REGIONAL PROJECT PROPOSAL

Title of Project:	Strengthening Resilience to Climate and Covid-19 shocks through Integrated Water Management on the Sudan – Chad Border area (SCCIWM)
Countries:	Chad, Sudan
Thematic Focal Area[1]:	Food Security, Disaster Risk Reduction
Type of Implementing Entity:	Multilateral Implementing Entity (MIE)
Implementing Entity:	Food and Agriculture Organisation (FAO)
Executing Entities:	Higher Council for Environment and Natural Resources (Sudan) Ministry of Irrigation and Water Resources (Sudan) Ministry of Agriculture and Natural Resources (Sudan) Meteorological Authority (Sudan) Ministry of Environment Water and Fisheries (Chad) Ministry of Urban and Rural Water (Chad) National Meteorological Agency (Chad) Food and Agriculture Organisation (FAO)
Amount of Financing Requested:	14,000,000 (in U.S Dollars Equivalent)

[1] Thematic areas are: Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.

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List of Acronyms

AF	Adaptation Fund
AfDB	African Development Bank
CBO	Community-Based Organisations
COP	Conference of the Parties
COVID-19	Coronavirus Disease 2019
CWU	Conjunctive Water Use
DRR	Disaster Risk Reduction
ECHO	European Civil Protection and Humanitarian Aid Operations
EWEA	Early Warning Early Action
EWS	Early Warning System
FAO	United Nations Food and Agriculture Organisation
FSTS	Food Security Technical Secretariat
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environmental Facility
HCENR	Higher Council for Environment and Natural Resources (Sudan)
HDI	Human Development Index
IDP	Internally Displaced People
IPCC	Intergovernmental Panel on Climate Change
IFAD	International Fund for Agricultural Development
INDC	Intended Nationally Determined Contributions
ITCZ	Inter-Tropical Convergence Zone
IWM	Integrated Water Management
MoEWF	Ministry of Environment Water and Fisheries (Chad)
MWU	Multiple Water Use
MURW	Ministry of Urban and Rural Water
NAPA	National Adaptation Programme of Action
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organisations
SP	Service Provider
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Conventions on Climate Change
UNHCR	United Nations High Commissioner for Refugees
VAT	Village Agriculture Technicians
VDC	Village Development Committees
WAM	West African Monsoon
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WUA	Water User Associations

PART I: PROJECT INFORMATION

A. Project Background and Context:

Provide brief information on the problem the proposed project is aiming to solve, including both the regional and the country perspective. Outline the economic social, development and environmental context in which the project would operate in those countries.

Sahel Region

1. **Geography.** The Sahel spans around 6,000 km from the Atlantic Ocean and Senegal in West Africa to Sudan and Ethiopia by the Red Sea in East Africa, in a belt covering an area of around 3 million square kilometres. It is a semi-arid region stretching longitudinally and latitudinally from just north of the tropical forests to just south of the Sahara Desert; it is a transitional ecoregion between the Saharan desert and the wet climate of tropical Africa comprising semi-arid grasslands, savannas, steppes, and thorn shrublands. The Sahel is mainly flat and most of the region lies between 200 and 400 meters above sea level and is known to be particularly vulnerable to natural variability as most human activities in the region depend on the highly volatile single annual rainfall season, June through September peaking in August.

2. **Precipitation.** Annual precipitation in the Sahel region averages between 250 and 500 mm.[2] Rainfall distribution can be roughly divided into different homogeneous regions: one along the west coast, a weaker one around Lake Chad and one over the western Ethiopian plateau. The dominant feature of the climate of this region is the West African Monsoon (WAM) system, which is a recurrent low latitude large-scale circulation pattern arising from the meridional boundary layer gradient of dry and moist static energy between the warm sub-Saharan continent and the tropical Atlantic Ocean. The WAM system develops from April to October, bringing the Inter-Tropical Convergence Zone (ITCZ) and associated rainfall peak in August.[3] The predominant weather in the eastern Sahel, particularly south of Khartoum, are significantly influenced by weather patterns deflected around and over the Ethiopian Highlands to the southeast.[4] Along with the transcontinental south-westerly winds carrying moisture from the South Atlantic, the moisture-laden weather systems entering from the Indian Ocean through the Turkana depression south of the Ethiopian Highlands, and circulating around the southwest corner of the latter, are significant players in the development of convective systems over the plains of East Sudan.[5]

3. **Climate change.** The Sahelian region is experiencing the full impact of climate change with rainfall deficits and severe droughts with devastating consequences on people's livelihoods, the region is one of the most severely affected from land degradation and desertification in the world.[6] It has experienced severe drought and increasing deterioration of soil quality and vegetation cover[7] and the scarcity of natural resources has led to conflict and migration. In the Sahel, droughts are becoming increasingly intense and temperatures are rising 1.5 times faster than in the rest of the world. More than elsewhere, in the Sahel these natural disasters are degrading the natural resources essential to the agropastoral livelihoods that underpin the economy in much of the area 80 to 90 percent of the population actively engage in agriculture.[8] Drought deteriorates land causing it to lose its fertility. Insufficient rain-fed irrigation means that crops fail or are destroyed, while livestock struggle to find water for drinking. The Intergovernmental Panel on Climate Change (IPCC) predicted that yields from rainfed agriculture has already have fallen by 50% over the 20-year period between 2000 and 2020.[9]

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[2] http://www.fao.org/3/y7738e/y7738e09.htm
[3] Met Office Hadley Centre (2010), Sahelian climate: past, current, projections.
[4] El Gamri T, Saeed AB, Abdalla AK (2009) Rainfall of the Sudan: characteristics and prediction. Arts J 27: 18–35. Journal of the Faculty of Arts, Univ of Khartoum, Sudan.
[5] Riddle EE, Cook KH (2008) Abrupt rainfall transitions over the greater horn of Africa: Observations and regional model simulations. J Geophys Res 113(D15): D15109.
[6] UNEP. 1992. World Atlas of Desertification. Edward Arnold. London.
[7] Geist, H.J., Lambin, E.F. 2004. Dynamic causal patterns of desertification. Bioscience 54(9): 817-829.
[8] UNEP. 2012. Sahel Atlas of Changing Landscapes: Tracing trends and variations in vegetation cover and soil condition. United Nations Environment Programme. Nairobi.
[9] Boko, M., I. Niang, A. Nyong, C. Vogel, A. Githeko, M. Medany, B. Osman-Elasha, R. Tabo and P. Yanda,(2007): "Africa. Climate Change 2007: Impacts, Adaptation and Vulnerability." Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge UK, 433-467.

4. Near surface temperatures have increased over the last 50 years in the Sahel with the number of cold days and cold nights decreasing and the number of warm days and warm nights increasing between 1961 and 2000, research also shows warming of between 0.5°C and 0.8°C between 1970 and 2010 over the region. Extreme precipitation changes over eastern Africa such as droughts and heavy rainfall have been experienced more frequently during the last 30 to 60 years.[10] A continued warming in the Indian- Pacific warm pool has been shown to contribute to more frequent East African droughts over the past 30 years during the spring and summer seasons.[11] Projected increases in heavy precipitation over the region have been reported with high certainty in the IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) that indicate an increase in the number of extreme wet days by the mid-21st century.[12]

5. In order to tackle the climate-driven challenges, countries in the Sahel region have laid out their national priorities to adapt to climate change and committed to limit the impacts of climate change through specific adaptation measures. At the Conference of the Parties (COP) in Paris in 2015, the United Nations Framework Conventions on Climate Change (UNFCCC) requested signatory countries to present their Nationally Determined Contributions (NDCs) for both adaptation and mitigation. In the central-eastern Sahel the countries of Chad and Sudan have outlined their respective priority actions aimed at reducing the impacts generated by extreme weather events on the most vulnerable sectors. The proposed project proposal focuses those sectors that have been identified as being of national adaptive importance for both countries, namely agriculture, water resources, livestock and land resources.

Table 1. Identified national adaptation priority sectors for Chad and Sudan

Sectors	Chad	Sudan
Agriculture	+	+
Water Resources	+	+
Rangeland		+
Livestock	+	+
Forestry	+	+
Land Resources	+	+
Coastal		+

National Contexts

Chad - General Characteristics

6. **Geography.** Chad is the fifth largest country in Africa and ranks second among Sahelian countries after Sudan and is landlocked. Chad is located in central northern Africa at 7-23˚north of the equator, straddling the sub-tropical climate band called the Sahel. The north of Chad extends well into the arid Sahara Desert, whilst the south has a much wetter and typically tropical climate. The country's terrain is one of a shallow basin rising gradually from the Lake Chad area in the west and is surrounded by mountains to the north, east and south. Chad is bordered in the north by Libya, in the east by Sudan, in the south by the Central African Republic, and in the west by Cameroon, Nigeria, and Niger. The northern part of the country in the Sahara Desert has a population density of only about 8 people per square km, and is home to just 1 percent of Chad's population. The whole central swath is in the Sahel and both N'Djamena, the capital, and Lake Chad are found in this region. Lake Chad is fed by the country's two main rivers, the Chari and the Logone, it is the largest body of water in the Sahel and a major centre of economic activity for the region. Natural irrigation is limited to the rivers and their tributaries, which flow from the southeast

[10] Funk, C., M.D. Dettinger, J.C. Michaelsen, J.P. Verdin, M.E. Brown, M. Barlow, and A. Hoell, 2008: Warming of the Indian Ocean threatens eastern and southern African food security but could be mitigated by agricultural development. *Proceedings of the National Academy of Sciences of the United States of America*, 105(32), 11081-11086.

[11] Williams, A.P. and C. Funk, 2011: A westward extension of the warm pool leads to a westward extension of the Walker circulation, drying eastern Africa. *Climate Dynamics*, 37(11-12), 2417-2435.

[12] Niang, I., O.C. Ruppel, M.A. Abdrabo, A. Essel, C. Lennard, J. Padgham, and P. Urquhart, (2014): Africa. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1199-1265.

into Lake Chad. Due to erratic variations in the region's climate and overexploitation of the rivers that feed it, this shallow lake (1.5 m deep on average) has shrunk to a small fraction of its 1960 size. Chad's population lives mainly in the southern part of the country, in the more humid Sudanian climate zone, southern Chad has the largest, relatively intact expanses of wooded savannas and woodlands of any of the Sahelian countries.

7. **Economy.** Traditionally, Chad's economy has been based on farming and livestock, but in the last decade the economy has changed dramatically from the oil boom. Besides oil, there are also significant deposits of gold, marble, and sodium carbonate. After two years of recession (2016 and 2017) following the fall in the price of oil, which led to a debt crisis, real Gross Domestic Product (GDP) growth turned positive, reaching 2.4% in 2018 and 2019, driven by the good performance of grain (up 1.2% in 2019), cotton (142%), and oil production (14%, or 146,000 barrels a day).[13]

8. **Human Development Index (HDI).** Chad's HDI value for 2019 is 0.398 which puts the country in the low human development category - positioning it 187th out of 189 countries and territories. Between 2000 and 2019, Chad's HDI value increased from 0.293 to 0.398, an increase of 35.8 percent. Between 1990 and 2019, Chad's life expectancy at birth increased by 7.2 years, mean years of schooling increased by 1.2 years and expected years of schooling increased by 4.2 years. Chad's Gross National Income (GNI) per capita increased by about 57.3 percent between 1990 and 2019.

9. **Food Security.** Chad has one of the highest levels of hunger in the world - 66.2 percent of its population of 15.5 million live in severe poverty. It is surrounded by countries at war, and conflict and the climate crisis exacerbate hunger and poverty. Around 40 percent of children aged under five suffer stunting, with low height for their age caused by chronic malnutrition. The presence of hundreds of thousands of refugees who have fled conflict in neighbouring countries has put additional pressure on Chad's already limited resources. Displaced people, and other poor communities, in the Lake Chad Basin, the east and south of the country are dependent on humanitarian assistance for survival. According to the 2019 Humanitarian Response Plan, 4.3 million people are in need of humanitarian assistance, of whom only 2 million are targeted with adequate support.[14]

10. **Climate.** The northern desert regions of Chad receive very little rainfall all year round while the southern, tropical savannah regions of Chad experience a wet season between May and October (receiving 150- 300mm per month), and the central sub-tropical regions have a shorter wet season between June and September (receiving 50-150 mm per month). In the dry months between November and March, almost no rain falls at all. These seasonal rainfalls are controlled by the movement of the tropical rain belt (also known as the ITCZ which oscillates between the northern and southern tropics over the course of a year. Variations in the latitudinal movements of the ITCZ from one year to another cause large inter-annual and decadal variability in wet-season rainfall. Annually, mean temperatures are similar across most of the country at 25-30℃, and only differ substantially in the cooler mountainous regions of the north at 15-25℃. However, seasonal variations are large, and differ in their patterns for different parts of the country. In the north and central regions, summer and winter temperatures are distinct at 27-35℃ in summer and 20-27℃ in winter (these temperatures are 5-10℃ lower, year-round, in the northernmost mountainous regions). In the south, less seasonal variation is evident, but the summer months are the coolest (22-25℃) due to the cooling effects of rain at this time of year.

Recent Climate Trends[15]

11. **Temperature.** Mean annual temperature has increased by 0.7℃ since 1960, an average rate of 0.16℃ per decade. The rate of increase is most rapid in the wettest season, (July – September), at 0.36℃ per decade. There is insufficient daily observed data to identify trends in daily temperature extremes for all seasons, but the average number of 'hot' nights per year in Chad has increased by 50 (an additional 13.6% of days) between 1960 and 2003. Cold nights are observed to decrease in all seasons where data are available. The average number of 'cold' nights per month in these seasons has decreased by 3.6-4.6 (11.6-14.9% of days) between 1960 and 2003.

12. **Precipitation.** Mean annual rainfall over Chad has not changed with any discernible trend since 1960. Some unusually high rainfalls have occurred in the dry season in the very recent years (2000- 2006), but this has not been

[13] African Development Bank (2020) Chad Economic Outlook https://www.afdb.org/en/countries/central-africa/chad/chad-economic-outlook
[14] WFP (2020) Chad Country Brief. https://www.wfp.org/countries/chad
[15] C. McSweeney, M. New and G. Lizcano. UNDP Climate Country Profiles Chad. *School of Geography and Environment, University of Oxford. Tyndall Centre for Climate Change Research* *https://www.geog.ox.ac.uk/research/climate/projects/undp-cp/UNDP_reports/Chad/Chad.lowres.report.pdf*

a consistent trend. There is no sufficient daily precipitation data available to determine trends in the daily variability of rainfall.

Climate Change[16]

13. **Temperature.** The mean annual temperature is projected to increase by 1.0 to 3.4℃ by the 2060s, and 1.6 to 5.4℃ by the 2090s with the range of projections by the 2090s under any one emissions scenario between 1.5-2℃. The projected rate of warming is similar across all seasons and regions of Chad and all projections indicate substantial increases in the frequency of increased maximum and minimum temperatures. Annually, projections indicate that 'hot' days will occur on 17-36% of days by the 2060s, and 21-54% of days by the 2090s with maximum temperatures increasing most rapidly in the summer months. Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 26-49% of nights by the 2060s and 31-63% of nights by the 2090s. Projected increases in maximum and minimum temperatures are expected to be more rapid in the south of the country than the north. All projections indicate increases in minimum temperatures leading to decreases in the frequency of days and nights that are considered 'cold' in current climate, and in much of the country will not occur at all by the 2090s.

14. **Precipitation.** Projections of mean annual rainfall averaged over the country from different models project a wide range of changes in precipitation for Chad. Projected change in precipitation range from -15 to +9 mm per month (-28 to +29%) by the 2090s. Whilst the range of projections is large, the regional changes in rainfall more consistently indicate increases in wet-season rainfall in the south of the country. The proportion of total rainfall that falls in heavy[17] events is projected to increase in the south of the country, but to decrease in the north. Projections indicate that maximum 1- and 5-day rainfalls may increase in magnitude in the south of the country.

