decree No. 66 /2014/ND-CP, Decision No. 172/2007/QD-TTg, Decision No. 1002/QD-TTg, Decision No. 1041/QD-TTg</p>
Agriculture	<ul style="list-style-type: none"> <li>• (CO 1.1.1. – ESP 1, 2, 3, 5), (CO 1.1.2. – ESP 1, 2, 3, 5), (CO 1.1.3. – ESP 1, 2, 3, 5), (CO 1.1.4. – ESP 1, 2, 3, 5), (CO 1.2.1. – ESP 1, 2, 3, 5), (CO 1.2.2. – ESP 1, 2, 3, 5),</li> <li>• (CO 2.2.1. – ESP 1, 2, 3, 5, 11, 15), (CO 2.2.2. – ESP 1, 2, 3, 5, 11, 15), (CO 2.2.3. – ESP 1, 2, 3, 5, 11, 15), (CO 2.2.4. – ESP 1, 2, 3, 5),</li> <li>• (CO 3.1.1. – ESP 1, 2, 3, 5, 11), (CO 3.1.2. – ESP 1, 2, 3, 5, 11), (CO 3.1.3. – ESP 1, 2, 3, 5, 11), (CO 3.1.4. – ESP 1, 2, 3, 5, 11)</li> </ul>	<p>Law on Crop Production, Decision No. 1895/QD-TTg, Circular No. 07/2015/TT-BNNPTNT, Decision No. 132/1999/QD-BNN-HTQT, Decree No. 02/2010/ND-CP repeals Decree No. 56/2005/ND-CP</p>

63. The project will fully comply with the national technical standards and the 15 principles of the Environmental and Social policy of Adaptation Fund. Screening of national technical standards has been conducted (*detailed in section K*), and the relevant regulations per sectors are indicated in the Table. In course of the full proposal development, these regulations will be detailed and explained how they relate to the project. The concrete outputs are screened against the Adaptation Fund principles. The outputs are in line with the principles, and a narrative will be provided in the full proposal. FAO has established its Environmental and Social Safeguards that set out specific requirements to social and environmental issues. The nine safeguards are natural resource management; biodiversity, ecosystems and natural habitats, plant genetic resources for food and agriculture; animal – livestock and aquatic genetic resources for food and agriculture; pest and pesticide management; involuntary resettlement and displacement; decent work; gender equality; indigenous peoples and cultural heritage. The project will reflect on the defined Safeguards to ensure compliance with the organizational policy.

#### **F. Duplication of project / programme with other funding sources**

64. Viet Nam holds various climate change related projects and initiatives, although more focused on the southern part of the country. Initial screening for potential duplication has not highlighted any overlapping or duplication with other funding sources and the proposed project in technical, spatial, and / or temporal dimensions. The proposed project will take due account of them, and in some cases utilize the lessons learned of other projects to reinforce the objectives. At the stage of full proposal development and consultations, information-sharing, coordination and dialogue will take place to create implementation synergies and alignment with the existing initiatives. Moreover, the proposed project, due to its integrated and compatible design, will be able to draw lessons from the achieved results of recently implemented and concluded FAO pilot project through the building on the existing outcomes on climate monitoring and drought assessment and sourcing information from the established drought portal.

Relevant Projects/Programme	Goals and Achievements	Complementarity potential and non-duplication	Project timeline
<p>World Bank “Viet Nam Dam Rehabilitation and Safety Improvement Project” Location: all country, focusing on prioritized dams and reservoirs Sectors: Irrigation and drainage; other water supply, sanitation and waste management; public administration</p>	<p>The subproject developed in Nghe An province aims to ensure the long-term viability of a selected dam and reservoir; to ensure the safety of downstream people and agricultural areas, as well as downstream infrastructures, and to ensure stable water source for irrigation of rice and animal production</p>	<p>The project, although related to water resources management, refers to a single dam, in Khe San reservoir which is located in Quynh Thang, a district of Nghe An province away from the current target area At full proposal level, best practices, products and lessons learned will be carefully examine.</p>	<p>Approved in 2017 and expected to finish in 2022</p>
<p>ADB Water Sector Investment Program. Multi-tranche project -Vinh water supply subproject Location: Vinh city and surrounding region, Nghe An province</p>	<p>The project provides an improved water supply coverage in the system, as well as an old pipe replacement or improvement. The network is partitioned and master meter installed, as well as Supervisory Control And Data Acquisition (SCADA)</p>	<p>The ADB project is not overlapping with the proposed project, but lessons learned could be in-built to maximize the efficiency of project implementation. Best practices and products will be taken into account for the full proposal design.</p>	<p>Duration: 2013-2018</p>
<p>World Bank / Viet Nam Government Viet Nam managing natural hazards project (vn-haz project) Location: Various provinces of Viet Nam, including Nghe An, which involved 9 subprojects (one in Thanh Chuong district regarding Repairing and Upgrading Dyke Luong Yen Khai)</p>	<p>The project involves 1. Strengthened Disaster Risk management, 2. Weather Forecasting and Early Warning Systems; 3. a community-Based Disaster Risk Management and 5. priority investments for Disaster Risk Mitigation Investments</p>	<p>AF project will take into account the produced material of World Bank project in terms of early warning and information systems in order to avoid duplication, although AF project will be more in-situ by developing a climate-hazard monitoring system targeting the command area During the full proposal process a dialogue channel through consultation can be establish with the steering committee of the World Bank project to draw lessons.</p>	<p>Duration: 2012 – 2019</p>
<p>FAO Pilot Study: Strengthening the agroclimatic information system to improve the agricultural drought monitoring and early warning system in Viet Nam Location: Ninh Thuan province</p>	<p>The main goal of FAO project is to provide a web platform in which includes a satellite-based monitoring system. The platform allows to map extreme events to improve drought management at decision-makers level.</p>	<p>AF project will create synergies with this pilot study, in order to convey an upgraded and integrated initiative within the selected area. Consultation will be established at full proposal level to explore synergies or lessons learned and to build on products and best practices</p>	<p>Duration 2017-2019</p>
<p>JICA Technical Cooperation Project on Development Planning of Agriculture Sector in Nghe An in the Socialist Republic of Vietnam Location: Nghe An province</p>	<p>The project aims to develop "The Agriculture Development Master Plan (M/P) for Nghe An Province" and "Action Plan (A/P)" to achieve the goals of the M/P, through introduction of "Contract Agriculture" which will enhance food value chain in Nghe An province.</p>	<p>The project will draw lesson on the development of pilot projects on sustainable agriculture. The project is complementary to the objectives of the current project. The AF project will examine the products in order to avoid duplication and establish consultation with the JICA Steering Committee.</p>	<p>Duration 2014-2019</p>