15. **Impact of Climate Change.** Climate change will threaten food security due to the impact of projected temperature increases and extreme weather events on crop nutrient content and yields, livestock, fisheries and aquaculture, and land use. Climate change has already affected crop suitability in many areas, resulting in changes in the production levels of main agricultural crops. Crop production is negatively affected by the increase in both direct and indirect climate extremes. Changing precipitation patterns, and increased temperatures will cause increased probability of drought, heat stress. Climate change will also increase the spread of pest and diseases that also have detrimental effects on cropping systems.[18]

Sudan - General Characteristics

16. **Geography.** Sudan is the largest country in Africa and has a special geopolitical location bonding the Arab world to Africa south of the Sahara. It has an area of 2.5 million km^2 extending between 4º and 22º north latitudes and 22º to 38º east longitudes. Its north-south extent is about 2 000 km, while its maximum east-west extent is about 1 500 km. On the north-east it is bordered by the Red Sea and it shares common borders with nine countries: Eritrea and Ethiopia in the east, Kenya, Uganda and the Democratic Republic of Congo in the south, The Central African Republic, Chad and the Libyan Arab Jamahiriya in the west, and Egypt in the north. The country is a gently sloping plain with the exception of Jebel Marra, the Red Sea Hills, Nuba Mountains and Imatong Hills. Its main features are the alluvial clay deposits in the central and eastern part, the stabilized sand dunes in the western and northern part and the red ironstone soils in the south. The soils of Sudan are broadly divided into six main categories according to their locations and manner of formation: i) desert; ii) semi-desert; iii) sand; iv) alkaline catena; v) alluvial; and vi) iron stone plateau. Within these soil categories there are many local variations with respect to drainage conditions.

17. **Human Development.** Sudan's HDI value for 2019 is 0.510 which put the country in the low human development category - positioning it 170th out of 189 countries and territories a position shared with Haiti. Between 1990 and 2019, Sudan's HDI value increased from 0.331 to 0.510, an increase of 54.1 percent. Between 1990 and 2019, Sudan's life expectancy at birth increased by 9.8 years, mean years of schooling increased by 2.3 years and expected years of schooling increased by 4.0 years. Sudan's GNI per capita increased by about 142.9 percent between 1990 and 2019.[19]

18. **Food Security.** Conflicts and natural disasters cause widespread displacement (including both internally displaced persons and refugees from South), fractured infrastructure, and broken institutions. These factors have

[16] Ibid
[17] A 'Heavy' event is defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in current the climate of that region and season.
[18] World Bank Group Climate knowledge portal. https://climateknowledgeportal.worldbank.org/country/chad
[19] UNDP (2020) Human Development Report Sudan Briefing note http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/SDN.pdf

led to the Sudanese population suffering from expansive hunger (ranked 7th on Global Hunger Index[20]) food insecurity and malnutrition with women, children and youth suffering disproportionately. Rural women and youth in Sudan form the majority of the extremely poor people in the country. According to World Food Programme (WFP), approximately 9.6 million people were food insecure in early 2020, and estimated 80 per cent were unable to afford the food one needs on daily basis[21]. And 2.7 million children under 5 are suffering from acute malnutrition. Basic health services are available to less than 50 per cent of the population, while only 13 per cent of the rural population has access to improved sanitation facilities.[22]

19. **Economy.** In 2010, Sudan was considered as the 17th fastest growing economy in the world given the rapid development of the country largely from oil profits, despite international sanctions. However, the secession of the South in 2011 has gravely affected the economy as more than 80% of Sudan's oil fields existed in the southern part of the country. This decline in oil revenues caused a major adjustment to the Sudanese fiscal situation and prompting financial austerity measures. The situation was further exacerbated by the continuing tensions between Sudan and South Sudan and their inability to reach an agreement over transit fees for oil from South Sudan. Both parties have still not reached an agreement on this issue. Sudan however is endowed with rich natural resources, including natural gas, gold, silver, chromite, asbestos, manganese, gypsum, mica, zinc, iron, lead, uranium, copper, kaolin, cobalt, granite, nickel, tin and aluminium. Historically, agriculture has been the main source of income and employment in Sudan, hiring over 80% of Sudanese and making up a third of the economic sector. Despite this strong agricultural orientation, oil production drove most of Sudan's post-2000 growth. In the agricultural sector, the government has tried to diversify its cash crops; however, cotton and gum Arabic remain its major agricultural exports. Livestock production also has vast potential, and many animals, particularly camels and sheep, are exported to Egypt, Saudi Arabia, and other Arab countries. Problems of irrigation and transportation remain the greatest constraints to a more dynamic agricultural economy.[23]

20. **Climate.** Sudan has a variable climate ranging from desert and semi-desert areas in the north to arid savannah in the east, west and south, with seasonal rains in central areas between El Obeid and Atbara. Mean annual temperatures vary between 26ºC and 32ºC across the country. The most extreme temperatures are found in the far north, where summer temperatures can often exceed 43ºC and sandstorms blow across the Sahara Desert from April to September. The main rainy season is from May to October, with precipitation ranging between less than 50 mm in the extreme north to more than 1500 mm in the extreme south.[24]

Climate Change Trends

21. Observed trends in climate are difficult to assess due to the lack of reliable and consistent meteorological data. FEWSNET reports that between the mid-1970s and late 2000s, summer rainfall decreased by 10–20 percent across parts of western and southern Sudan, and that summer rains in western and southern Sudan have declined by 10–20 percent since the mid- 1970s. Temperatures have also increased by 1 degrees Celsius over most of central and Southern Sudan and over the past 30 years it has been among the most rapidly warming locations on the globe, with station temperatures increasing as much as 0.4°C per decade. Year-on-year variations in evapotranspiration are strongly related to changes in plant growth, cereal formation and filling, end-of-season yields, and pasture biomass. Climatic warming effects combine with decreases in rainfall to reduce evapotranspiration and crop yield. Over the past 20 years, declines in evapotranspiration are larger for the extended Darfur region (approximately -40 percent) and southern Sudan (approximately -28 percent) than the associated decreases in rainfall (approximately -10 per- cent). Temperature impacts appear to be amplifying the effects of drought.[25]

[20] International Food Policy Research Institute. 2017. 2017 Global Hunger Index: The inequalities of hunger. https://www.globalhungerindex.org/pdf/en/2017.pdf
[21] World Food Programme. October 2020. Country Brief Sudan. https://docs.wfp.org/api/documents/WFP-0000121832/download/
[22] Ibid
[23] UNDP (2020) About Sudan. https://www.sd.undp.org/content/sudan/en/home/countryinfo.html
[24] Sudan Ministry of Environment and Physical Development. 2013. Second National Communications to the UNFCCC.
[25] Funk, C., Eilerts, G., Verdin, J., Rowland, J., Marshall, M., 2011, A climate trend analysis of Sudan, U.S. Geological Survey Fact Sheet 2011-3072, 6 p.

Climate Change projections

22. **Temperature**. Projections from the latest Intergovernmental Panel on Climate Change Fifth Assessment report[26,27,28] indicate a substantial warming trend across Sudan with projected temperature increases of between 1.5°C and 3°C in daily maximum temperature for Sudan by the middle of the 21st century. Up to the mid-21st century there is little difference in the pattern of climate change across different future greenhouse gas concentration scenarios.[29] From the mid-21st century onwards, however, the climate change pathways under different greenhouse gas concentration scenarios diverge. A scenario of on-going and substantial increases in future global emissions of greenhouse gases (scenario RCP8.5) is consistent with projections where temperatures continue to increase to the end of the 21st century, from mid-century level. This scenario also indicates a small increase in annual rainfall in many model projections. In contrast, a scenario of rapid and sustained reduction in future global emissions of greenhouse gases (scenario RCP2.6) is consistent with a stabilisation of climate conditions from the middle of the 21st century.[30]

23. **Precipitation**. Rainfall projections across the Sudan region show a pattern of potential increased rainfall emerging during the second half of the century. That pattern appears to be consistent across the majority of CMIP5 models in the ensemble. Relative magnitudes of potential increased rainfall in the Upper White Nile region could potentially reach about 500mm / year wetter by 2100 which equates to 40% of the baseline normal. The rainfall over the much drier Sahara region could potentially increase by up to 100% above the baseline normal. The increase in rainfall seems to be strongly associated with increase in all rainfall events and also high intensity rainfall events. It must be noted that these results are derived from GCM projections which may not accurately represent changes in extreme rainfall dynamics. They are, however, consistent with the increased convective rainfall intensity (e.g. thunderstorm-related rainfall) expected in a warmer climate. [31]

24. **Climate change impacts.** The frequency of extreme climatic events is increasing, particularly drought. Once a rare occurrence (occurring in the 1910s, 1940s, and 1970s, and 1980s), severe drought is now one of the most important and frequently recurring challenges facing Sudan. Since the end of the last drought in 1984, droughts have recurred with increasing frequency in 1987, 1989, 1990, 1991, 1993, and 1996. Future drought threatens about 19 million hectares of rain-fed mechanised and traditional farms, as well as the livelihoods of many pastoral and nomadic groups.[32] The results of climate model simulations reveal that extreme negative variability will cost the Sudan cumulatively between 2018 and 2050 USD 109.5 billion in total absorption and USD 105.5 billion in GDP relative to a historical mean climate scenario without climate change.[33]

Sanitation and Climate Change

25. An estimated 4.5 billion people worldwide live without access to safely managed sanitation[34] putting them at risk of infectious diseases; climate variability and change exacerbate these risks by placing strain on sanitation systems. Climate change projections indicate changes to the timing, intensity and spatial distribution of weather- and climate-related events. Increasing global and regional temperatures have the potential to increase the frequency, intensity and duration of severe extreme weather events increasing the variability and unpredictability of

[26] Ibid ref 26

[27] IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

[28] IPCC (2014) AR5 Cliamte Change 2014: Impacts, Adaptation and Vulnerability. https://www.ipcc.ch/report/ar5/wg2/

[29] Stott, P. A., Mitchell, J. F. B., Allen, M. R., Delworth, T. L., Gregory, J. M., Meehl, G. A. and Santer, B. D., 2006: Observational Constraints on Past Attributable Warming and Predictions of Future Global Warming. J. Climate, 19, 3055–3069. doi: http://dx.doi.org/10.1175/JCLI3802.1

[30] van Vuuren DP, Edmonds J, Kainuma MLT, RiahiK, Thomson A, Matsui T, Hurtt G, Lamarque J-F, Meinshausen M, Smith S, Grainer C, Rose S, Hibbard KA, Nakicenovic N, Krey V, Kram T. 2011: Representative concentration pathways: An overview. Climatic Change. doi:10.1007/s10584-011-0148-z.

[31] Siddig, Khalid; Stepanyan, Davit; Wiebelt, Manfred; Zhu, Tingju; and Grethe, Harald. 2018. Climate change and agriculture in the Sudan: Impact pathways beyond changes in mean rainfall and temperature. MENA RP Working Paper 13. Washington, DC and Cairo, Egypt: International Food Policy Research Institute (IFPRI). http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/132833

[32] Ministry of Environment Forestry & Physical Development (2013). Sudan's Second National Communication under the United Nations Framework Convention on Climate Change

[33] Siddig, Khalid; Stepanyan, Davit; Wiebelt, Manfred; Zhu, Tingju; and Grethe, Harald. 2018. Climate change and agriculture in the Sudan: Impact pathways beyond changes in mean rainfall and temperature. MENA RP Working Paper 13. Washington, DC and Cairo, Egypt: International Food Policy Research Institute (IFPRI). http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/132833

[34] WHO and UNICEF (2017) Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines. Geneva: World Health Organization and United Nations Children's Fund.

precipitation. These changes affect sanitation systems and the infrastructure, water resources, water services, and other social and governance systems on which sanitation depends. Many of the direct and indirect effects on sanitation pose a danger to human health and development.[35]

26. Climate change-related health consequences from sanitation systems generally fit within two overarching categories: (i) increased risk of disease or illness from exposure to pathogens and hazardous substances through increased environmental contamination, and/or (ii) increased risk of disease or illness resulting from a lack of access to adequate sanitation when systems are destroyed or damaged. Poor and vulnerable groups face the most immediate and severe consequences from climate change, and health is no exception. People without access to basic services experience overlapping forms of disadvantage and are likely to face the worst effects.[36]

Table 2. The impact of climate change on sanitation[37]

Climate change effect	Example impact on sanitation	Examples of associated health effects
Long-term declines in rainfall and run-off (leading to e.g. long-term drought etc.)	Declining water supply impeding function of water-reliant sanitation systems (e.g. flush toilets, sewerage); Increased demand for use of wastewater – especially in agriculture; shifting ground due to drying soils cracks or damages infrastructure	• Increased risks of water- and vector-borne diseases (e.g. due to lack of water for flushing and cleaning resulting in poor sanitary conditions and poor hygiene, and changes in mosquito breeding between dry and wet) • Increased open defecation and associated health risks • Increase risk of water- and vector- borne diseases linked to untreated wastewater reuse for food production
Higher temperatures (leading to e.g. warmer surface water and soil temperatures, heatwaves)	Malfunction, breakdown or inaccessibility of sanitation systems deterring safe sanitation behaviours (e.g. strong odours during heatwaves deterring use of latrines)	• Health impacts resulting from unsafe use or non- use of sanitation systems (e.g. physical or mental health conditions)

COVID-19

27. The outbreak of coronavirus disease 2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a global public health concern with rapid growth in the number of patients with significant mortality rates. FAO estimates that the COVID-19 in Sudan and related containment measures is adversely impacting all four dimensions of food security: availability, access, utilization and stability. Food availability is affected due to on-farm labour shortages as well as shortages of transportation of items while access to food will be challenged as many micro-enterprises and petty / small informal businesses are restricted or curtailed. This will cause the loss of essential income sources that enable vulnerable people to access basic commodities. With limited availability and access, vulnerable families will resort to low quality and quantity of food which will result in undernutrition.[38]

28. At the extraordinary G20 Agriculture's Minister's meeting held in April 2020 involving inter alia FAO, a joint statement on the impacts of COVID-19 on food security and nutrition was issued concluding that the pandemic is also already affecting the entire food system at multiple levels. The situation poses critical challenges that might

[35] WHO (2019) Discussion Paper: Climate Sanitation and Health. https://www.who.int/publications/i/item/climate-sanitation-and-health

[36] Mukheibir, P., Boronyak-Vasco, L. and Alofa, P. (2017) 'Dynamic Adaptive Management Pathways for Drinking Water Security in Kiribati', in Leal Filho, W. (ed.) *Climate Change Adaptation in Pacific Countries: Fostering Resilience and Improving the Quality of Life*. Springer International Publishing, pp. 287-301.

[37] WHO (2017) Climate-resilient water safety plans: Managing health risks associated with climate variability and change. Geneva: World Health Organization.

[38] OCHA (2020) Humanitarian Response Plan – Sudan https://www.who.int/health-cluster/countries/sudan/Sudan-Humanitarian-Response-Plan-COVID-Addendum-March-December-2020.pdf?ua=1

lead to food insecurity and that the impact is most devastating on people living in the poorest countries as they require urgent support to avoid further setbacks reversing progress thus far achieved in combating poverty, inequality and underdevelopment. Sudan's Food Security Technical Secretariat (FSTS) [39] projects that the consumption patterns will shift towards low quality and quantity and this will increase malnutrition. Restrictions and interruptions in the flow of goods and services that ensure safety nets and social protection of the vulnerable population is expected to have an impact on food stability. Safely managed water, sanitation, and hygiene services are an essential part of slowing the spread of COVID-19.

SMART Irrigation – SMART WASH

29. The Central and Eastern Sahel Region is largely underdeveloped and facing a number of critical climate change-related challenges caused by increasing water insecurity and rising temperatures that adversely impact human and animal health causing increased food insecurity and reduced capacity to ensure basic sanitation requirements. In 2020 the global COVID-19 pandemic has brought additional vulnerability to bear on already climate-vulnerable rural communities, with no quick end on the horizon. To address these multiple and mutually reinforcing aggravating conditions, FAO has developed the innovative SMART Irrigation – SMART WASH initiative. The initiative proposes a twin-track approach for solutions to enhance irrigation and provide Water, Sanitation and Hygiene (WASH) facilities to vulnerable communities, hereby responding inter alia to the needs in times of the COVID-19 crisis whilst ensuring adaptation to climate change at multiple levels in agriculture and sanitation through Multiple Water Use (MWU) systems.[40]

30. The **Conjunctive Water Use (CWU)** includes the surface water from pond and groundwater resources lifted by a solar-powered system. The optimal combination of rainfall water and groundwater preserve the vulnerable groundwater resources, minimizes the undesirable physical and environmental effects and balances the water demand and supply.[41]

31. **Multiple Water Use (MWU)** systems form part of the CWU and allow to fight the pandemic while helping to reduce the climate-vulnerability of rural communities by using water from the same source or infrastructure for multiple uses and functions; the SMART Irrigation – SMART WASH approach combines multiple water uses where water is required to meet the demands of both irrigation and WASH. The harmonised development of water resources through multiple water use techniques play a key role to mitigate the adverse impacts in developing countries, where food production systems are often fragile. The MWU also addresses access to safe water which is not available or affordable and health systems that are underdeveloped with institutions too fragile to establish appropriate infrastructure.[42]

Project Area and Target Groups

32. The aim of the project is to build climate resilience into agricultural and sanitation systems within the broader watershed of the Chari River in Chad on the border between Chad and Sudan (as shown in Annex 2). The project will be focused on improving agricultural productivity, food security, health and sanitation. It will do this through an Integrated Water Management (IWM) approach to: i) upscale FAO pilots in macro- and micro-level water-efficient, multiple and conjunctive use climate-smart irrigation and sanitation infrastructure; ii) develop climate-resilient agricultural techniques to climate-proof livelihoods; and iii) promote a regional cooperation platform where national and knowledge institutions, civil society and broad stakeholders and organisations are able to share experiences and learn best practices.