<p>Vietnam Forests and Delta Program Location: Thanh Hoa, Nghe An, Nam Dinh, Long An province</p>	<p>VFD has successfully developed policies and implemented actions to achieve green growth, sustainable forest management, and equitable payment for forest environmental services in Nghe An and Thanh Hoa provinces. As a result of project support, approximately 25 000 households are receiving PFES payments and are now more actively engaged in local forest protection</p>	<p>The projects have only minor cross-cutting objectives. However, achievements in the VFD programme will provide valuable basis for case studies on ecosystem-based adaptation. This can be part of the capacity-building programmes. Thus, best practices, products and lessons learned will be taken into account and thoroughly examine.</p>	<p>Duration 2012-2021</p>
<p>LuxDev “Western Nghe An Rural Development Project  Location: Con Cuong, Tuong Duong and Ky Son</p>	<p>The project aims to alleviate Rural Poverty by improving rural livelihoods in a sustainable way and through appropriate and diversified agricultural production and related infrastructure. Specifically, the local capacity to deliver sustainable agricultural services has been strengthened; as well as rural households benefits from the adoption of sustainable agricultural practices, and improvement of rural communities’ access to goods and services.</p>	<p>The project involved Con Cuong.  Best practices in sustainable agricultural activities, products and lessons learned will be taken into account and thoroughly examine, considering the possibility to partially build on them.  The proposed AF project will examine the training material used in order to draw lessons.</p>	<p>Duration: 2006 - 2015</p>
<p>GCF/UNDP “Strengthening the resilience of smallholder agriculture to climate change-induced water insecurity in the Central Highlands and South-Central Coast regions of Vietnam”  Location: Dak Lak, Dak Nong, Binh Thuan, Ninh Thuan and Khanh Hoa provinces</p>	<p>The project aims to secure water resources and improve soil and water management while ensuring more efficient water use, together with climate-resilient crop production, strengthening capacities to apply climate and market information, technologies, and practices for climate-resilient water and agricultural management.</p>	<p>The project focuses on 5 provinces of Central Highlands and South-Central Coast area. There is no geographical overlap with the AF project and the agro-ecological zones are different than the current project. Since the thematic areas are close to the proposed project ones and it is a new-born project, potential synergies may be explored in terms of approaches and methodologies.</p>	<p>Duration 2020-2025</p>
<p>ADB “Viet Nam: Water Efficiency Improvement in Drought-Affected Provinces Project”  Location: Dak Lak, Dak Nong, Binh Thuan, Ninh Thuan and Khanh Hoa provinces</p>	<p>The project main objective is to integrate climate-resilient agricultural activities and irrigation modernization practices, through the strengthening of irrigation management, modernization of irrigation infrastructure, and support for efficient on-farm water management practices. It will enhance the ability to manage climate variability, improve the water productivity of agriculture, and increase incomes.</p>	<p>The project focuses on 5 provinces, namely Binh Thuan, Dak Lak, Dak Nong, Khanh Hoa, and Ninh Thuan. Thus, while this project has a similar focus as one of the proposed projects, intervention sites are in different agro-ecological zones.  However, a dialogue can be established with ADB for the purpose of synergies, in order to share knowledge and best-practices on the similar activities.</p>	<p>Duration 2019 - 2026</p>
<p>GEF/FAO “FOLUR IP-Child project” Location: 20 percent of the Mekong Delta (MD)’s rice production area within the provinces of Dong Thap, An Giang, Vinh Long, Soc Trang and Tra Vinh .</p>	<p>The project will address key sustainability and social inclusion issues in rice production landscapes (on-farm and off-farm), through national policy instruments and partnership along the value chain while enabling conditions to establish sustainable landscape management, food security and poverty alleviation, climate mitigation , conservation of biodiversity and water resources.</p>	<p>The project targets provinces in Mekong Delta focusing strictly on rice production. Sustainable activities in rice production landscape will be taken into account as lessons learned during the development of Component 2 of the proposed project. Also, the results related to enabling environment, and policy instruments will be</p>	<p>Duration: 2020-ongoing</p>



		valuable baseline to align Component 1 to national and regional trends.	
IFAD "Adaptation in the Mekong Delta in Ben Tre and Tra Vinh Provinces (AMD)"	The main objective of this project is to support sustainable livelihoods for the rural poor while strengthening the adaptive capacity of target communities and institutions to combat climate change.	No duplication has been identified from the project, and the agroecological zones in the project are different than the current project. However, the proposed project can take into account the products and lessons learned about community based adaptation and disaster risk management planning	Duration: 2014-2020
SWISS/IRRI/GIZ "RIICE: Remote Sensing-based Information and Insurance for Crops in Emerging Economies"  Location: "10 provinces of the Red River and Mekong Deltas"	The interregional project aims to provide a platform by adopting satellite-supported activities, to reduce the vulnerability of smallholder rice farmers to extreme weather events and increase their economic well-being through crop insurance. In Vietnam, the project uses satellite earth observation data to monitor rice production	No duplication has been detected from this project, since it targets a different area and the focus is only on rice production. However, data and experience from satellite-based platform can be feed into Component 3 of the proposed project	Duration: 2012-ongoing
FAO/GEF "Fostering Water and Environmental Security in the Ma and Neun/Ca Transboundary River Basins and Related Coastal Areas"	The regional project aims to enable Viet Nam and Lao PDR in addressing freshwater resource management and ecosystem health in the transboundary river basins and coastal zones by creating an enabling environment for transboundary cooperation and action.	The regional project targets the area of Ma and Neun/Ca. transboundary rivers in the northern regions, thus there is no geographical overlapping Synergies or lessons learned may be explored during design consultations.	Duration: 2021-2026
FAO/GEF "Enhancing sustainability of the Transboundary Cambodia - Mekong River Delta Aquifer"	The project objective is to strengthen environmental sustainability and water security in the Lower Mekong Basin, with the focus on improved governance and sustainable utilization of Cambodia-Mekong River Delta	The project has strong transboundary focus and builds on transboundary cooperation and groundwater assessment and management in the Mekong Delta. Therefore, no duplication is identified.  Regarding the approach and methodologies, the project can provide important lessons on the best approach on groundwater mapping and information dissemination. The project management and stakeholders will be consulted and a continuous dialogue will be set up for information exchange	Duration: 2021-2026

## G. Learning and knowledge management component to capture and disseminate lessons learned

65. Component-specific capacity-building is essential part of the project to improve ownership of stakeholders, contribute to knowledge management, increase sustainability of project results and demonstrate good practices. The different components act at different level (decision-makers, community leaders, farmers), so the design of knowledge management is aligned differently. In particular, as current knowledge of communities on climate change and potential adaptation measures is limited, there is a strong need to scale knowledge products at their level.
66. Beyond specific capacity-building programmes, the project sets out to regularly document the practices, lessons-learnt and conclusions. All learning materials are to be disclosed and widely disseminated to transfer knowledge at wide scale both through national channels (local and sub-national media and FAO communication channels, including FAO publishing services and social media accounts).

Expected outcomes	Stakeholders and learning objectives	Knowledge product
1.1. The enabling environment is strengthened at province level through the establishment of an inclusive integrated drought and flood management model.	For decision-makers, management staff and community leaders: <ul style="list-style-type: none"> <li>To obtain structured and systematic management analysis with institutional and policy dimension</li> <li>To develop management process model</li> </ul>	<ul style="list-style-type: none"> <li>Structured dataset of management dimensions at different level</li> <li>Guide on institutional and policy analysis with FAO-developed Action Matrix for professionals</li> </ul>
1.2. Relevant stakeholders are empowered to operate the management model	For decision-makers, management staff and community leaders: <ul style="list-style-type: none"> <li>To operate, maintain and update the management process model</li> <li>To support inclusive and integrated policy decision</li> </ul>	<ul style="list-style-type: none"> <li>Operation plan and tutorial modules for the process model</li> <li>Face-to-face training for decision-makers on the process plan</li> </ul>
2.1. Water availability/access for multiple use of the communities most vulnerable to climate change better secured through aquifer recharge, water harvesting and the application of efficient water techniques	For professional staff, engineers, community leaders and relevant stakeholders: <ul style="list-style-type: none"> <li>To promote climate change adaptation in water sector development</li> <li>To support the design of green infrastructure, namely ecosystem-based structures in further development processes</li> <li>To facilitate efficient water allocation and distribution rules for multiple purposes</li> <li>To improve knowledge on groundwater management</li> </ul>	<ul style="list-style-type: none"> <li>Guide on multicriteria assessment in designing climate adaptive and ecosystem-based infrastructure in water sector</li> <li>Manual on O&amp;M of ecosystem-based adaptation infrastructures</li> <li>Maps and data repository on groundwater management</li> <li>Face-to-face training on water allocation modelling for multiple purposes</li> <li>Training-of-trainers on groundwater management in participatory approaches</li> </ul>
2.2. Vulnerable communities' capacities strengthened to adapt to impacts of drought through adopting best on-farm technologies and practices	For extension service, community leaders and farmers: <ul style="list-style-type: none"> <li>To enable climate-resilient and water efficient farming practices</li> <li>To improve farming outcomes (profitability, productivity, resource efficiency)</li> <li>To ensure cost recovery of irrigation sector at micro level</li> </ul>	<ul style="list-style-type: none"> <li>Field guide for practitioners on in-situ water harvesting</li> <li>Field guide for practitioners on climate-resilient agricultural practices</li> <li>Community-level information campaign on in-situ water harvesting and climate-resilient agricultural practices</li> <li>Toolbox of good agricultural practices for diversification and dissemination campaign</li> <li>Manual on water pricing protocol</li> </ul>