33. **Regional Approach.** By adopting a regional approach, the project will enable the two countries to reap the full benefits of the potential spill-over effects of a shared scale-up strategy in the most cost-effective way. A regional approach for irrigation development will help: (a) facilitate coordinated investment planning in shared natural resource areas; (b) build the knowledge base and facilitate cross-learning at the regional level; and (c) facilitate the development of regional and national policies. The regional approach provides an opportunity and entry point for solutions at scale that have not been achievable to date. Experience shows that separate national projects do not

[39] Sudan Federal Food Security Technical Secretariat (2020) Food Security Information and Knowledge Sharing System http://fsis.sd/Pages/FoodSecurity/PublicationsFind.aspx?lang=EN&I=103892&DId=0&CId=0&CMSId=5003213&q=creator:Food%20Security%20Technical%20Secretariat%20(FSTS)

[40] Salman, M., Pek, E. and Ahmad, W. 2020. *Smart irrigation – Smart wash. Solutions in response to the pandemic crisis in Africa*. FAO Land and Water No. 16. Rome, FAO. https://doi.org/10.4060/cb1306en

[41] Ibid

[42] Ibid

provide the scale and depth that is required to induce lasting institutional changes and that analytical work is not sufficient to create an enabling environment.

Chad- Sudan Chari River basin

34. The project proposes to implement climate change adaptation measures along the watershed between the Chad and Sudan border as shown in Annex 2 of this proposal. Activities are proposed along two rivers, the Assongha River (Chad/Sudan) and Wadi Kadja (Sudan), that are tributaries to the larger Chari river that in turn drains into Lake Chad. The Wadi Kadja originates from the western Jebel Marra highlands in North Darfur State and drains the west and southwest of the mountain towards Chari River in Chad. Along the Chadian side of the border, the project proposes to focus on the Asoungha department in the Ouaddaï province; while on the Sudan side, the project will focus on the West Darfur State, on both sides focusing on villages and towns with agricultural potential.

35. **Disa Sandstone Aquifer.** The sandstone covers an area of 300 km^2 in West Darfur and extends into Chad with the West Darfur State Capital El Geneina, situated on top of the eastern part of the sandstone aquifer. The lithology of the sandstone formation comprises mainly of medium to coarse grained sand, cemented by arenaceous and ferruginous materials, sometimes containing kaolinite and with thin inter-bedded layers of clay, ironstone and conglomerates (gravels). At Jebel Disa the bedding of the sandstone slightly dips to the north however, the dipping of strata cannot be observed from boreholes data. The total water storage capacity of Disa Sandstone aquifer is calculated as 49.9 x $106m^3$. Disa Sandstone Aquifer is considered as one of the key aquifers providing towns in West Darfur, the Asoungha Department, Internally Displaced People (IDP) and refugee camps with water supply requirements.[43,44]

36. **Water Availability.** The rivers are highly seasonal and according to the Aqueduct Water Risk Atlas[45], the target area is considered a high-water risk area in terms of water stress and water depletion. The main water resources are seasonal surface water catchments and alluvial, fractured basement and deep groundwater aquifers. Many rural water systems in Darfur were damaged or destroyed as part of the conflict. High population densities in IDP camps in Darfur and refugee camps in Assongha have created intense water demand, which can lead to diminished and depleted ground water, particularly when rainfall is low. The humanitarian response effort resulted in extensive drilling of boreholes as emergency measures, often in concentrated locations and without conducting coordinated hydrological and hydrogeological surveys. As a result, the ongoing extraction volume, especially in areas where deep wells have tapped into poor aquifers, water resources have been negatively affected and have lowered the water table and dried up some shallower wells.[46]

Food Production

37. **Assongha.** Specific food production baseline information on the proposed project target watershed area is limited, however food production in the region of Assonga can be defined as 'rain-fed cereals and market gardening', with most households also maintaining some animals. In a good year, the combination of rain-fed and off-season grain production coupled with off-season garden production along the wadis has potential to fulfil most food requirements. However, as a combined result of rainfall deficits, crop pests, animal disease outbreaks, over-grazing and environmental degradation, and sale of food stuffs to regions in the north, the zone as a whole is considered food deficient in two years out of three. The staple food crop are millet, groundnuts and sorghum, along with niébé, sesame, and cowpeas with grain crops used for household consumption, animal feed and alcohol production. Ground nuts are of particular importance as they can be transformed into peanut oil and the residue used for animal feed. They therefore generate an important source of household income and subsistence. [47] Garden production comprises garlic, tomato, pepper, gumbo, squash, carrots, lettuce, parsley, melon and watermelon; fruit production includes guava, lemon, bananas and mango. Gathering activities particularly during the dry season, are also important, and conducted principally by women and children. Livestock holding is essentially of the sedentary kind, although the zone also provides important passage-ways for the herds of the transhumant zone in the north that

[43] Mandel, S. and Shiftan, Z. L., (1981): Groundwater Resources, Investigation and Development. Academic Press. New York. Journal of water resource and protection, vol. 6, No. 9, June 26, 2014.
[44] Ali, K.M., El Sheikh, A.E. and El Khidir, S.O., Determination of Hydrogeological Parameters of Alluvial and Disa Sandstone Aquifers of West Darfur State, Western Sudan. Al Neenlain Journal of Geosciences, vol 3, issue 1, 2019
[45] https://www.wri.org/aqueduct
[46] UN Fund for Recovery Reconstruction and Development in Darfur (2014) Increased Access to and Use of Sustainable Water, Sanitation and Hygiene (WASH) Services Underpinned by Improved Integrated Water Resources Management (IWRM) in Darfur: http://mptf.undp.org/document/download/15873
[47] FEWSNET (2011) Chad Rapid Livelihood Zone Profiles https://fews.net/west-africa/chad/livelihood-profile/august-2011

are taken south for grazing. This promotes economic exchange between herders and the local farmers, but also provokes conflicts arising from crop damage by the transhumant herds.[48]

38. **West Darfur.** The project target area in Western Darfur falls under the FEWSNET category of 'Western Agropastoral Millet' zone that is a narrow agroclimatic zone stretching from the proposed project area on the border with Chad east through Darfur and neighbouring Kurdufan to the south of Khartoum in Central Sudan. This is considered a marginal agricultural zone in which only drought-resistant millet is reliably produced. Mean annual rainfall in much of the area is well under 300mm, at best marginally adequate for millet cultivation but not for cash crops such as groundnuts or sesame, although small amounts may be grown for home consumption.[49] Households also grow watermelon, hibiscus, and okra in low-lying areas. Given limited agricultural productivity, livestock sales account for the majority of the better-off and middle groups' cash income, while the incomes of the poor groups mainly come from labour and trade. When the rains fail poorer people may not even be able to harvest a month's supply of grain, and for the one or two extra goats they may have to sell they are likely to receive low prices, while grain prices may be unusually high. Wild foods can be sought, but there is little extra local work to be found, and so the only recourse is migration.[50]

Targeting Approach

39. **Cluster approach.** The project will follow cluster approach focusing project interventions on a group of neighbouring communities that share or use a micro ecosystem within Wadi Kadja and Assongha river macro ecosystems. Accordingly, the project direct beneficiary communities will be selected on the basis of micro ecosystem used by them and not on administrative boundaries and to the extent possible this will be applied to the Chad – Sudan border area. The regional platform developed in component 4 will be pivotal in the coordination and approval of such a regional and cross-border ecosystem approach, where viable / applicable. However, the multiplicity of micro ecosystems in the target project area are anticipated to fully provide for the representation of the different administrative units in the project area. The cluster size should not exceed 6-8 communities. It is also important to note that social coherence and community interest are important aspects for successful clustering approach

40. **Link between land / natural resource, livelihood and peacebuilding.** The project area particularly on the Sudan side has a history of communal conflict over land and natural resources. Competing and conflicting livelihoods (farming and pastoralism) do exist therefore the project will develop community-level and community-driven conflict resolution platforms that are focused on the equitable and sustainable use of limited natural resources through promoting dialogue and consultations. Such platforms will allow for disagreeing communities to be integrated and brought together into cooperative and negotiation processes that diffuse social and political tension by establishing mutual trust and a general sense of shared interests while addressing priority livelihood issues and interests.

Target Groups

41. The project will directly target poor and vulnerable household smallholders in farming and agro-pastoral sectors (30%) in settled, IDPs / Refugees and returnees. Within these groups there will be special emphasis on the inclusion of women and vulnerable female headed households (60%) and youth (25%). However, for the purposes of conflict resolution and improved land management within a cluster, other social actors or users connected to the livelihood system of the target group / beneficiaries in various aspects such as production, access to resources, selling of products etc, will be consulted (these may include tribal leaders, pastoralists, and well-off farmers among others), especially for contributing to the aspect of conflict resolution and land management.

42. **Village-based smallholders in rainfed farming areas** are farmers owning land of 0.5 hectares in the rainfed farming and whose livelihoods and food security situation have been negatively impacted by conflict, climate change and land degradation. The project will assist them to improve their food security and income level through: adoption of climate-resilient soil and water conservation techniques and climate resilient crop varieties; women-focused alternative income generating and agroforestry activities.

[48] Ibid
[49] FEWSNET (2011) Livelihood zoning "Plus" Activity in Sudan. https://documents.wfp.org/stellent/groups/public/documents/ena/wfp239943.pdf
[50] FEWSNET (2015) Rural Livelihoods of Eastern, Central and Northern Sudan https://fscluster.org/sites/default/files/documents/Sudan%20Profiles%20Final%20en%20%283%29.pdf

43. **IDPs and refugees:** The overwhelming number of IDPs in West Darfur and refugees in Chad (an estimated 24,000 households) and are originally land-owning farmers and who had been displaced by the conflict since 2003. Assongha is home to 3 refugee camps totalling around 108,000 people while Sudan has 10 IDP camps totalling around 149,000 people.[51] The livelihoods of the refugees / IDPs have been severely impacted by the conflict, insecurity, loss of agricultural tools and implements and severe limitation of economic resources. In spite of this, and particularly since 2016 when the security conditions started to improve and the humanitarian support to dwindle, they used to travel back and forth from the town, where the IDPs camps exist, to surrounding rural areas to carry out farming activities. The project will engage with the IDPs and refugees, through their camp leaders and sheikhs to assist them to improve their food security and income level through: adoption of soil and water conservation techniques and climate resilient crop varieties; support with agricultural tools and implements, access to alternative income-generating and production skills and tools.

44. **Returnees:** After nearly two decades of displacement some groups, estimated at 19,102 persons comprising an estimated 2,730 HH have returned to their original homes in recognizable return sites (4 sites) that are usually small compared to permanent settlement with the number of households in the site varies between 340 households and 750 households. The returnees who are mainly farming groups, in addition to the increasingly adverse climatic changes also suffer severe conditions associated with loss of economic assets including agricultural tools and implements and the destruction of services infrastructure including the destruction of water supply sources and irrigation infrastructure as part of the war tactics during the early years of the conflict. The returnees have also lost access to humanitarian support as a result of their voluntary return. Because of that the returnees are largely engaged in environmentally destructive income generation activities, especially trade in firewood and charcoal. The project will directly target the returnees with the objective of helping them to recover and rebuild their livelihoods founded on agriculture through: water supply and sanitation interventions; soil and water conservation agriculture; climate resilient crop varieties; agricultural tools and implements; and alternative income generation activities, including moringa plantations.

45. **Women in agriculture.** Women, including IDPs (Sudan) and refugees (Chad) account for around 60-70% of the labour force in the agricultural sector, in both the rainfed and irrigated sub-sectors although there are no official statistics. They are the main bread winners in the household. However, women have been caught in complex web of vulnerabilities associated with the impacts of conflict, violence, climate change and environmental degradation. As bread winners, women had been particularly impacted by Covid-19 through the closure of markets and the curtailing of economic opportunities related to that. 60% of the project direct stakeholders will be women in both the rainfed and the irrigated sector. The project will target women and women-headed households through a package of interventions including agriculture-related interventions (soil and water conservation techniques, climate resilient crop varieties; agricultural tools and implements, alternative income generating activities (IGA including moringa plantations) and improved sanitation.

46. Women also add value to the household agricultural produce and sell the surplus produce in the local market as well as having to walk long distances for access to water and firewood. The project will therefore complement their agricultural production activities with additional skills in alternative income generating activities such as the commercial production of energy saving stoves that reduce wood consumption by 50%. The SCCIWM will also enhance their knowledge and provide them with basic tools in simple food processing and packaging such as cheese making, groundnut and sesame oil packaging, dried meat production and packaging etc. Consultations with women groups in Chad and Sudan have shown that these activities are being requested and will considerably add to improving their livelihoods and in making them more climate-resilient. The project will also address the multiple faceted issue surrounding the use of wood and charcoal as a source of homestead energy. Wood collection for firewood is an activity with considerable environmental impact on an already fragile ecosystem as well as exposing women to personal safety and sexual harassment risks when in having to walk to distant and remote areas for wood collection. The project will address this through the piloting of innovative 1 ha communal moringa plantations run by women groups for the production of indigenous fast growing nutritious moringa seedlings that will be bought by the project for on-farm intercropping and a source of firewood.

47. **Women in sanitation.** The project will have a considerable activity related to the education surrounding the importance of sanitation as well as the promotion of open defecation-free villages through the community-constructed basic toilets. As advised in consultation with UNFPA, women need to be represented in the WASH and WUA committees that will be set up to decide on sanitation issues such proximity of toilets to the village instead

[51] See annex 10 for more information on the IDP / refugee camps

which is safer. The AF project will therefore have 50% women quotas on the WASH decision-making WUA committee members.

48. **Youth:** Village and IDPs / refugee-based youth in the age group19-34 years account for almost 25% of the total population in the project target area. The decades of war in Darfur had left an entire generation without access to education while trapping the youth into a vicious circle of poverty, illiteracy, unemployment and social exclusion. The youths also constitute the main actors in conflict, violence and criminalities. The project will therefore directly target the youth with the objective of improved livelihood conditions while transforming their capacities positively to building climate-resilience through sustainable NRM and peacebuilding. The project will assist the farming youth, in both the rainfed and irrigated sectors while providing for improved capacities for entrepreneurship and small businesses development and management, active participation in community structures and decision-making arenas, peacebuilding training and participation in peace dialogue platforms.

Targeting Strategy

49. **Targeting Approach.** The project will be implemented applying a combination of geographical targeting, self-targeting and direct targeting approaches: Most of the interventions will be of interest for all target groups. Furthermore, specific activities are directed to specific disadvantaged categories such as women and youth. The robustness of the target strategy relies on a diagnostic process to be conducted at the beginning of the operations (described in output 1.1.1: Community mobilization and peacebuilding). Community development planning and identification of development priorities and sub-projects will be of interest for all community members and all will be engaged to participate. Using community driven development (CDD) approach, a strong consultation and social inclusion strategy, a clear selection criteria and diagnostic process with key steps for community engagement, the project will ensure that all views are captured.

50. According to the WB Poverty Notes 2017, the incidence of poverty for households who had less than four members been 23.7. This increased to 55.4 if the household had more than ten or more members. Similarly, female-headed households are generally more at risk of food insecurity and malnutrition, as their coping capacities in times of food shortage are significantly more limited than households headed by men. Even without external shocks they are likely to experience high levels of food insecurity and large consumption gaps than men headed households. They are also often unable to ensure adequate nutrition to household members, especially infants and children below 5 years. Preliminary investigations the project area show that the poor rural groups reveal all or many of the following characteristics: women and female headed households; returnees, IDPs and refugees; households with members requiring special needs; Large household size dominated by children in general education age; lack or ownership of few ruminants; lack of agricultural tools and implements; limited sources of income; and dependence on casual labour.