<p>3.1. Climate-hazard monitoring established and knowledge sharing platform on inclusive integrated drought and flood management established</p>	<p>For professional staff, engineers, community leaders and relevant stakeholders:</p> <ul style="list-style-type: none"> <li>• To strengthen climate-hazard monitoring and forecasting capacities</li> <li>• To enable information-based decision-making in climate change adaptation</li> <li>• To create effective mechanism for information sharing with communities</li> </ul>	<ul style="list-style-type: none"> <li>• Manual on O&amp;M of monitoring system with tutorial modules</li> <li>• Face-to-face training on monitoring and forecasting for professionals</li> <li>• Training-of-trainers on reporting and information-sharing with communities</li> </ul>
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## H. Consultative process

67. The consultative process involved stakeholders at different levels from decision-makers to community representatives. The consultation team involved national and international experts with decent gender balance. The consultation included representatives from relevant ministries to ensure the alignment with national priorities and strategies. MONRE was involved over the project development phase to exchange on progress and ensure that proposed activities are in conformity with national adaptation objectives. In order to anchor the project on communities' actual need and reach their support in project development, several field consultations were arranged with the communities in the target area. As the process handled gender equity as high priority, representatives of Women Union were invited to participate in the consultation. Given the length limit, the proposal summarizes the main conclusions of the multiple steps of consultation.

Name	Position, role	Conclusions
<b>Consultation team</b>		
Mr. Nguyen Song Ha (FAO VN, Assistant of FAO Representative, Viet Nam), Mr. Nguyen Thi (MONGRE, Officer, Viet Nam), Mr. Nguyen Sy Linh (National expert, Viet Nam), Mr. Maher Salman (FAO NSL, Senior Land and Water Officer, Rome), Ms. Margarita Diubanova (FAO OCB, Senior Climate Expert, Rome), Ms. Eva Pek (FAO NSL, Water Resource Specialist, Rome), Ms. Camilla Simongini (FAO NSL, Environmental engineer, Rome), Ms. Stefania Giusti (FAO NSL, Programme Officer, Rome)		
<b>Consultation meeting with Than Lam commune, Thanh Chuong district</b>		
<p>Mr. Nguyen Xuan Ky (Vice chairman of the commune), Mr. Tran Hung Tien (Land and Environment Officer), Mrs., Nguyen Thi Thuy (Vice Chair of Woman Union), Mrs. Nguyen Thi Van Anh (Vice Chair of Farmer Union), Mr. Dinh Van Nam (Head of Village 1), Mrs Nguyen Thi Tho (Head of Village 2) Mr. Phan Van Hoang (Vice Head of Village 6)</p>	<p><b>Problem statement:</b> The community is characterized by high poverty rate, with reliance on income from remittances. Due to current pandemic crisis, however, the families' access to remittances has dramatically dropped. The community is severely exposed to high-frequency flooding, and recently observed severe flood damage, whereas 4 out of 6 villages were inundated for more than 8 days. The recent agricultural performance is low, as farmers can cultivate only in one season due to drought and lack of access to water. The traditional farming practices are not resilient; thus the actual rice yields do not reach the tenth of the national average (0.5 ton/ha). The community has been experiencing devastating droughts with cascading effects, including lack of water for irrigation and household purposes, shrinking groundwater tables and complete yield failure.</p> <p><b>Identified adaptation measures:</b> The consultation together with accompanied field visit identified possible adaptation measures to address the abovementioned hardship. Communities requested the introduction of water harvesting techniques to increase access to water and recharge aquifers. Also, the participants highlighted the need of irrigation system rehabilitation to increase irrigation performance and allow for sufficient irrigation in two seasons. Furthermore, the update of current agricultural production with smart practices were reiterated by farmers. Given the high frequency of occurring floods, community leaders agreed on the need of information generation on flooding, in particular on accurate mapping to support livelihood protection and agricultural protection.</p>	
		
<b>Consultation meeting with Binh Chuan commune, Con Cuong district</b>		
<p>Mr. Vi Dinh Thanh (Chairman of Binh Chuan Commune), Mr. Khu Van Van (Head of Quan village), Mr. Nguyen Manh Ha (Vice Chairman of Binh Chuan Commune), Mr. Luong Van Ly (Head of Xiem village), Mr. Vi Van Kinh (Head of Toong village), Mrs. Khu Thi Huong (Farmer from Na Co village), Mr. Khu Van Vien (Head of Que village), Mr. Lay Van Vinh (Head of Quan village), Mr. Vi Van</p>	<p><b>Problem statement:</b> The agricultural production is limited in the area, to around 500 ha, which is prone to drought. The communities expressed their concern about growing food insecurity due to low agricultural productivity and as result of the previous landscape change (deforestation) in the area. Around 60 percent of the rice production area is affected by climate extreme, thus resulting extremely low yield. The communities reported a large number of deteriorated dams that are currently out of use. The</p>	

<p>Luyen (Head of Dinh village), Mr. La Van Sao (Head of Na Co village), Mr. Vi Van Hoang (Head of Met village), Mr. Lo Van Hau (Head of Xieng village), Mrs. Khu Thj Du (Head of Dinh village), Mrs. Luong Thi May (Farmer from Na Co village), Mrs. Vay Thi Yen (Farmer from Dinh village), Mr. Lai Van Hung (Vice head of Agriculture and Rural Development Division of Con Cuong district), Mr. Vi Van Dung (Vice head of Natural Resources and Environment Division of Con Cuong district)</p>	<p>frequent drought events and overall water scarcity pose enormous pressure on local communities and make them increasingly vulnerable. However, the rehabilitation of dams and water infrastructure would be desirable to tackle the multiple issues regarding water access. Another concern arose from the poor access to water for domestic water use. The current wells in use are dried up, as groundwater tables dropped. Drilling deeper wells would result in ecosystem degradation including soil erosion and groundwater exploitation, as well as it would entail significant cost to pump water from deep wells. Communities are extremely vulnerable to further decrease in water supply, as they already <i>“have to ask for water to drink from each other”</i>.</p> <p><b>Identified adaptation measures:</b></p> <p>As water scarcity and currently limited agricultural potential are the major pressing issues, the participants agreed that water harvesting structure for water retaining and storing, as well as the rehabilitation of dams and adjacent irrigation systems are inevitable to build resilience to further climate impacts. Communities articulated the need of groundwater mapping, as they have no information on the current trends.</p> <div style="display: flex; justify-content: space-around;">   </div>
<p><b>Consultation meeting with DONRE office, Nghe An</b></p>	
<p>Mr. Thai Van Nong (Vice Director of Nghe An DONRE), Mr. Dao Duy Tam (Head of Division- Hydrology and Metrology under DONRE) , Mr. Le Van Hoa (Vice Head of Division- Hydrology and Metrology under DONRE), Ms. Nguyen Thi Le (Official of Division- Hydrology and Meteorology under DONRE), Mr. Nguyen The Anh (Official of Sub-department of Water Resources under DARD of Nghe An province), Mr. Trang Van Binh (Vice head of Division of water work management and rural clean water under Sub-department of Water Resource), Mr. Nguyen Hoa Lam (Vice director of Sub-Department of Rural Development under DARD of Nghe An province), Mr. Nguyen Tien Duc (Director of Sub-department of Plant Protection and Crop production under DARD of Nghe An province)</p>	<p>The consultation introduced the project frames and the possible adaptation measures to respond to the current issues in the province. The participants agreed that Nghe An province is in utmost need to introduce adaptation measures to respond to climate change impacts, increase resilience and improve livelihoods through more productive agriculture. The meeting highlighted the socio-economic hardship of the communities and the threats of increasing poverty.</p>

## **I. Justification for funding requested, focusing on the full cost of adaptation reasoning**

68. The project is fully in line with national adaptation priorities as presented in the D section. The project is also in line with the requirement of communities and directly addresses the increasing vulnerability to climate change impacts. The project concrete outputs are complementary to provide a solid and comprehensive framework for adaptation from institutional, technical, socio-economic and climate point of view. Therefore, the project does not require additional fund to achieve full impact.
69. From institutional point of view, the project tackles the identified institutional gaps to enable integrated management of flood and drought. By strengthening institutional mechanism, the project will be embedded in efficient management environment, which is also in line with the relevant national institutions. This will pave the way to maintain the project results in long-term and contribute to enabling environment for climate change adaptation.
70. From technical point of view, the project provides integrated solutions for flood and drought. The deployed technologies themselves will reduce the risk of flood and drought damages. It will also address to environmental issues, such as shrinking groundwater resources, ecosystem degradation including soil erosion. No additional technology is required to have fully functional system and achieve the objectives of technology development. The information system is built on existing facilities, however, these are already in place.
71. From socio-economic point of view, the project delivers adequate farming practices that support farmers both in climate change adaptation and livelihood improvement. Farmers will take multiple advantages of proposed suite of best practices involving water-efficient and climate resilient farming, as they aim at reducing pressure on natural resources, while increasing farming outputs. In order to be inclusive for different cropping systems, farmers are supported in both updated rice production practices and crop diversification, as well as gardening. Communities' livelihood is also supported through sustainable management of groundwater resources. As households water use rely exclusively on groundwater resources, augmentation of groundwater in shrinking aquifer will continue to supply water even for poorer households, who cannot afford deep well drilling, while protecting aquifers from depletion. Recharge capacity will be designed to counterbalance both climate change impacts and current rate of exploitation.
72. From climate-change point of view, each output of the project provides adaptation measures starting from planning and management capacities, technological solutions, farming practices to monitoring, information system including early-warning. While information system and updated management frameworks are non-structural measures to reduce the climate risks, the technologies and farming practices are combined non-structural and structural measures to adapt climate change and reduce the impact on vulnerable communities in long-term. Therefore, the project design itself is suitable to adapt climate change impacts even in worst scenario.

## **J. Project sustainability**

73. The project design directly addresses the critical factors impacting on the post-project sustainability. The project is built on national experiences of water resource development, whereas imbalance between investment and operating expenses resulted fast deterioration of infrastructure. This was mainly due to the engineering design not complying with environmental requirements, high technological complexity, centralized management, poor O&M of infrastructure and increased load due to climate change impacts. In order to obtain long-lasting and scalable results, the project tackles both internal and external factors of sustainability. The assessment through different aspects provides a composite picture of the overall sustainability:
  - a. Technical sustainability: Unlike the current grey infrastructure in place, ecosystem-based design is rather built on traditional knowledge of natural process than on engineering capacities.



Consequently, ecosystem-based adaptation solutions present reasonable technical complexity that can be integrated into participatory management. An infrastructure built on natural processes involve uncertainty, as its level of service evolves continuously. These processes can be observed and documented to establish high-performing management rules. In order to support the sustainability of the O&M of created infrastructure, performance monitoring (quantity, quality, impacting factors) is essential part of the project, as well as capacity-building on monitoring and O&M through Component 2. Component 3 directly contributes to the technical sustainability, as monitoring system is extended to observe natural processes (discharge, soil water content and groundwater tables). Based on the generated information, O&M guidelines and capacity-building will be developed to ensure the technology uptake and management transfer. In post-project phase, the deterioration of the structures is expected to remain low, thus enabling a long life-span.