51. **Geographical targeting.** The project will be focused on the specific transnational border area of West Darfur in Sudan and Assongha in Chad and be focused on the watersheds of the Assongha river and the Wadi Kadja and their tributaries. The project intervention areas will result from a combination of variables including the groundwater mapping and monitoring (output 2.1.1), and the topographical, hydrological and hydrogeological surveys (output 2.2.1) that will determine the physical location of the water infrastructure sites (for the irrigation activities). These will then be cross-referenced with the poverty index; population location and density; the existence of agricultural potential; and food security needs based on the classification of the Integrated Food Security Phase Classification (IPC)[52]. The project outreach and targeting strategy will be conducted annually and updated each year based on the outcome of the assessments.

52. **Direct targeting** of households aims at achieving the outreach targets of 60% women, 25% youth and 30% refugees, IDPs and returnees in the respective countries. Women and women-headed households will be directly targeted with 1,200 women (300 young women) benefitting from IGAs and life skill training in basic financial literacy, nutrition, child health, Gender-Based Violence, basic sanitation practices (in combination with the Community-led Total Sanitation - CLTS output 2.3.1) and other life skills to empower women and increase their climate resilience. 25% of the women targeted will be young women including (i) households headed by women, (ii) households headed by youth, and (iii) households with pregnant and lactating women.

[52] https://www.ipcinfo.org/

53. To contribute to generate employment and economic opportunities for young people and women, it is expected that they will join Farmers Field Schools (FFs) as follows corresponding to 60% women and 25% youth: (i) 3,000 young women and 2,000 young men in rainfed agriculture Farmer Field Schools (FFS); 195 young women and 130 young men in irrigated FFS; and 42 young women and 28 young men engaged as seed producers / multipliers.

54. **Approach for gender mainstreaming.** To contribute to tackle constraints faced by rural women, the project will adopt an inclusive approach to ensure that women and men equally benefit from project's interventions. The targeting and social inclusion strategy will rely on a strong community engagement (the diagnostic process as explained in output 1.1.1) to be undertaken at the beginning of the project and then annually to support identification of the target groups and all socio-economic categories identified. The selected Service Providers will follow the selection criteria provided and ensure that the project's approach to gender mainstreaming will achieve the following objectives:

- Ensure that women and men have respectively 60% and 40% access to capacity building, training and productive assets. Furthermore, specific services and trainings will target women on a 100% basis i.e. for outcome 3.2.

- **Increase women's voice in decision-making at the household and community level.** As part of literacy and life skills, leadership training will also be included. Women will be trained to form groups and their leadership and negotiation skills will be strengthened to enable them to make informed decisions during the community planning process. It is expected that women in representative position (committees) will be 50%. Gender-awareness trainings (including Gender-based Violence – GbV) will be mainstreamed into all training to men and women will be carried out at both household and community levels, including village leaders.

- **Increase women's access to skills and knowledge:** Women will be 100 % beneficiaries for the trainings in literacy, life skills and nutrition (including young women). Furthermore, women will be 60% beneficiaries of FFS where they will be able to acquire practical knowledge for livelihood improvement through FFS and climate resilience. Women will be 60% beneficiaries of training package under outcomes 2.2 and 3.1 as for example: climate resilient irrigation technologies, improved soil and water conservation practices, water management. 100% of women will be targeted for IGAs and moringa plantations that will help reduce their burden in wood collection but also provide additional income, improve the environment (contributing towards the Great Green Wall Initiative - GGWI).

- **Develop skills to improve the well-being of women and other family members**: With this purpose, nutrition education will be provided at both household and groups level under outcome 3.2. The training will include training in nutrition and dietary knowledge. Specific attention will be given to young women, including also women refugees, IDPs and returnees.

- **Train project staff and extension service providers on gender-related issues.** It will be ensured that training modules include specific sections related to gender sensitive topics, including GbV. The project will produce/adapt and oversee the training modules and curricula that will be delivered to targeted communities/ households and the work of Community Facilitators and all project staff.

Threats to the border area

Chad – Assongha

55. The main factors causing food insecurity in Assongha are linked first to low diversification of income sources and despite secondary incomes from growing produce such as tomatoes, onions and gumbo, 40.5% of the population suffers from severe food insecurity. The decrease in grain production in the area is also important considering that 97.2% of the population practices agriculture. Soil depletion is a major factor affecting production and following a period of poor production, locals are heavily dependent on local markets for food, especially during the lean season. The resilience of communities to external shocks on livelihoods such as irregular rains is also considered to be very weak. Proper hygiene practices are also an issue as just 14% of women with children

demonstrated having knowledge of appropriate hand washing techniques. Furthermore, soap products are expensive or can sometimes be in short supply and are also principally used for laundry and not for handwashing.[53]

56. Key constraints to agriculture include: loss of soil fertility and lack of fertiliser, crop pests, population pressure on the land, including through the influx of refugees in the zone, loss of land through erosion by wadis, destruction of crops by animals, irregular and poorly timed rains; and post-harvest losses. Most cultivation is done with rudimentary instruments – primarily the hoe, which further limits productivity. Water retention activities to enhance agricultural potential have included installation of weirs (seuils d'appendage) and dams; but these have so far had limited coverage. [54]

Sudan – Darfur.

57. Population growth, climate change, prolonged conflict, and rapid urbanization have combined to create conditions in Darfur that place the region's water resources under considerable strain. While raw data is scarce, there is a general decline and variability of rainfall over the past 50 years that has resulted in less dependable seasonal surface water availability, increased desertification, increased rates of surface water run-off, increased siltation rates and reduced rates of aquifer recharge. Over the past 30 years, climatic factors and conflict have driven rapid urbanization, and more recently the concentration into urban or peri-urban camps of upwards of 1.7m conflict-affected people. This has resulted in unsustainable rates of local groundwater extraction in some areas.

58. Agriculture and livestock are the two key sources of livelihoods for Darfuris and both are dependent upon rainwater. It is estimated that across Darfur there exist more than 50 surface water reservoirs and 100 major hafirs, along with numerous small storage structures and a scattering of other water harvesting schemes, as well as over 400 deep borehole water yards and thousands of hand pumps. [55] The State Water Corporation (SWC) during consultations have estimated that in the project area there are 73 traditional wells of which 18 are non-functional and 55 functional. In terms of wells with hand pumps the SWC estimates that there are around 492 of which 200 are non-functional, while 292 remain functional. Many rural water supply structures have suffered from conflict destruction and a historic lack of maintenance. Their restoration and increase in the coverage of surface and sub-surface water infrastructure will be central to successful integrated water resource management.

Water Health and Sanitation (WASH)

59. **West Darfur.** Water scarcity is a central factor in the border area's struggle to develop. Groundwater levels in the Disa sandstone aquifer have shown significant and substantial reduction due to excessive abstraction from the aquifer for various water utilisation purposes. The groundwater level fluctuations reflect the variation of the atmospheric pressure of the aquifer and the aquifer's water recharging and withdrawal are the most important factors that cause groundwater-level fluctuations. During the daytime, the water level is affected by abstraction, where it ranges from 12.2 to 12.8 m below surface, while the seasonal variation in water level indicates clear water level fluctuation. The water level reaches 12.5m below surface during the dry period, while it reaches a value of 12.1m during the rainy season.[56,57]

60. Extremely poor water and sanitation conditions throughout the region have led to years of interventions from both humanitarian and development actors, but the situation remains extremely challenging throughout Darfur and Assongha and on average only about half of the population in Darfur states have access to improved water sources. As per 2013 Sudan S3M (Simple Spatial Survey Methodology) around 17% of households in West Darfur have access to improved sanitation facilities.[58] Water quality monitoring capacity is underdeveloped, and in remote rural areas, is non-existent although the Ministry of Health (MOH) with World Health Organisation (WHO) support have

[53] Patrick McCarty (2016) Case Study Chad, Abdi District of the Ouaddaï region 2015-2016. Action Against Hunger https://linknca.org/article/etude_de_cas_-_district_d_abdi_region_du_ouaddai_tchad.htm?lng=en&

[54] Watson, C., Dnalbaye, E. and Nan-guer, B., 2018. REFUGEE AND HOST COMMUNITIES IN CHAD: DYNAMICS OF ECONOMIC AND SOCIAL INCLUSION. http://documents1.worldbank.org/curated/en/734861563057353544/pdf/Refugee-and-Host-Communities-in-Chad-Dynamics-of-Economic-and-Social-Inclusion-Report-of-Qualitative-Research-Findings.pdf

[55] UN Fund for Recovery Reconstruction and Development in Darfur (2014) Increased Access to and Use of Sustainable Water, Sanitation and Hygiene (WASH) Services Underpinned by Improved Integrated Water Resources Management (IWRM) in Darfur. http://mptf.undp.org/document/download/15873

[56] Mandel, S. and Shiftan, Z. L., (1981): Groundwater Resources, Investigation and Development. Academic Press. New York. Journal of water resource and protection, vol. 6, No. 9, June 26, 2014.

[57] Ali, K.M., El Sheikh, A.E. and El Khidir, S.O., Determination of Hydrogeological Parameters of Alluvial and Disa Sandstone Aquifers of West Darfur State, Western Sudan. Al Neenlain Journal of Geosciences, vol 3, issue 1, 2019

[58] Sudan National S3M (2013): Report of a Simple Spatial Surveying Method (S3M) survey in Sudan. Federal Ministry of Health, Sudan. 2013. https://www.coverage-monitoring.org/wp-content/uploads/2014/12/Sudan_S3M-_2013_FINAL-Endorsed-EXECUTIVE-SUMMARY_25Nov2014.pdf

established basic water quality laboratories in each Darfur state with trained personnel. Field missions from the State Laboratory and MOH environmental department, mostly supported by WHO, are organised to take water samples, assess the availability of water and conduct sanitary inspection of water sources and distribution.[59]

61. **Assongha.** According to the comprehensive food security and vulnerability analysis conducted by Action Against Hunger, only 3% of households use a water source without risk for contamination. Additionally, faecal matter contamination from humans and animals is a major concern as only around 13% of households have access to latrines. Proper hygiene practices are also an issue as just 14% of women with children demonstrated having knowledge of appropriate hand washing techniques. Furthermore, soap products are expensive or can sometimes be in short supply and are also principally used for laundry and not for handwashing.[60] A generally improving security situation in recent years has made access to isolated regions easier, however capacity to sustainably manage WASH services at both community and institutional levels remains a challenge. Lack of clarity and accountability continues to affect the roles and responsibilities of relevant authorities, leading to the absence of clear regulatory framework, politicised decision-making, and waste of extremely limited resources. Key risks in the WASH sector include environmental factors (including groundwater depletion and reduced rainfall), continuing urban migration, and weak water management capacities that contribute to increased risks of disease outbreaks.[61]

Gender

62. **Assongha.** An Action Against Hunger survey showed that the role of women in the community was found to affect their well-being and the nutrition of their children and their high workload was linked with infants' undernutrition due to the mother's general unavailability to be able to provide care. According to the survey 32% of local women reportedly were too busy to care for their young children. The research shows that the workload for women is higher than that for men and women are expected to carry out all domestic duties as well as collect well water and fire wood and buy and sell food in the local markets. Women are also the principal source of manual labour. In addition to tending their own plots, women are expected to work as agricultural day laborers, which is a key source of income during the lean season. Men and women alternate between working their own land and working other fields.[62]

63. **In Darfur** women have largely been excluded from the Native Administration and from leadership positions among traditional authorities. There have been small steps toward women's participation in traditional structures although most female leaders attend primarily to women's affairs. Furthermore, there are perceptions that traditional structures and customary courts perpetuate patriarchal and social norms that may circumscribe women's access to justice, with particularly serious implications for disputes related to land or sexual and gender-based violence.[63]

Gender and Climate Change

64. Climate change severely affects the poorest and most vulnerable populations, particularly women and girls because of the increased time burden, reduced economic opportunities, and health implications associated with increasingly scarce resources and the disproportionate exposure to risk from climate-induced phenomena such as droughts compared with men. In the West Darfur – Assongha border area climate change and environmental degradation are leading to deteriorating soil quality, water scarcity, severe droughts which all have a disproportionate effect on women and girls. For example, women and girls are often the most affected by water shortages as they need access to water for tasks such as cooking, cleaning, and bathing children. In times of scarcity, they also restrict their own personal use, which can lead to psychological and physical discomfort during menstruation.

65. Climate change has a differential gender impact on women and girls; the involvement of women on an equal basis with men in all climate and environment-related decision-making processes is essential to ensure a gender-responsive adaptation to climate change and resilience in the face of climate-induced disasters. Water and sanitation services for example, are often more effective and more sustainable if women have an active role in

[59] UN Fund for Recovery Reconstruction and Development in Darfur (2014) Increased Access to and Use of Sustainable Water, Sanitation and Hygiene (WASH) Services Underpinned by Improved Integrated Water Resources Management (IWRM) in Darfur. http://mptf.undp.org/document/download/15873

[60] Ibid

[61] Darfur Development Strategy Review Steering Committee (Oct. 2019). Review of the Darfur Development Strategy 2013-2019 – Consolidated Review Report. Trias Consult. https://undarfurfund.org/content/dam/darfurfund/docs/dds-review/undp-darfurfund-documents-DDS-Review-Volume-I-Oct-2019.pdf

[62] Patrick McCarty (2016) Case Study Chad, Abdi District of the Ouaddaï region 2015-2016. Action Against Hunger https://linknca.org/article/etude_de_cas_-_district_d_abdi_region_du_ouaddai_tchad.htm?lng=en&

[63] World Bank (2013) Brief overview of gender issues in Darfur http://documents1.worldbank.org/curated/en/715571468311372234/pdf/862970BRI0Box30ogica0DissNoteDarfur.pdf

designing, planning, and operating facilities and programs. Women can also play an important role in educating their families and the community about good hygiene.

Social Structure

66. **West Darfur** has a population of more than 1.7 million is ethnically mixed although African groups predominate: in Geneina and Habila provinces the Masalit are the majority (60 percent), followed by the Arabs and other Africans, namely, Zaghawa, Erenga, Gimr, Dajo, Borgo and Fur. In Zalingei, Jebel Marra, and Wadi Salih provinces the Fur predominate. In Kulbus province approximately 50 percent is Gimr, 30 percent Erenga, 15 percent Zaghawa, and 5 percent Arab. Together the Fur and the Masalit comprise the majority of the population of West Darfur. Dar Masalit, or homeland of the Masalit,[64] is located around the state capital Geneina and north and south along the border.[65]

67. **Assongha** is multi-ethnic retaining its historical Islamic identity, with the main ethnic groups being the Massalit; Assanghouris and other groups such as the Maba, Mimi, Tama as well as Zaghawa, Arab and Goran. Although the region is ethnically diverse, villages themselves are largely ethnically homogeneous.[66]

Conflict and Refugees

68. In a sign of the improving security situation in Darfur, the joint United Nations-African Union mission in the Darfur region of Sudan (UNAMID) confirmed the decision to close the mission, which followed the unanimous adoption of a Security Council resolution on 22 December 2020, and progress made by the transitional Government of Sudan in addressing the conflict in Darfur. This follows developments in October of the same year when a milestone peace agreement was reached between the Sudanese authorities and two armed groups in Darfur, some two years after the Sudanese Revolution, which led to the overthrow of longstanding leader, Omar Al-Bashir, in April 2019.[67] Recently Sudan is currently undergoing a period of transition, although international development projects and humanitarian relief efforts are are ongoing and therefore the current situation is not expected to adversely impact the project.