- b. **Financial sustainability:** The financial sustainability is supported by two parallel approach: decreasing the cost of irrigation and increasing the farm profitability. The increased profitability is envisaged through the improved yields, increased cropping intensity (double-cropping), decreased production cost and introduction of climate-resilient and safe production practices for cash crops. On the other side, the developed infrastructure will be operated by grassroots-level organization of the commune, thus optimizing the current water service and irrigation fees. The operating expenses of ecosystem-based structures are significantly lower than grey infrastructure and can be mainstreamed into participatory programmes. While grey infrastructures require a reasonable budget regarding the maintenance works (in particular regarding the condition-based maintenance and repair works), the EbAs have the potential to be maintained and financed by communities without any significant financial burden. In order to strengthen the financial sustainability, the project includes a new pricing modality, which creates balance between financial and in-kind contribution. Consequently, the pricing model improves the financial sustainability, while does not jeopardize farm profitability. The commune will be the direct budget holder, so the compliance with the established payment modalities and contribution plan will be monitored at local level. Such organization mechanism will also enable the creation of incentives for farmers (e.g. fee deduction for water saving, accounting in-kind contribution etc.).
- c. **Community-related sustainability:** The involvement of communities from the beginning of the project aims at creating strong ownership and commitment from direct end-users. Communities having reliable access to water are expected to remain engaged post-project. Also, communities channeled into information-sharing through Component 3 (climate information, early-warning reports, status of water resources) will be incentivized to maintain project results. In post-project phase, the communities will have sufficient capacities to operate the structures, practice climate-resilient agriculture, and eventually elevate farming outcomes.
- d. **Institutional sustainability:** The revisited institutional arrangements that are more inclusive and information-based provide strong framework for the project sustainability through Component 1. The process model complementing the project results from institutional point of view will create the most efficient setting of sustainable management. It will also form a basis for similar investments at larger scale. In post-project phase, the institutional actors will be empowered to become self-organized and more integrated. The institutional sustainability is also improved by the capacity-building programmes in Component 2, which are designed to empower the communities to manage the water infrastructure at grassroots-level.
- e. **Environmental sustainability:** The core concept is built on ecosystem-based development, which is fully in line with environmental sustainability objectives. Building on natural process, such as re-naturalization and water resource augmentation helps restoring the ecosystem while providing substantial gains for stakeholders through Component 2. In post-project phase, the project adds to environmental benefits through groundwater conservation, prevention of soil erosion and support of natural embankments.

74. The project sustainability requires the cooperation of stakeholders at different level. MONRE is responsible for the overall coordination of the project results and mainstreaming its results to national policies. The implementation, management and maintenance of results of Component 1 related to institutional modelling is to be trusted on district-level authority (Sub-department of Water Resource in Nghe An province). The implementation, management and maintenance of results of Component 2 related to water infrastructure is to be shared between district-level authority and commune organization. Further related to Component 2, farm-level development is to be maintained directly by farmers and embedded into the programme of extension service. The implementation, management and maintenance of results of Component 3 related integrated information system is to be trusted on local meteorological and hydrology station as shared responsibility (Official of Division- Hydrology and Meteorology, DONRE).
75. The project provides scalable results that can be replicated at regional level. In order to ensure the scalability, capacity-building programmes and project results are disseminated through physical, online and offline knowledge products. At system level, the project provides good practice on turning degraded infrastructure into productive and environmental-friendly adaptation structures. By approaching their end of lifespan, large part of the countries' outdated water infrastructure requires re-investment to restore their function. Therefore, the project aims at promoting sustainable re-engineering that supports the climate-change adaptation. Therefore, the interest of the project result replication at national level is expected to be high. At on-farm level, the introduced agricultural practices can be scaled at regional level, whereas climate similarity allows farmers to adopt them.

#### K. Environmental and social impacts and risks

76. According to Adaptation Fund's regulations and following the initial screening, the concept proposal has been categorized as Category C, considering that no adverse environmental or social impacts have been identified.
77. A preliminary environmental and social risks assessment is shown in the table, which will be extended with more detailed narrative of the indicated principles in the full proposal, using specific, reliable and effective indicators. At this stage some potential areas that require further assessment have already been identified and indicated in the below checklist.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks
<i>Compliance with the Law</i>	X Relevant laws, regulations and technical standards are identified and listed in Section E More detailed description will be provided in the full proposal	
<i>Access and Equity</i>	X Communities' leaders and representations are already consulted Field visit was conducted to map direct beneficiaries in both districts The planned multilevel pricing model will take into account the socio-economic conditions of beneficiaries and it will be formulated with the aim to ensure a fair and equitable access to water resources by the most vulnerable, whereby past experiences generally resulted in over-pricing mechanisms, particularly unsustainable for poor and marginalised groups The access and equity is enhanced through the project design that places the management responsibilities at grassroots level More rigorous and detailed analysis will be conducted in the full proposal stage	
<i>Marginalized and Vulnerable Groups</i>	X Most vulnerable groups are mapped and visited during the field visit More rigorous and detailed analysis will be conducted in the full proposal stage	
<i>Human Rights</i>	X Project risk related to human rights is not identified	

<i>Gender Equity and Women's Empowerment</i>	<b>X</b> Women representations are consulted and presented in Section H More detailed description will be provided in the full proposal	
<i>Core Labour Rights</i>	<b>X</b> Project risk related to human rights is not identified	
<i>Indigenous Peoples</i>	<b>X</b> No indigenous people live in the project area	
<i>Involuntary Resettlement</i>	<b>X</b> Field visit was conducted to map the project area Component 2 is planned in equipped area, so neither land acquisition nor involuntary resettlement is required	
<i>Protection of Natural Habitats</i>	<b>X</b> Con Cuong command area is bordered by natural park, but the project area does not include it The project sets out ecosystem- based infrastructure in the place of current grey infrastructure, so the project improves the natural habitats While threats to biological diversity and damage to aquatic ecosystems are unlikely, there is a low possibility that the creation of water storage infrastructure and naturalisation of existing structures may adversely impact on local biodiversity and environmental flows. Consultations with Thanh Lam, and Thanh Choung communities are foreseen to define the exact site locations that ensure protection of natural habitats and respect existing ecosystems through the implementation of Ecosystem-based adaptation measures (EbA). More detailed description will be provided in the full proposal	
<i>Conservation of Biological Diversity</i>	<b>X</b> Project risk related to conservation of biological diversity is not identified	
<i>Climate Change</i>	<b>X</b> Project risk related to climate change is not identified	
<i>Pollution Prevention and Resource Efficiency</i>	<b>X</b> Component 2 targets to improve resource efficiency (land and water) Envisaged co-management mechanisms, planned across dry and wet seasons, will reduce potential negative impacts posed by upstream water retaining infrastructure. The system is gravity-fed and water intake is designed at peak water level to harvest excess water. Reduced harm is expected to groundwater resources through the provision of capacity development programmes, groundwater assessment and monitoring on sustainable water management and O&M. More detailed description will be provided in the full proposal	
<i>Public Health</i>	<b>X</b> Groundwater recharge and system outlet for domestic purposes must comply with national regulations More detailed description will be provided in the full proposal	
<i>Physical and Cultural Heritage</i>	<b>X</b> Project risk related to physical and cultural heritage is not identified	
<i>Lands and Soil Conservation</i>	<b>X</b> Component 2 targets to reduce riverbank and soil erosion More detailed description will be provided in the full proposal	

## PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

### A. Record of endorsement on behalf of the government<sup>33</sup>

<sup>6</sup>. 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.

Dr. Tran Hong Ha, Minister of Natural Resources and Environment, Ministry of Natural Resources and Environment, Socialist Republic of Viet Nam

Date: Jan 14 2021



SOCIALIST REPUBLIC OF VIET NAM  
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT

Ha Noi, 14 January 2021

The Adaptation Fund Board  
C/o Adaptation Fund Board Secretariat  
Email: [Secretariat@adaptation-Fun.org](mailto:Secretariat@adaptation-Fun.org)  
Fax: 202 522 3240/5

**Subject: Endorsement for Building resilience and improving response to drought and flood in North Central region of Viet Nam to reduce the impacts of climate change: Inclusive Integrated Management of Drought and Flood**

In my capacity as designated authority for the Adaptation Fund in the Socialist Republic of Vietnam, I confirm that the above project concept note is in accordance with the government's national priorities in implementation adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the North Central Region of Viet Nam. The project will contribute to implementation of Viet Nam's updated Nationally Determined Contribution (NDC) which submitted to UNFCCC on 11<sup>th</sup> September 2020 and the National Action Plan adapting to climate change (NAP) for 2021-2030 period and vision to 2050 of Vietnam which was approved by the Prime Minister of Viet Nam on 20<sup>th</sup> July 2020.

Accordingly, I am pleased to endorse the above project concept-note with support from the Adaptation Fund. If approved, the project concept-note will be developed in the full proposal and be implemented by the Food and Agriculture Organization of the United Nations (FAO) and executed by the Ministry of Natural Resources and Environment (MONRE) in Viet Nam.

Sincerely,

**Dr. Tran Hong Ha**  
Minister of Natural Resources and Environment  
Socialist Republic of Vietnam

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## 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 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.

*Maher Salman*

Implementing Entity Coordinator



Date: *(February, 17, 2021)*

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**Annex I.**

**TASKS OF IMPLEMENTING THE NATIONAL CLIMATE ADAPTATION PLAN FOR THE PERIOD 2021 - 2030, WITH A VISION TO 2050** (Attached to the Decision No. 1055 / QD-TTg dated July 20, 2020 of the Prime Minister)

D. Water resources

No.	Adaptation priorities/ needs	Targets/ specific objectives	Tasks	Implementing agency/ies
1	Minimize the impact of climate change on water resources	Improve efficiency of water resource management in climate change conditions	Develop a National Strategy on Water Resources to 2030, with a vision to 2050	MONRE
			Develop a master plan on water resources for the period 2021-2030, with a vision to 2050	MONRE
			Building integrated planning of inter-provincial river basins and inter-provincial water sources	MONRE
			Review and adjust inter-reservoir operation procedures in river basins	MONRE, MARD, MoIT
		Strengthen monitoring and protection of water resources	<u>Complete the national water resources monitoring and monitoring system</u>	MONRE
			Determining areas where underground water exploitation is restricted for areas, especially the Mekong River Delta	Provincial authorities/government
			To restore and develop protection forests and mangrove forests in order to protect water sources, prevent riverbank and coastal erosion	MARD and provincial government
		Increase water storage capacity and improve water efficiency	<u>Investigate, evaluate and develop total solutions for water storage based on natural trends of each area</u>	MONRE
			Classification of water scarcity, proposing water storage measures, saving water, limiting water exploitation and use according to each level of water scarcity	MONRE, PPCs
			Investigating, evaluating and identifying solutions to artificially supplement underground water for the Mekong River Delta, South Central Coast and Central Highlands to improve the efficiency of sustainable use of underground water resources in variable conditions. climate change	MONRE and MARD
			<u>Develop, deploy and multiply models of economical and efficient water use</u>	MARD, MoC, PPC
			<u>Construction of additional works to store water, exploit and use water resources in increasing drought conditions due to climate change</u>	MARD, PPCs



## **Annex II.**

### **Initial Gender Assessment**

The population of Viet Nam is around 93 million people with an annual 0.93 percent growth rate. The current imbalanced sex ratio at birth (106 male births per 100 female birth) is increasingly challenging for future development and policy scenarios. The fertility rate has considerably declined over the recent decade to 2.09 from 4.26 in 1989. The Gender Development Index ranks Viet Nam to the Group 1, and Gender Inequality Index groups Viet Nam in the 2nd quartile of global ranking (UNDP, 2018)<sup>34</sup>.