69. Sudan has experienced nearly continuous conflict since independence in 1956, and has required external emergency assistance every year since 1984. Over the past fifty years, humanitarian crises in Sudan have been the result of inequality in the distribution of wealth and power between centre and periphery, of conflicts and displacement, as well as drought and economic crisis. The Sudan regime created famine and food crisis in the periphery of Darfur among others, in 1991, 1996, 2001, and a severe conflict-created humanitarian crisis in Darfur from 2003 onwards. The United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) estimates that 9.3 million people are in need of humanitarian assistance in 2020 including 1.9 million Internally Displaced People (IDP) and 1.1 million refugees with around 330,000 in Chad.[68,69] The 2016 OCHA humanitarian profile for the region of Ouaddaï reports that refugees (numbering 116,687) make up 6.5% of the total regional population of 892,981.[70] They are installed in four camps: the first one opened in 2004 is Farchana (area of 1,720,000 m^2, with a population of 28,552 refugees, the majority Massalit (95%) in 6,814 households); the second, is Bredjing (population 45,558; third Treguine (area 1,270,000 m^2, with a population of 24,471, also majority Massalit (98%) in 5,810 households; and the fourth is Gaga, opened in 2005, and the only one still accommodating incoming refugees, with a current population of 24,857, 85% Massalit, along with Zaghawa (4%) and Fur (4%) in 5,792 households.[71]

70. While in Assongha field data suggests that the situation is relatively calm and inter-tribal conflicts have declined over the past ten years as a result of Chad Government effort, conflict between refugees and host communities associated with competition over land has been reported. In the project area there remain historical

[64] *Dar* roughly corresponds to homeland or home territory.
[65] Human Rights Watch (2004) https://www.hrw.org/reports/2004/sudan0504/4.htm#_ftn2
[66] Watson, C., Dnalbaye, E. and Nan-guer, B., 2018. REFUGEE AND HOST COMMUNITIES IN CHAD: DYNAMICS OF ECONOMIC AND SOCIAL INCLUSION. http://documents1.worldbank.org/curated/en/734861563057353544/pdf/Refugee-and-Host-Communities-in-Chad-Dynamics-of-Economic-and-Social-Inclusion-Report-of-Qualitative-Research-Findings.pdf
[67] UNNEWS (2020) UN confirms closure of Darfur peacekeeping mission https://news.un.org/en/story/2020/12/1081122
[68] OCHA (2018) Sudan Humanitarian Overview https://www.humanitarianresponse.info/en/operations/sudan/infographic/darfur-humanitarian-overview-1-oct-2018
[69] Susanne Jaspars, Bedreldin Shutta (2020) One Year on: Sudan's Fragile Humanitarian Situation. https://www.ispionline.it/it/pubblicazione/one-year-sudans-fragile-humanitarian-situation-26283
[70] OCHA (2016) Profil humanitaire de la region du Ouaddai (août 2016) https://reliefweb.int/report/chad/tchad-profil-humanitaire-de-la-r-gion-du-ouaddai-ao-t-2016
[71] UNHCR Farchana (2018) 'Bredjing Camp Profile' http://documents1.worldbank.org/curated/en/734861563057353544/pdf/Refugee-and-Host-Communities-in-Chad-Dynamics-of-Economic-and-Social-Inclusion-Report-of-Qualitative-Research-Findings.pdf

grievances surrounding conflicting access to land for agriculture and pastoralism which is at the root of community conflict, with communities conflicting over the seasonal migration of livestock by nomadic pastoralists and the expansion of farming areas. In both West Darfur and Assongha local conflict over farming, pastoral lands and access to water may happen from October to December, during the harvest season, and from June to July, during the rainy season when land is being cultivated. Consequently the project has integrated a conflict mitigation and resolution strategy as part of output 1.1.1.

B. Project Objectives:

List the main objectives of the project

71. The project objective is to strengthen the regional agro-ecology and sanitation resilience to climate change and COVID-19 in the border area between Chad and Sudan. This will be achieved by enhancing regional water mapping, monitoring and governance capacity to better adapt to drought events; by improving water availability, water use efficiency; promoting adaptive agriculture production systems and multipurpose water technologies for improved livelihoods, food security and sanitation of rural households; and developing a Regional Natural Resource Management Plan.

72. The project will be structured around four components:

i. Outreach, capacity building, conflict resolution and knowledge management
ii. Investment in Natural Resource Management and Climate Resilient Community Infrastructure
iii. Improving Food Security through Climate-Resilient Agricultural Practices and Technologies
iv. Enhancing regional cooperation on water resource development-based food security, climate change adaptation and natural resource management

C. Project Components and Financing:

Fill in the table presenting the relationships among project components, outcomes, outputs and countries in which activities would be executed, and the corresponding budgets.

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)
Component 1 Outreach, Capacity Building, Conflict Resolution and Knowledge Management	**Outcome 1** Community-based organisations empowered on adaptive management of natural resources, with a focus on climate-smart water and soil conservation.	**Output 1.1.1** Community mobilisation and peacebuilding	Chad Sudan	515,000
	Outcome 1.2 Knowledge is generated and disseminated	**Output 1.2.1** Knowledge generation and dissemination programme implemented	Chad Sudan	300,000
		Output 1.2.2 Inception workshop		
		Output 1.2.3 Baseline assessment		
		Output 1.2.4 Development of guidelines		
		Output 1.2.5. Project Implementation Manual (PIM) and Technical Feasibility Report		
		Output 1.2.6 Mapping of drivers of conflict		
		Output 1.2.7		

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)
		Improved climate risk understanding of project area through comprehensive research		
Component 2: Investment in Natural Resource Management and Climate Resilient Community Infrastructure	**Outcome 2.1** Enhanced adaptive capacity through water resource assessment and monitoring to increase food security and agriculture preparedness	**Output 2.1.1** Mapping of surface and ground water	Chad Sudan	634,741
		Output 2.1.2 Groundwater monitoring		
		Output 2.1.3 Climate data gathering		
	Outcome 2.2 Improved water supply augmentation and integrated water resource management through conjunctive and multiple water use	**Output 2.2.1** Infrastructure surveys and EIAs	Chad Sudan	5,386,300
		Output 2.2.2 An integrated ToF training programme is designed and implemented to train on maintenance of climate-resilient water infrastructure.		
		Output 2.2.3 Design and installation of water harvesting and multiple water use infrastructure		
		Output 2.2.4 Design and construction of water yards		
	Outcome 2.3 Communities receiving the Multiple Water Use (MWU) Sanitation Services	**Output 2.3.1** Implementation of Community-Led Total Sanitation Programme	Chad Sudan	243,600
		Output 2.3.2 Installation of handwashing stations		
Component 3 Improving food security through climate-resilient agricultural practices and technologies	**Outcome 3.1** Livelihood activities made climate resilient through application of climate-resilient agricultural practices	**Output 3.1.1** A rainfed and irrigation agriculture training programme designed and implemented	Chad Sudan	3,400,600
		Output 3.1.2 Implementation of the Rainfed Farmer Field Schools		
		Output 3.1.3 High efficiency irrigation pilot implemented		
		Output 3.1.4 Irrigation Farmer Field Schools implemented		
		Output 3.1.5 Seed multipliers established and operational		
	Outcome 3.2 Climate-resilient alternative income generating livelihoods implemented	**Output 3.2.1** Alternative Income Generating (IGA) activities	Chad Sudan	828,360
		Output 3.2.2 Communal women group moringa plantation pilots implemented		
Component 4 Enhancing regional cooperation on water resource development-based food security and climate change adaptation in agricultural and	**Outcome 4.1** Regional adaptive capacity for food security through regional cooperation increased	**Output 4.1.1** Establishing regional platform	Chad Sudan	394,000
		Output 4.1.2 Strengthening capacity of national organisations and establishment of technical-level joint operational unit		
		Output 4.1.3 Regional tool developed and implemented for the identification and monitoring of water availability supporting decision making in drought planning and early response		

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)
policy development		**Output 4.1.4** Joint Regional Natural Resource Management Plan developed		
Project Cost				**11,702,601**
Project Execution Cost (9.3%)				1,200,625
Total Project Cost				**12,903,226**
Project Cycle Management Fee charged by the Implementing Entity (8.5%)				1,096,774
Amount of Financing Requested				**14,000,000**

D. Projected Calendar:

Indicate the dates of the following milestones for the proposed project

Milestones	Expected Dates
Start of Project Implementation	2022
Mid-term Review	2024
Project Closing	2025
Terminal Evaluation	2025

PART II: PROJECT JUSTIFICATION

A. Project Components

Describe the project components, particularly focusing on the concrete adaptation activities, how these activities would contribute to climate resilience, and how they would build added value through the regional approach, compared to implementing similar activities in each country individually.

Component 1: Community Mobilisation, Conflict Resolution, Strengthening and Knowledge Management

Outcome 1.1 *Community-based organisations empowered on adaptive management of natural resources, with a focus on climate-smart water and soil conservation.*

73. **Output 1.1.1.** This output will be conducted in annual cycles and aims to ensure that the project follows a community-based bottom-up approach to identify the investment options in close collaboration with the target group and that an open, transparent and participatory mechanism is in place to communicate with the targeted communities and identify the target households. The process is designed to ensure proper communication with the beneficiaries about the objectives of the project and its implementation approach and activities. One of the first activities will be the hiring of two experienced Service Providers (SPs) (one per country) and there will be specific stipulations that the selected SPs hire sufficient women staff to engage with women stakeholders. The first activities of the SPs will be to identify the long-list of villages and settlements that will be included in the project outreach in accordance with the project targeting strategy as detailed in section I-A. This **preparatory phase** will include the review of satellite images, field surveys for the identification and mapping of the long list of potential locations for project interventions.

74. The design of the specific training activities in terms of the topics, timing, location and format will be discussed with beneficiaries for components 2 and 3. All consultations will also be held in compliance with AF Environmental and Social Policy and the AF Gender Policy on consultations ensuring that women will be equally consulted and in separate groups from their male counterparts at appropriate times of day to reduce the impact on their daily lives and duties. In addition to the consultations held for the design of the proposal, this output will, through consultations, further ensure that women are incorporated in the planning and implementation of the project activities by the application of the gender quotas.

75. Once the long-list of villages has been identified, the two SPs will initially conduct **exploratory visits** in both country project areas and will assess the most appropriate existing community institutions as entry points with which to liaise with for the identification and implementation of project activities. These could be for example a Community Development Association (CDA) such as a Village Council (VC), a Community-Based Organisation (CBO) or Water User Association (WUA). The identified community organisation will be requested to facilitate an open village / community meeting that will enable the majority of the households to be informed about the project. In the event that communities don't already have community institutions, then the SPs will be tasked to form them should there be interest in the project. During the exploratory visit a time and date suitable to the community will be fixed for an initial community-wide dialogue meeting.

76. **Phase one:** It is during this first phase that the initial dialogue will ensure that a large majority of the community households will be informed about the benefits of the SCCIWM project and community buy-in will be obtained for activities related to the Farmer Field Schools (FFS), the Water User Associations (WUA) and water infrastructure and the Community-Led Total Sanitation (CLTS) women groups for the activities under output 3.2.1 and 3.2.2. Those interested communities in agreement with the terms of the project will designate specific lead resource persons for each of the relevant activities to facilitate the coordination with the community members as part of Phase two. **Phase two:** Once confirmed, a series of follow-up consultations will be held with community leads or contact persons to identify the participants for components 2 and 3. The SPs together with village elders will also ensure that the identification of beneficiaries is based on the selection criteria that is communicated during the first phase.

77. **Phase three** will entail the signing of the terms of the partnership between the SP and the beneficiaries in order to enable the beginning of project activities. The SP will with the community agents agree on all schemes to

be built and the method of contracting. The SP will also ensure the participants of the training sessions and agree on the time, location of the planned sessions. A community committee will be nominated to finalize all aspects of the identified infrastructure scheme to ensure that it is technically and socially feasible and is designed to meet the needs of the beneficiaries and designed and implemented in a participatory manner. The participants for the operation and management of the schemes and the contribution from participants and their role will also be discussed and agreed upon. No activities will be undertaken until the terms of partnership are agreed.

78. **Phase four:** The fourth and final phase will be held at the completion of the activity to obtain beneficiary feedback and assessment to improve the following annual cycle of activities. The respective M&E units will develop special tools for this purpose and ensure that the feedback obtained through the process is used to refine and incorporate lessons in subsequent sessions. More details on the diagnostic process and the series of consultations to be held, the participants and their purpose and agreed course of action is outlined in the table below.

Table 3. Outreach plan

Diagnostic process	Location	Participants	Purpose	Outcome
Preparatory phase	Satellite imagery and field surveys	Project manager, PMU and consultants / technical experts	Identification of possible locations for annual water harvesting and FFS activities	Preliminary list of locations and communities to visit as part of the 'Exploratory Visit' phase
Exploratory Visit	Village / camp	Any existing community-based organization members and village elders. Separate consultations with women community leaders	Inform them about SCCIWM components and investments. Fix a date and suitable time for discussion with larger group of residents. Communicate selection criteria and targets for inclusion of women and youth. Identify any communities that do not have access to toilets.	Fix a date on which the SP and project staff can meet with the community members who qualify for participation in the project based on identified criteria.
Phase One	Village / camp	At least 30% of the HHs from the Village Unit Women are consulted separately	Inform about component activities and ask to select the most relevant for them including a lead person from the community to take responsibility for each sub-component	The community identifies lead persons or contact persons for identifying farmers for FFS, WUAs women groups, the CLTS programme and the conflict resolution mediators (CRM) (see below).
Phase Two	Households and technical specialists	Lead persons and households interested in specific activities	To determine the participants for each activity, identify specific topics for FFS, WUA /conflict resolution training, CLTS timing, location and a plan for the year.	To agree on the Terms of Partnership in the various activities and fix community responsibility.
Phase Three	Agreed location of FFS, CLTS, CRM workshop, recipient households.	Participants and resource persons	Implementation of activities.	To participate in the plan as agreed and become open defecation-free zones.
Phase Four	Village / Camp	Project participants and lead persons	To assess project performance and obtain beneficiary feedback.	To incorporate the findings in next round of implementation.

79. **Training on conflict resolution** will be a core element of the project design. Each of the two selected SPs will be required to include an expert on community conflict resolution with relevant context-specific experience for each of the two project areas. Firstly, during the inception phase the SPs will set out the criteria for who can be considered as a community conflict mediator (one male and one female), this will need to be approved by the PMU and approved by each of the Conflict Resolution Committees (CRCs) that will be set up in both countries to address

any community conflict that may arise during implementation and coordinate a response mechanism. Once the selection criteria have been identified, the SP will through the process detailed above, reach out and have the local communities identify their conflict resolution mediators. The SPs will develop a training programme for the community conflict mediators, but also to train the community leaders (as per annex 8 on community governance and leaders) and project staff as well as the identified CRC members. Gender will need to feature prominently with 50% of any village / cluster level conflict resolution committees as women have a strong role at community level and have typically great influence in conflict resolution. The exchange of experiences and best practices will be discussed at the regional platform between the SPs and the conflict resolution committees in component 4.

80. Project activities will include:

i. Community mapping, mobilisation and sensitisation;

ii. Mapping the role of customary institutions;

iii. Stakeholder awareness workshops;

iv. Identification, establishment and strengthening of WUAs, conflict mediators and CRCs;

v. Identification and mapping of communities without access to toilets and practicing open defecation.

Outcome 1.2 Knowledge is generated and disseminated

81. **Output 1.2.1 Knowledge generation and dissemination** will form a core part of the SCCIWM project. The AF-supported Knowledge Management (KM) officers in Chad and Sudan will be responsible for the coordination of the AF KM programme. They will work closely with the binational Project Manager, the national coordinators and M&E Officers to set up a campaign of gathering project-related information on success stories in every aspect of the AF funded activities. The KM officers will be responsible for the development of a project website, radio programmes that inter alia will also function as the pilot drought EWS system awareness raising mechanism, as will as the posters and leaflets. This will form part of a community-wide awareness raising campaign that will also highlight the benefits of sustainable NRM and water use to better adapt to the challenges posed by climate change but also on the importance of peace and coexistence. This will include the production of simple picture-based educational leaflets on drought response strategies, the benefits of the agricultural practices, techniques and technologies being promoted by the project. Under **output 1.2.2**, the project KM will also include two national inception workshops and one regional inception workshop to be held through output 4.1.1. The project will also conduct a baseline assessment under **output 1.2.3** within the first 3 months of the project and will enhance technical knowledge through the development of technical guidelines under **output 1.2.4**. The latter will be based on the lessons learned and best practices. These will include but will not be limited to: climate-resilient agricultural practices, climate change adaptation and conflict resolution through sustainable NRM. Relevant technical guidelines will also be proposed throughout the course of the project implementation. The guidelines will be shared widely nationally, regionally and internationally.