The labour participation rate is relatively high for both men (82.5 percent) and women (73.3 percent). However, the informal employment of women significantly hampers the achieved results in gender equality, as women enrolled in informal employment are not entitled to the social safeguards of Labour Code. Women dominate mostly in hired domestic help, education and training and service sector (UN Women, 2015)<sup>35</sup>. The proportion of women doing unpaid family work is at 22.1 percent compared to the 10.4 percent for men. Housework remain the primary responsibility of the women, with no difference in women with different educational level (FAO, 2019)<sup>36</sup>.

#### Women in agriculture

Agriculture sector has prominent role in the rural employment of women, as 48 percent of the female workforce is employed in agriculture as compared to 45 percent of the male workforce. In rural areas, this gender difference is even more striking, accounting for 63 percent of working in agriculture (UN Viet Nam, 2016)<sup>37</sup>. Due to the economic growth, a labour market transition is already on-going in Viet Nam, with somewhat lower rate for women, who are more likely to remain in agricultural sector than men. The current country regulation puts further obstacle to achieve balanced access to productive assets. Although Land Law stipulates that both women and men can obtain land use rights, the implementation is not enforced. Furthermore, the already issued land certificates in line with the previous laws allowing men to hold rights are not revisited. The gender wage gaps are still not eliminated and men's wages (average 3 368 thousand VND) in agriculture are significantly higher than women's wages (2 327 thousand VND) (FAO, 2019). The current traditional practices applied in agriculture aggravates the problem, as women are more crowded out from heavy physical works (ploughing with animal force). Women are more assigned to easy physical works (sowing, seeding, transplanting or weeding), however, these are mostly defined by the head of households (most frequently males). Lack of access to technology is, therefore, a significant obstacle to make women more productive. However, currently only 5.1 percent of men have access to machine or any other technology transfer, which is 2.6 percent point higher than as of women (GSO, 2012)<sup>38</sup>. There is a significant potential of the current project to increase the productivity and earning of women through Component 2. As women are responsible for households and works around the house, the currently unexploited potential of gardening can be addressed directly by the activities. As garden fruits and vegetables have higher market price and do not require substantial physical work, the project can strengthen the position of women. The project can allow the active involvement of more than 800 women in the project target area and reach out to a significantly larger number of women beneficiaries through the dissemination and capacity-building activities.

#### Women exposed to climate change

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<sup>34</sup> UNDP (2018). Human Development Indices and Indicators: 2018 Statistical Update. New York, USA

<sup>35</sup> UN Women. (2015). National Report on Social Protection for Women and Girls in Viet Nam. Hanoi, Viet Nam

<sup>36</sup> FAO (2019). Country gender assessment of agriculture and the rural sector in Viet Nam. Rome, Italy

<sup>37</sup> UN Women (2016). Toward gender equality in Viet Nam: making inclusive growth work for women, Hanoi, Viet Nam

<sup>38</sup> General Statistics Office of Viet nam (2012). Viet Nam Household Living Standard Survey 2012. National Review of 20-year implementation of the Beijing Platform for Action on the Outcomes of the 23rd Special Session of the General Assembly in Viet Nam.

The country is severely exposed to climate change, whereas women are in direct threat of climate hazards (flood, drought). Women have less access to resources, services and capacity-building means to construct coping strategies. Women are also exposed to climate hazards in a sense that they are more bounded to household, less mobile and have less possibility to migrate from flood-prone areas. This is particularly true in rural areas, where women have less access to information channels. The project directly targets the empowerment of women through facilitated information system in Component 3. The formulated climate hazard monitoring system is designed in a way to provide full accessibility through diversified channels.

Another important issue directly stemming from climate change is the interrupted access to clean water. As groundwater constitutes the basis of household use, the dropping groundwater tables pose serious risk to women, responsible for housework. In recent years, the effects of droughts prompted farmers to use groundwater, thus exploiting the only resource for household demands. The trend reached the critical stage when people have practically no water for drinking. Women having no alternative water sourcing options and being often unpaid remain without water to cover the essential needs. The project takes due account of the increasing vulnerability of women and integrates a major activity of groundwater recharge, essential for the health and daily activity of women.

#### Women's empowerment in decision-making

Women's representation in decision-making is still fragile country-wide, accounting for only 26.8 percent in the National Assembly for the 2016-2021 term<sup>39</sup>. The projects acting at local level have considerable potential to bring women towards decision-making, as district and commune-level representation seems to be slightly higher than women's involvement in the councils at higher level. However, women's role in management is still very low, presenting only 1.9 percent of women as business owner as compared to men at 3.8 percent in the country (FAO, 2019). As the project is operated at local level and envisages the management of improved infrastructure at commune-level, the project embeds concrete actions to improve the gender equality. The involvement of Women Union was carried out formulation level. Component 1, as well as the management transfer of results developed in Component 2 have serious potential to actively and productively involve women and their representation directly in management and decision-making roles.

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<sup>39</sup> UN Viet Nam (2016). Viet Nam Gender Briefing Kit. Hanoi, Viet Nam