82. **Output 1.2.5 Project Implementation Manual (PIM) and Technical Feasibility Report (TFR).** The project will recruit a team of expert consultants specialised in the technical areas of the project to develop a Project Implementation Manual (PIM) and conduct a Technical Feasibility Report (TFR) within the first three months, that will help project staff through step-by-step instructions on how to achieve each output. The output will produce a detailed step-by-set guide on the implementation of the project activities that will assist in project execution. Project staff and executing partners will receive training through workshops on the PIM and that will aim to facilitate their understanding. The TFR will also map the native administration / customary institutions. In the project area there are competing administrations with the governmental authorities on the one side and the native administrations on the other. The project area also comprises a diverse number of tribes and ethnic communities each of which have their own native administrations, however they also have general similarities that have been described in annex 8. The project will need to identify and understand the roles that the native administrations have and work with the respective native administrations for the success and sustainability of the project. In order to do this, the project will need to map the native administrations and customary institutions which will then enable their involvement in every aspect of the project activities including on identifying their technical gaps and capacity building opportunities. The TFR will map the administrative and customary institutions for the entire project. This output will be essential for the project implementation and will need to be conducted within the first 3 months of project implementation and presented at the Regional Platform events and will need to be approved by the Regional Steering Committee.

83. **Output 1.2.6 Mapping of drivers of conflict and connectors.** The project area, and to a greater extent West Darfur, has historically been negatively affected by social tensions that have lead to conflict that in this area can take many forms and is complex and is interrelated. These are however frequently based on limited scarce

resources and lack of knowledge around sustainable NRM which is already aggravated by climate change. In order to minimise the risk of social conflict as a result of the project activities, and in response to consultations from FAO consultants and project staff with extensive experience of living and project managing in West Darfur, the project will conduct a much-needed study identifying the social drivers of communal conflict. The binational study will *inter alia* also map the historical connectors, or solutions that have resulted in the resolution of conflict situations including the main actors involved. The results of this study will help better understand the drivers of conflict and how to address / mitigate them during the implementation of the project. The research will also benefit from the cross-fertilisation and sharing of lessons learned in successful community-level conflict mitigation efforts in both countries. For example, in Sudan there are already community-level Peace and Reconciliation Committees (PRC) that resolve communal conflicts and is formed by the native administration in the villages and is informally mandated with facilitating mediations for conflict involving different communities although the police and legal authorities work closely with them in resolving intercommunal conflicts. The lessons from both sides of the border can be mutually relevant and best practices shared as part of the regional platform developed in component 4.

84. Within the first three months, the project will conduct a mapping of the drivers of conflict and historical solutions to conflict that will be an important factor in reducing the risk of conflict as well as helping ensure the sustainability of the project activities. The outcome of the assessment will directly contribute to the training of the conflict resolution mediators (output 1.1.1) and the identification and strengthening of existing conflict mediation structures and where necessary recommend setting up of new ones. It will research the drivers of conflict, the ways in which conflict has been resolved in the past and the exploration of the possible conflict resolution mechanism for which the project will identify and recruit two teams of national conflict resolution experts with experience in the project area. The two teams will work as one under the coordination and supervision of the national coordinators and the binational project manager. The teams will meet regularly and share information including on synergies and promoting cross-fertilisation of ideas for conflict resolution and mitigation. The research will be conducted through a combination of desk reviews, the collection of primary data through community consultations in line with the AF guidelines, and also the conducting of conflict analysis workshops including project staff, expert consultants and external actors from both sides at the end of the two-week research. The mapping will involve a two-day workshop will be divided into sessions and will include discussions at national and regional level as required and will be held either in West Darfur or Assongha.

85. **Output 1.2.7 Climate risk research.** The project area is characterised by a lack of scientific knowledge about climate change, climate change adaptation and sustainable natural resource management. The KM of the project will therefore address the knowledge gaps by hiring an international climate research institution or consulting firm and within the first six months to conduct a comprehensive climate risk assessment of the project area. The research will have the objective to: i) Describe surface meteorological measurements, estimates of wadi flow, satellite observations of precipitation, soil and vegetation cover, and digital terrain information used in hazard mapping; ii) Explain the modelling approaches used to construct and corroborate spatial estimates of water harvesting, and cropping potential in the project area; iii) Evaluate the sensitivity of hazard distributions to changes in climate; iv) Identify the most significant data constraints and opportunities for method refinement, including options for further research and data collection; and v) Construct an inventory of other studies pertinent to climate hazard assessment. It will achieve this by conducting rainfall modelling including predictor variables, rainfall regression model calibration and validation and heavy rainfall estimations; Temperature modelling including predictor variables, temperature regression model calibration and validation; climate sensitivity analysis; Modelling of hafir and sub-surface dam rainwater harvesting and climate sensitivity analysis; climate evaluation of major crops.

86. Project activities will include:

i. The conducting of a baseline assessment;

ii. The development of a Project Implementation Manual (PIM) and Technical Feasibility Studies;

iii. The mapping of context-specific drivers of social conflict and development of conflict resolution strategies through identifying historical connectors and resolved conflict;

iv. The conducting of a regional climate research;

v. The development of technical guidelines for wide dissemination of best practices; and

vi. Implement an awareness campaign about climate change and project results.

Component 2: Investment in Natural Resource Management and Climate Resilient Community Infrastructure

87. Climate change affects water resources by reducing the predictability of water availability and affecting water quality. Climate change also increases the occurrence and magnitude of droughts harming ecosystems and societies, threatening biodiversity and sustainable social-economic development. This has major implications for water resources and the management of these water resources within a given country and across borders. It is also the poorest and most vulnerable women, men, children and elderly that face the greatest risks associated with increased food insecurity, human health, energy production, and biodiversity hereby exacerbating existing social inequalities that can lead to further social strife, forced migration and conflict.

88. The impacts of climate change on the availability of water resources affect the poor disproportionately through their effects on agriculture, health and natural disasters and the resulting social strife from the struggle for scarce natural resources. The rural poor largely rely on rainfed agriculture or livestock to sustain themselves and their families, all of which are highly climate- and water-dependent and therefore at risk to hydro-meteorological variability. With increased rainfall variability they will become increasingly vulnerable and their opportunities for rising out of poverty will be reduced. As a consequence, agricultural production shocks may trigger significant increases in the price of food and lead to food insecurity. As poorer households spend a significantly larger share of their income on food, they will be the most impacted.

89. Climate change generates additional risks to water-related infrastructure, revealing also pre-existing threats to water management. Increased weather uncertainties require enhanced resilience better water monitoring capacities that improves flexibility and is focused on addressing risks, especially for people most at risk from poverty and vulnerability. National and regional water information and monitoring systems are essential to water governance and are fundamental to address challenges in service delivery; information and monitoring are key elements of any effective water service mechanisms. Water monitoring enables institutions to track progress across a range of indicators related to water availability as they are grounded in context-specific data acquisition, information and monitoring systems and can be turned into forecasting, and eventually early-warning drought monitoring systems. These indicators and monitoring technologies need to be adapted, developed and tailored to those in need and best suited to the priorities and resources of the region and each individual and country.

90. The SCCIWM proposal places sustainable water management at the heart of this integrated water management (IWM) project. The project follows a three pronged approach aiming to: i) improve access to, and storage of, wadi, rainfall and floodwater for enhanced climate-resilient agricultural productivity; ii) develop a regional integrated water resource information system that maps surface water infrastructure and the underground Disa aquifer and monitors seasonal underground water availability through the development of a Natural Resource Monitoring System (NRMS); iii) promotes regional cooperation through the development of a regional platform to mainstream sustainable natural resource management hereby reaping the full benefits of the potential spill over effects of a shared scale-up exit strategy. To achieve this, this AF-funded activities, bring together and upscale proven technologies and innovative approaches from previous FAO pilot projects in Burkina Faso, Lebanon, Morocco and Uganda into one regional project applying the lessons learned and best practices to the regional context of the selected Sahelian countries.

91. The project will benefit from the lessons learned while adapting it to the different Sudan / Chad context from an FAO pilot in Lebanon: The 'Improved Water Resources Monitoring System / Integrated Water Resources Management at regional level in Lebanon project'.[72] The aim of the Lebanon project was to improve the performance the capacity of regional water management institutions through the establishment of a multidimensional water monitoring system. This system brought together the four major aspects of water monitoring, namely the climate features, discharge, water quality and agricultural water use. The project enabled decision-makers to create an evidence-based management mechanism and to provide reliable and equitable water service to end-users. It also enhanced the adaptive capacities of the agricultural water users by providing spatial and real-time information on water scarcity. The AF project will benefit from the accumulated experience on creating complex data acquisition, monitoring and information system through combined approaches while adapting it to the local context.

92. Secondly, the SCCIWM will also upscale the "Strengthening Agricultural Water Efficiency and Productivity on the African and Global Level (SAWEPAGL)"[73] project that focused on improved Agriculture Water Management

[72] FAO, 2020. Improved Water Resources Monitoring System/Integrated Water Resources Management at regional level in Lebanon http://www.fao.org/3/cb1438en/cb1438en.pdf

[73] FAO (2014) Strengthening Agricultural Water Efficiency and Productivity on the African and Global Level http://www.fao.org/agwa/news-events/details/en/c/242109/

(AWM) and mainstreaming AWM in national frameworks and processes with the objective to reduce hunger and poverty in Burkina Faso, Morocco and Uganda. The programme covered 5 key areas: i) Water accounting; ii) Crop water productivity; iii) Water harvesting for agriculture; iv) Agricultural water policy; and v) Water use efficiency. The AF project will benefit from the knowledge that resulted from the SAWEPAGL through the guidelines that have been produced, these include a: i) Field guide to improve crop water productivity in small-scale agriculture[74]; ii) Field guide to improve water use efficiency in small-scale agriculture;[75] iii) Policy guide to improve water productivity in small-scale agriculture;[76] iv) Policy guide to improve water use efficiency in small-scale agriculture;[77] and v) An assessment of the best practices relating to 42 water harvesting techniques already extensively applied in Uganda, Burkina Faso and/or Morocco.[78] The project successfully piloted water-use efficiency and water harvesting measures in specific command areas in Sub-Saharan Africa and have a high potential for upscaling and replication.

Outcome 2.1 Enhanced adaptive capacity through water resource assessment and monitoring to increase food security and agriculture preparedness

93. **Output 2.1.1 Mapping of surface and ground water.** There are considerable pressures on limited water resources in the project area and the competition is aggravated by climate change and the resulting struggle for scarce natural resources that has historically been one of the drivers of social strife and conflict driving many from their homes and into IDP and refugee camps in Sudan and across the border in Chad. Additionally, deep boreholes in the project area tapping the shared underground aquifer have been regularly drilled in both sides of the border in order to access water during the dry season (October / November to June / July) without a proper mapping and understanding of the availability and quality of the underlying aquifer water.

94. In order to enhance the understanding and improve the sustainable management of this valuable resource, the project will aim to map the underlying Disa aquifer within the project area. Following consultations with technical experts in the Groundwater Department of the Ministry of Irrigation and Water Resources (MoIWR) in Sudan and technical experts in the Ministry of Urban and Rural Water (MURW) and Ministry of Environment, Water and Fisheries (MoEWF) in Chad, the two countries already cooperate internationally in the mapping of the Nubian sandstone Aquifer in the north in a transnational UNDP/GEF/IAEA project between Chad, Sudan, Libya and Egypt. The SCCIWM project aims to build on the linkages that have already been developed between the two countries in the mapping of the Nubian Aquifer and to this end keen interest at both the technical and political levels in both countries have been expressed in extending the same level of cooperation for the mapping of the Disa Aquifer as well.

95. The mapping of the aquifer will be carried out through the utilisation of innovative technology characterised with underwater detection.[79] The AF project will support the acquisition of two of these resistivity meters for each country in order to conduct the mapping. The technology being proposed is a new and non-invasive that is fairly straightforward to use and comes with its own software in English, French and Arabic. This technology is sturdy and operates with three systems for detection of groundwater, artisan wells and borewells underground. It utilises a 3D imaging system, a geophysical search system and a long-range system reaching a depth of 1,500 meters below ground and up to 3,000 m^2. Additionally, the technology is highly accurate and able to determine the type of underlying water and whether it is fresh, salty or very salty and it is able to operate all over the world in six different types of soil (rocky, natural, mixed, mineralised, clay and sandy) and also shows the percentage of rocks within the area being scanned. Crucially, the technology also produces high-quality three-dimensional images of the location of water and rocks in the search area as is demonstrated Annex 3.

96. The consultations and meetings with the relevant ministries have identified that there is sufficient technical personnel capacity to conduct the mapping, however, due to the low salary levels some incentives will be needed for around 5 technicians in each country for 6 months a year (dry season). The teams of technicians of the respective ministries will be trained either with a technician from Germany to travel to the respective capitals, or for a master trainer to travel to Germany to receive training on the operation and maintenance of the equipment. In the latter scenario, the master trainer would then in turn train other water engineers upon his or her return. Upon request

[74] Salman, M., Pek, E., Fereres, E., Garcia-Vila, M. 2020. Field guide to improve crop water productivity in small-scale agriculture. Rome. FAO. https://doi.org/10.4060/ca8443en

[75] Maher Salman, M., Pek, E. and Lamaddalena, N. 2019. Field guide to improve water use efficiency in small-scale agriculture – The case of Burkina Faso, Morocco and Uganda. Rome, FAO. http://www.fao.org/documents/card/en/c/ca5789en/

[76] Salman, M., Pek, E., Fereres, E. & García-Vila, M. 2020. Policy guide to improve water productivity in small-scale agriculture - The case of Burkina Faso, Morocco and Uganda. Rome, FAO. https://doi.org/10.4060/CA7596EN

[77] Salman, M., Pek, E. and Lamaddalena, N. 2019. Policy guide to improve water use efficiency in small-scale agriculture – The case of Burkina Faso, Morocco and Uganda. Rome, FAO. http://www.fao.org/documents/card/en/c/ca7144en/

[78] Maher Salman, Lisa Bunclark & Motasem AbuKhalaf, 2016. Strengthening agricultural water efficiency and productivity on the African and global level, FAO. http://www.fao.org/3/a-i5976e.pdf

[79] https://gerdetect.de/underground-water-detectors/river-g.php?la=en (accessed Nov. 2021)

from the respective ministries, the project will establish a national and binational technical committee and hold 6-monthly meetings covering all the technical aspects related to component 2 including the aquifer mapping. Specific requests have been made for the technical committee between Sudan and Chad to be held locally either in in El Geneina in Sudan and Adrè or Abeche in Chad by simply crossing the land border.

97. The sharing of groundwater data between the two countries is important in order to be able to conduct the required modelling and better understand the quality and direction of flow of the water vis-à-vis the points of water extraction that will be mapped both through site visits and through the technology being procured as a result of this output. In order to bring together all the mapped data the project will hire one company specialised in software development that will enable the integration of the mapped data that will be collected as a result of outcome 2.1. This data will include aquifer water availability and quality, the data collected as a result of the monitoring of shallow ground water levels (output 2.2.2), the location of sub-surface reservoirs, hafirs, boreholes and enhanced concrete-lined shallow wells. The electronic database that will be developed will also integrate the manually coolected information that is currently available at UNICEF Sudan. Consultations with UNICEF Sudan have shown that a manual database of existing infrastructure is in the process of being compiled, however UNICEF was not in a position to share that information with the project design team at the time of the design as this was still incomplete.

98. The sharing of the database will be made possible through a network of servers that will be set up in both countries and in the cloud allowing for the real-time sharing of data and function as a back-up.

99. The project activities will include:

i. Hiring of international consultancy / expert in groundwater mapping / hydrologist for designing of training programme;
ii. Training of national staff to conduct water use mapping and in using computer software and use of database (10 technicians, 5 per country);
iii. Mapping and modelling of the shared Disa aquifer in the project area;
iv. Creating a shared electronic database of surface and ground water availability and number and type of water infrastructures in the project area;
v. Developing and implementing a software that allows for the integration of the diverse water data sources to be integrated into one programme and will enable the immediate access to critical water information in real time.

100. **Output 2.1.2 Groundwater Monitoring.** The Sudan government only has at best scattered groundwater monitoring stations in the project area, the data most of which needs to be collected manually. Additionally, during consultations for the design of the SCCIWM the Ministry of Irrigation and Water Resources (MoIWR) in Sudan was not able to produce reliable groundwater monitoring data, the data provided was scattered and incomplete. In Chad the situation is very similar in as much as consultations had with the Directorate for Knowledge and Water Regulation at the Ministry of Urban and Rural Water (Direction de la Connaissance et de la Règlementation sur l'Eau du MHUR) explained that the country does not have any ground water monitoring coverage in the project area or the capacity to drill the boreholes and install the required piezometers, the MoEWF will consequently launch a public tender for the contract to install the ground water monitoring stations. Contrary to Chad, in Sudan the HCENR will execute the output by contracting the Ministry of Irrigation and Water Resources and the State Water Corporation.

101. The project will drill and install 10 groundwater monitoring stations in each side of the project area for a total of 20 stations. These installations will be located appropriately for example near schools, police stations, army compounds and other areas where they can be secured. The technology that will be used will be similar to that sold by Campbell Scientific[80] and will include sensors that measure water depth and water quality. The technology being proposed will be able to transmit the data remotely by GPS for which each station will need to be equipped with GPS sim cards with the required data credit for transmission. It has been noted during the consultations that the project area is remote and telephone coverage may be inadequate or non-existent in some locations in both West Darfur and Assongha. In order to overcome this challenge and to avoid the need for manual data collection, the proposed technology is able to transmit over radio frequency from station to station until it reaches a station that has access to the GPS network to then send on to the base stations in both El Geneina and Abeche. Technical staff in both the MoIWR and MRUW will be trained and equipped with computer hardware and software provided by the supplier to operate and maintain the installations.

[80] https://www.campbellsci.com/surface-water (accessed Nov 2021)

102. Project activities will include:

i. Technical design and installation of piezometers;

ii. Procurement of groundwater monitoring equipment (data recording and monitoring of quality and quantity and GSM);

iii. Procurement and installation of PCs and servers to collect remote data;

iv. Training and technical back-up support to the MoIWR (Sudan) and MRUW (Chad) to build technical capacity building on water and climate related information acquisition and sharing.

v. Facilitation of binational technical working groups and committees to agree on standardised data collection, creation of a binational groundwater data collection database and development of protocols for sharing of data under output 2.1.1 above.

103. **Output 2.1.3 Climate Data Gathering.** Following consultations with meteorological technical experts in the Chad Meteorological Agency (MA) and the MoIWR have shown that support is needed for Automatic Weather Station (AWS) in both countries to collect data on windspeed and direction, air pressure and temperature, humidity, rainfall and soil temperature. Following consultations with the Specialist Agroclimatologist at the MA Chad has a networks of 64 AWS in Chad but none in the province of Assongha. The network currently relays real-time climatic information to the server in the office the Agroclimatologist at the MA. The project will tender for the procurement and installation of one AWS in each of the project area to complement the climatic data collection and will conduct the regular monitoring of climatic trends. The data collected from the AWS in both Sudan and Chad will be compiled as part of the regional Natural Resource Monitoring System (NRMS) being developed and will help improve the knowledge and understanding of the climate trends in the project area.

104. Activities will include:

i. The procurement and installation of atwon AWS in Assongha and West Darfur;

ii. The sharing of climate data as part of the NRMS, contributing towards the development of the Regional Natural Resource Management Plan (RNRMP) resulting from outcome 1.2.

Outcome 2.2 Improved water supply augmentation and integrated water resource management through conjunctive and multiple water use

105. **Conjunctive Water Use (CWU).** The increasing acuteness of water scarcity problems, worldwide and in the Sahel in particular, requires the adoption of a double approach of balancing the management of water supply and demand. Communities are already using groundwater for multiple purposes in the area. However, groundwater resources are highly vulnerable and without effective recharge, they are prone to depletion. The shrinking aquifers are widespread phenomenon in semi-arid areas, where communities withdraw groundwater resources to supply their needs. Uncontrolled and unmonitored groundwater use, however, poses both environmental and social risks. There is an enormous need to balance water use between surface and groundwater, and assess the recharge needs and inflows of aquifers. Conjunctive use of surface and groundwater consists of harmoniously combining the use of both sources of water in order to minimise the undesirable physical, environmental and economic effects of each solution and to optimise the water demand / supply balance. In order to ensure groundwater can be used as part of the Conjunctive Water Use without causing additional water stress, CWU includes the active augmenting of underground water supplies. The artificial recharge of aquifers can be achieved *inter alia* using two different methods, namely water harvesting techniques such as hafirs and sub-surface reservoirs.

106. **Multiple Water Use (MWU).** As part of CWU is an innovative approach to adapting to water scarcity, namely the multiple use of water. Multiple water use (MWU), that provides vulnerable users with low-cost services for domestic water, water for agriculture, homestead, garden, water for livestock, and rural enterprise water supplies. Multiple use systems also support important functions that are essential for local well-being and livelihoods including groundwater recharge, water harvesting and water purification. MWU is an essential strategic approach to increase water use efficiency, as multiple use allows for integrated management of resources. It is a closed system, whereas non-consumptive water needs can be re-used for other needs. Diversification of water sources and of productive activities is instrumental in increasing local community resilience and management to climate shocks.

107. In outcome 2.2 the project promotes the augmentation of groundwater, water harvesting, and water use efficiency at macro / system-level and structures for water distribution. In order to be able to promote the MWU, it is essential to identify the most efficient water allocation strategies whereby to supply sufficient water for any kind of use that in the context of this project, will be specifically for agriculture, livestock and non-drinking domestic use. To this end, needs-assessments and feasibility studies will be conducted to identify and target appropriate technologies for the given geological, hydrological and socio-economic conditions; the SCCIWM will subsequently

design and implement water infrastructure with multiple outlets. The infrastructure proposals will be screened based on selection criteria including water availability, investment need, the feasibility of the engineering design and socio-economic factors. The project will implement a number approaches ranging from traditional technologies such as water harvesting structures to innovative methodologies such MWU for irrigation and household use. These will include but not be limited to water harvesting in dams, ponds, hill lakes, retention basins as well as groundwater recharge.

108. **Output 2.2.1 Infrastructure surveys and EIAs.** This output will focus on the studies and assessments for the topographical surveys and the hydrogeological investigations needed to assess the water availability and sustainability of water harvesting and groundwater extraction activities. These assessments will be conducted in conjunction with the technology procured for the innovative resistivity meters introduced in output 2.1.1 above. A coordinated effort will be made to simultaneously assess specific location suitability for construction while also conducting the mapping for the underground aquifer under said output. The feasibility studies will be conducted as part of the annual planning phase ahead of the following yearly cycle. Construction is only possible in the dry season (October – June / July) therefore the period for the assessments and construction will be done accordingly. These assessments will be for water availability and construction feasibility of the 7 Water Yards, 18 subsurface dams and 6 hafirs in Sudan and 7 Water Yards, 21 subsurface dams and 3 hafirs in Chad which is explained in more detail in outputs 2.2.2 and 2.2.3 below. The assessments will need to be submitted together with the technical drawings for governmental approval as detailed in section II-F including the need for Environmental Impact Assessments (EIA) of the water infrastructure. Each cycle will identify the project target area and conduct an outreach and community mobilisation campaign as identified in output 1.1.1 and as part of the targeting process an initial survey will be conducted to assess the location suitability for water infrastructure (water yard, hafir, subsurface dams and shallow wells in output 2.2.3 and 2.2.4.). Once suitable geographical locations are found these will then be assessed for project target groups quotas of smallholder farmers, men, women, youth, returnees, IDPs and refugees as well as their vulnerability and poverty statuses.

109. Activities will include:

i. Topographic survey, hydrological and hydrogeological investigation to assess water availability potential (Rainfall data collection, hydrological analysis);
ii. Environmental Impact Assessments of proposed infrastructure;
iii. Submission of technical proposals for review and approval.

Output 2.2.2 An integrated ToF training programme is designed and implemented to train water committee technicians on maintenance of climate-resilient water infrastructure

110. **Training of Water User Association (WUA) committees**. The training of WUAs is key in helping ensure the sustainability and operation and maintenance (O&M) of the water infrastructure. After the WUAs have been established, they will receive a comprehensive training on management, O&M and on gender equality and gender-based violence (GbV). Topics covered will include include gender-responsive participatory decision making, the management of conflicts over natural resources, understanding basic concepts related to hafir / subsurface dam / water yard management, the requirement to include women in the decision making WUAs specifically related to water resources management, hygiene and sanitation practices and Participatory Action Plan Development (management of water stations, collection of money, follow up and evaluation and water uses, organizing meetings, taking decisions and writing reports). The availability of trained technical personnel within the community is important for the O&M of the system. Hence the identification of such people under output 1.1.1. and their training and provision of continuous support initially by the project and then by the collection of water tariffs (below) is critical for sustainability.

111. **Tariffs**. The training will include the establishment of a community based revolving fund and the setting of realistic water tariffs and the benefiting communities will establish a water tariff system for regular O&M. Based on this system, and in consultation with communities; the WUAs will be actively involved in the determination of the revenue collection systems to meet future maintenance expenses. The training in tariff structure will help ensure that: i) the tariff structure will be responsive to the low income and the poor segments of the urban communities, with high-volume consumers pay higher rates to subsidize low quantity consumers; and ii) that water users genuinely unable to pay, the community shall make considerations to cover the cost from the charges collected from the rest of the community members.

112. **Hiring of local community members as clerks and technicians.** Local clerks and operators will be hired and trained from within the community and paid by the water committee out of community water revenues in the revolving fund. This will permit direct and effective supervision of the daily operations of the water yard and routine

preventative maintenance of the equipment. The clerk will be trained in basic bookkeeping and report preparation and the operator in pump and engine operation, lubrication, preventative maintenance, and pipe repair.

113. **Water yard O&M training.** Preventative maintenance is the key to ensuring a long life for a water yard. Regular monitoring will be carried out to make sure that maintenance needs are identified early enough to take appropriate action. Regular monitoring will also be carried out to ensure that water abstraction rates are maintained at a sustainable level. The proposed inspection protocols should be carried out by the individual technician or committee responsible for management and needs to be more frequent in the first year after construction, preferably once a month. Ideally a technician should assist in the monitoring for the first year. After the first-year, monitoring can be carried out thrice per year. Inspection forms should include, at a minimum, the following information. The training will need to include the sharing of inspection forms including: i) type of inspection (annual, seasonal, monthly, special conditions); ii) date of inspection; iii) items to be inspected; and iv) record of any problems noted during inspection and follow-up actions that are required.

Table 4. Summary of training and O&M tasks for water yards

Maintenance Task	Minimum Frequency of Task	Responsibility	Results expected when maintenance is performed
Rehabilitation of drilling	Annually	Community / WUA	Water supply and storage started and normal
Change of pump spare parts	When needed	Technician/ WUA	Water yard is operational
Inspect and repair if any for water leaks	Daily-basis	Technician	No leaking from water system
Inspect water outlets	Daily-basis	Technician	water supply and quality is normal
Checking and controlling livestock and human separate water supply	Daily-basis	Technician	organized water access and minimum water quality requirement kept
Rectification of the water yard compound fencing	Every week- months	Technician / WUA / Community	Damage and pollution hazards reduced
Emergency maintenance	When needed	Technician / WUA	Water yard is operational

114. **O&M training of Hafirs.** O&M costs associated with these activities are low, estimated at about $2,500 per year, mostly for fuel, lubricants, and spare parts. The main O&M activities include: i) Desilting can be done manually, by draught animal traction or mechanical. This should be done regularly, preferably once a year in areas where heavy siltation occurs. The depth of silt deposited (and hence the quantity to be removed) can be measured easily if a marked post is installed in the bottom layer at the time of construction; ii) Repairing of fences to keep livestock out and maintain quality of water; iii) Prevent leakage by compaction of eroded parts of embankment; iv) Maintenance of inlets and outlets and obstruction removal; and v) Establishment of a community based revolving fund and the setting of realistic water user fees.

Table 5. Summary of training and O&M tasks for hafirs

Maintenance Task	Minimum Frequency of Task	Responsibility	Results expected when maintenance is performed
Removal of slit (desilting) can be (manual, draught animal traction or mechanical).	Annually, before the rainy season	Community / WUA	Water flow and storage improved
Inspect and remove debris from hafir entrance point	A head before the rainy season and after heavy rain	Clerc and operator	Water flow improved
Inspect seasonal stream systems and facilitate water flow/ inspect and prevent any backflow	Annually	Clerc / operator WUA / community	flow is normal and no backflow
Inspect and repair leaks if any for cracks (Compaction of eroded parts of embankment)	Every 3 months	Clerc / operator WUA / community	No leaking from water system
Inspect and clean water outlets (should be cleared from silt and debris).	Community/ Guard and operator	Clerc / operator	water flow and water quality are normal
Checking and controlling livestock and human separate gates or entrances for water access	Daily-basis	Clerc / operator	organized water access and minimum water quality requirement kept
Rectification of thorny wire fencing	Every 3-6 months	Clerc / operator	Pollution hazards reduced, and minimum water quality maintained

115. The PMUs will hire an expert consultant to design a Training of Facilitators (ToF) programme summarised in Table 6 and will be in support of output 2.2.3 and 2.2.4 below. 31 WUA committees per country, the broader beneficiary community and maintenance technicians will be trained as a result of the project with an average of 12 committee members per WUA for a total of 372 trainees per country for a total of 62 WUAs and around 744 trainees in total. The WUAs and committee members will have been identified as part of output 1.1.1 and will be those responsible for the operation and maintenance of the water infrastructure. The expert consultant will be the master trainer (MT) and train 16 facilitators in 1, 10-day training courses per year to in turn train the WUAs. The training will be repeated annually for each new cycle of WUAs and improvements may be added to the training curriculum based on lessons learned and good practices. Facilitators will also be trained annually as refresher training and training of replacement facilitators as needed. In Sudan the facilitators will be hired from the extension services in the MoIWR and SWC at locality level and if necessary, the project will also recruit qualified young engineers as training facilitators with small remunerative incentives. In Chad the project will recruit a Service Provider (SP) as facilitators to conduct the execution of outputs 2.2.2 and 2.2.3. Additional facilitators can be sourced from the (National Agency for Rural Development Support) ANADER for the execution of the training programme and here also pay them remunerative incentives as the salaries are low or unpaid. The training programme and framework in Chad will otherwise remain the same as that described for Sudan hereabove with the training of 31 WUAs for a total of 372 WUA trainees for Chad and 62 WUAs and 744 trainees for the countries combined.

Table 6. Summary of water infrastructure training activities

Target	Training subject	Training summary
Water committee technician	Repair and maintenance of earthen structures (hafirs)	• Inspection of hafir embankments • Identification of erosion and rodent burrows • Documenting and mapping the location of erosion/rodent burrows, extent of erosion, potential causes, proposed remedies, action taken • Inspection and cleaning of hafir water intake and outlet structure • Necessary documentation of repairs where needed
	Repair and maintenance of civil infrastructure	• Inspection, repair and maintenance of hafir fence • Inspection repair and maintenance of guard room and other masonry structure for cracks and settlement etc. • Inspection, repair and maintenance of walkways and gates/doors
	Repair and maintenance of electrical and plumbing system	• Inspection, repair and maintenance of basic electrical installation i.e., lights, fans, fuses and switches etc. • basic repair and maintenance of pumps, oiling electric motors, and plumping accessories • Maintain inventory of basic spare parts of hand pumps • Cleaning of solar panels and repairing electrical connections • Repair and maintenance of hand pumps and plumbing • Ensure availability of required tools
Water committee accountant	Water tariff	• Helps the water committee management in setting water tariff • Calculation of monthly charges
	Financial record keeping	• Record keeping of beneficiary farmers/households • Record keeping of payments/revenue received • Record keeping of maintenance activities • Record keeping of utility bills and payments related to water facility • Record keeping of in-kind contribution (i.e., labor) by the community • Maintaining a bank account for water facility if applicable • Record keeping of donations received by the water committees • Ensure transparency in financial dealing accept ownership of the water facility
Water committee Guard / watchman / janitor	General	• Keep animals and public away from the storage reservoir for safety reasons • Ensure animals and human waste is kept away from the water facility (hafir and subsurface dam) • Watchful of the water facility property, tools, equipment and installations • Helpful to the management of water committee in performing daily activities

Output 2.2.3 Design and installation of water harvesting and multiple water use infrastructure

116. **Subsurface dams (SSD)** are cost-effective rainwater harvesting structures which are used as a response to conditions of water scarcity due to severe drought and climate extremes in drylands. The main function of the SSD is to intercept or obstruct the underground flow of groundwater below a stream and hereby stabilising the water

table upstream of the dam (see figure below). They are principally recharged by intense rainfall, which originate in catchment areas with higher elevation. A single and short-lived flash flood may fully recharge a SSD with water. Upon full saturation of the reservoir, the remaining flash floods will pass over the dam without further infiltration, replenishing water tables downstream. SSDs have been used successfully in several parts of the world where flows of groundwater vary considerably during the course of the year, from very high flows following rain to negligible flows during the dry season.

117. The subsurface dam needs to be built across a stream or valley where a trench is dug reaching the bedrock or other impermeable layer such as clay. Subsequently an impervious wall is constructed in the trench which is refilled with the excavated material. The optimum location for constructing a SSD is on gentle slopes (0.2 – 4%) and for which topographic surveys are required to assess the dimensions of the wadi and slope as well has hydrological investigations (output 2.2.1) to determine water availability, storage capacity and soil bearing capacity of the embankment construction for a minimum 10 year return period. If an assumption is made of a 1% slope, with an embankment hight of 5 meters and an embankment width of 50 meters, then the structure will effectively provide underground water storage for 500m upstream of the SSD with an estimated 25,000m^3 of water storage. Water is extracted by way of shallow hand-dug wells either in close proximity to the wadi, alternatively further away within the serviceable area. It is possible to lay underground pipes to facilitate the pumping of water with solar power if unsafe to do so in close proximity.

118. The advantages of constructing an SSD are multiple as much as primarily they are underground and not subject to the evapotranspiration rates of 2m as surface open reservoirs such as hafirs are. They also enable access to cleaner water, are easier to maintain, are longer lasting, they do not present breeding habitats for insects and are significantly cheaper to construct than other dams. For example, for a storage capacity of 50,000m^3 a sand dam costs around USD 187,000 (USD 3.74/m^3), a hafir around USD 146,000 (USD 2.92/m^3) and a SSD 70,500 (USD 1.41/m^3). While data on existing water infrastructure in Assongha is unavailable, consultations with the State Water Corporation (SWC) in Sudan confirmed that in the project area of El Geneina locality, there are currently 3 dams constructed of which two are out of use and one is operational. Subject to the assessment studies and topographical suitability, the project will aim to construct and rehabilitate an average 18, 50,000 m^3 SSDs in Sudan and 21, 50,000 m^3 in Chad for a combined total of 1.95 million m^3 of water harvesting capacity.

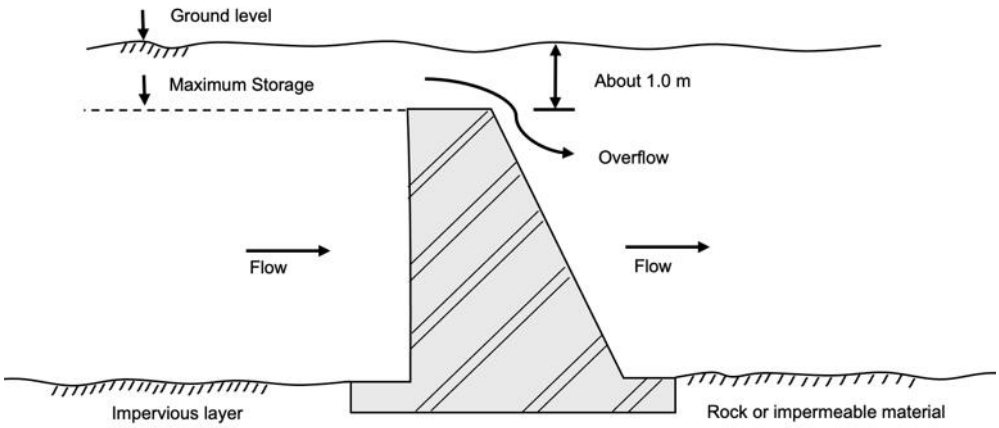


Figure 1. Typical subsurface dam

119. **Improved shallow wells.** The project aims to enhance the climate-resilience of the climate-vulnerable rural poor livelihoods by improving their access to water. Data availability on exact numbers of water infrastructure in Assongha is unavailable, however the consultations with the State Water Corporation (SWC) in Sudan report that in the El Geneina locality there are currently an estimated 73 traditional wells of which 18 are non-functional and 55 functional. In terms of wells with hand pumps the SWC estimates that there are around 492 of which 200 are non-functional, while 292 remain functional for an estimated population of 17,000 original households, 1800 returnee households and around 19,600 households in IDP camps. Improved shallow wells are an innovation brought by FAO in West Darfur and involve the concrete lining and sealing of around 5-6 meter-deep wells that tap into the rising shallow water table as a result of the SSD dams and enable farmers to cultivate land for 6 - 8 months into the dry season (October – March / April). These wells will be powered by solar water pumps from which farmers are able to irrigate their lands through a gravity-fed system of a concrete lined irrigation canals and pipes. Additionally,

the wells will also have concrete-lined outlets for the watering needs of livestock at a safe distance from the source of water to avoid contamination.

120. The project will target around 2,900 individual farmers supplied by the SSD water harvesting activities for the construction and rehabilitation of 80 improved shallow wells for each side of the border. In Sudan construction will be conducted the MoIWR while in Chad by contractors / Service Providers. This will provide for the irrigation capacity of outputs 3.1.3 and 3.1.4 through a combined total of 160 improved shallow wells with an estimated 8.5 – 9, 0.5 ha plots of land and a combined 100 ha (50ha Sudan and 50ha in Chad) of moringa plantations in output 3.2.2 to be irrigated from each well, it is estimated that a combined total of around 6,24 million m^3 of additional irrigation needs will be met directly by project rainwater harvesting infrastructure.

121. **Hafir.** A hafir is an artificial excavation designed for harvesting rainwater transported during the rainy season by seasonal streams, to enhance the access of vulnerable communities to water for agricultural, livestock and domestic / hygiene use. Hafirs are usually constructed big enough to cater for the needs of the villagers/nomads and their livestock during the dry season. The average hafir capacity can range from 15,000 to 250,000 m^3 and is typically surrounded by a fence for protection from animals for example in the pictures below. The project will construct around 6, 40,000m^3 solar powered hafirs in Sudan and 3 in Chad for a combined total of 360,000m^3 of water harvesting capacity. This will include fencing and inlets and outlets structures/pipes, wells, solar panel pumps and drinking troughs for animals away from the water points. The construction of hafirs will need to be subject to the appropriate topographic survey to determine slope dimensions of the wadi as well as hydrological surveys to determine water availability and design storage capacity. It is further recommended to include stilting pools to reduce siltation and shelterbelts to reduce evapotranspiration.

Figure 2. Pictures of a hafir under construction (left) and an operational hafir (right)

122. The output activities will include:

i. The design and construction of around 39, 50,000 m^3 capacity subsurface dams;

ii. Design and construct 160 improved shallow wells;

iii. Design and construction of around 9, 40,000 m^3 capacity hafirs;

iv. The supporting of the WUA committees with stationary and daily administration equipment as well as the technical toolkits and spare parts for regular maintenance.

Output 2.2.4 Design and construction of water yards

123. In addition to the SSD and hafirs, the SCCIWN project will aim to meet the WASH needs of the climate-vulnerable rural poor also through the construction of water yards. Water yards are essentially a water extraction and distribution complex which includes a borehole, a storage tank, animal watering basins and tap stands. The borehole is equipped with a pump, typically powered by a diesel engine, however in this project, solar-powered pumping is the chosen alternative due to the high cost of fuel. The water yard is contained within a fenced compound, and under the control of a technician and guard. The trough for livestock is separate from the tap stands dedicated for human consumption by internal cross-fencing. Water is pumped into the elevated storage tank, which is usually constructed from prefabricated steel sections. From the storage tank, water is distributed by gravity to tap stands for filling containers for human consumption, and to metal trough for watering livestock (see pictures below).

The average nominal daily tank capacity is 50 m^3 and it is expected that the water yard pump will have an extraction capacity of 20m^3/hr for an average operating time of 8 hours a day for an estimated extraction volume of 1,120m^3 per week.

124. Contrary to the water harvesting principle of the SSD and hafir, the water yard taps into the deep aquifer. This is an option for communities that are too far away from the wadis to benefit from the water harvesting investments. Like the water harvesting infrastructure, the construction of the water yards will require feasibility and hydrological studies and Environmental Impact Assessments (EIAs) to ensure that the underlying water source is sufficient for the intended consumption levels without unduly aggravating already precarious water supplies. In addition to any pre-existing groundwater meters and studies, this assessment will be made possible with the resistivity meters procured under output 2.1.1 and the underground water mapping activity in coordination with the construction of the water yards.

Figure 3. Examples of water yards

125. Output activities will include:

i. Design and construction of new water yards including tubewell and solar pumping system;

ii. The provision of maintenance toolkits for water yard technicians;

iii. Provision of stationary supply support for WUA committees.

Outcome 2.3 Communities receiving the Multiple Water Use (MWU) Sanitation Services

126. **Climate change.** Climate change poses an increased risk of disease or illness to the most vulnerable communities from exposure to pathogens and hazardous substances through increased environmental contamination, and/or increased risk of disease or illness resulting from a lack of access to adequate sanitation when systems are destroyed or damaged. People without access to basic services experience overlapping forms of disadvantage and are likely to face the worst effects. A factor compounding the adverse effects of climate change on the most vulnerable rural poor, in particular women is one of access to basic sanitation services and awareness raising to combat the COVID-19 pandemic. The project will therefore promote improved sanitation practices in the project area through a community-based approach to sanitation and by applying the Multiple Water Use (MWU) and Conjunctive Water Use (CWU) approach. To achieve this the project will promote the Community Led Total Sanitation (CLTS) which is already being applied elsewhere in both Chad and Sudan and will also promote improved health, through handwashing facilities utilising the water made available through the project's climate-resilient water infrastructure.

127. **Gender gap.** Gender will be fully mainstreamed throughout the project and including in outcome 2.3 as women and youth are the main actors in the procuring of water and women are the main members of society most vulnerable when walking long distances for WASH purposes either to collect water or go to the toilet. Many communities do not have access to a community toilet and practice open defecation, a practice that leaves many women vulnerable to Gender-Based Violence (GBV) as has been reported during the consultations with the United Nations Population Fund (UNFPA). The discussions with the UNFPA for the design of the SCCIWM project have raised specific concerns and requests that women be fully participant in the decision-making processes across the board but specifically regarding WASH matters, the AF project will therefore have 50% women quotas on the WASH decision-making WUA committee members.

Output 2.3.1 Implementation of Community-led Total Sanitation (CLTS) programme

128. According to a WFP Comprehensive Food Security Vulnerability Analysis (CFSVA) from December 2020, the results of which were provided by WFP as a result of design consultations, around 33% of the population of Sudan project area in El Geneina locality still practices open defecation in bushes or streams. The Community-Led Total Sanitation (CLTS) approach was first pioneered by Water Aid Bangladesh in 1999 / 2000 and has since been widely adopted around the world. The objective of CLTS is to combat poor access to adequate sanitation that result in the widespread open defecation and negatively affects communities in terms of diarrhoea and cholera. The CLTS approach involves facilitating a process to inspire and empower rural communities to stop open defecation and to build and use latrines through locally available resources and technical solutions. It uses a Participatory Rural Appraisal (PRA) approach that make members analyse their own sanitation profile including the extent of open defecation (OD) and the spread of faecal-oral contamination that detrimentally affects all concerned and ignites a sense of self-awareness among the community and the implications of faecal contamination. This realisation mobilises them into initiating collective action to improve the sanitation situation in the community. CLTS aims to trigger sustainable community-led local action to stop open defecation through a process that promotes ownership and application[81]. Once initiated, the CLTS empowers communities to construct homemade pit latrines as families start making toilets within their means, or share toilets in order to become a 100 per cent open defecation-free village. The process of empowerment enhances community pride and self-worth. Once the OD-free status is achieved community graduates and puts up a board at the entrance to the village highlighting their OD-free status.

129. The SCCIWM project will integrate the CLTS approach within the broader SMART Irrigation - SMART WASH approach of the project for which the project will procure local service providers (SPs) with experience in delivering similar WASH activities. SPs will be sought with expertise in CLTS and a network of extension workers, alternatively SPs can also work with extension workers at the local Ministry of Health extension agents in Sudan, or ANADER extension agents in Chad in addition to local youths in return for remunerative incentives covered by the SP contract. The project will ensure that all communities of the 62 WUAs (of which 50% women) that will be identified under output 1.1.1 (including their households) will be OD-free and will have successfully completed the CLTS programme. In addition to the CLTS programme and in complementarity to it, the SPs will also be tasked with the training of the project target communities on the importance of hand hygiene for which hand washing equipment will be installed in output 2.3.2 below.

Output 2.3.2 Installation of handwashing stations

130. In order to help vulnerable communities adapt to the multiple adverse impacts of climate change, the project will make use of the climate-resilient water infrastructure to help introduce basic hygiene and sanitation practices that will help reduce climate-vulnerability and help reduce the spread of disease and the COVID-19 virus. In addition to the ensuring that all the WUA communities are OD-free, the SPs responsible for output 2.3.1 above will also be tasked with the installation of handwashing stations as well as the training of WUAs, the broader community and community facilitators on the importance of handwashing for personal hygiene but also to combat the virus. The project will therefore ensure that each of the 62 WUA-supported community will receive 3 hand-washing stations together with soap and spare parts to be located in strategic locations such as the community CLTS latrines as well as training on the importance of personal hygiene following the CLTS approach.

131. The outcome activities will include:

i. The recruitment of service providers for the design and implementation of the CLTS programme to achieve open defecation-free zones in the project area;

ii. The training and installation of handwashing stations and the training of communities on the importance of personal hygiene and to combat disease and COVID-19.

Component 3 Improving food security through climate-resilient agricultural practices and technologies

132. Global temperature increases will adversely impact the project target areas and the vulnerable sectors including rainfed agriculture and surface and groundwater resources. This ultimately increases the vulnerability of certain communities, such as poor sedentary as well as IDP / refugee farmers, agro-pastoralists that rely on rainfed agriculture. The impact of climate change will not only be limited to temperature increases that are projected to

[81] A summary of the CLTS process can be found in annex 9

increase by up to 3°C by 2050, but also increasing rainfall variability with increased frequency of droughts. [82] Agriculture in the region is already inherently complex, and risk-prone, and farmers have long struggled to respond to challenging environmental conditions. Depending on the location and year, they face either moisture or soil fertility constraints as their primary challenge.[83]

133. This component is designed to strengthen the capacity of farmers (60% women, 30% IDPs / refugees / returnees, and 25% youth) for climate resilient and sustainable agriculture production through the adoption of environmentally sustainable and climate resilient technologies and practices. It is expected that 20,000 persons will be trained in improved crop production and in the management of climate-related risks. Of these, 12,000 people trained will be women, 6,000 IDPs / refugees / returnees and 5000 will be young men and women. While the main modality of the training will be through FFS, where appropriate some of the practices will also be demonstrated through field visits, pilot demonstrations of adaptation practices and technologies, and the exposure to best practices on NRM and climate change adaptation from relevant experiences of other projects implemented in comparable context. The project will focus on a number of target crops that have the most potential for growth and participation of smallholder farmers and that present good market potential. The key crops will be decided in participation with the participating farmers and could include vegetable production, legumes.

Outcome 3.1 Livelihood activities made climate-resilient through the application of climate-resilient agricultural practices

Output 3.1.1 A rainfed and irrigation agriculture training programme is designed and implemented (to build the capacity of water and soil conservation FFS facilitators with mainstreamed sanitation and gender.)

134. The AF will hire two master trainers (MTs), one for each country that will design the Training of Facilitators (ToF) and the Farmer Field School (FFS) training programmes for all rainfed and irrigated agricultural activities. For Sudan the PMU will work with the Ministry of Agriculture and for Chad the PMU will tender the FFS contract with the potential implementation entities being IARD / ITRAD, ANADER, or NGOs with the required network of extension agents and the capacity on the ground for outcome 3.1. Once the facilitators have been identified and the training programmes designed and approved by the respective PMUs and FAO, the MTs will train 50 facilitators for each country in four training sessions lasting 10 days. The ToF training programme will include a refresher course in PY3 and PY4 in case facilitators need to be replaced and for updating of the training to include improvements and lessons learned from the project. The training programmes will be tailored for both the rainfed agricultural FFS and the irrigated FFS under outputs 3.1.2, 3.1.3 and 3.1.4 the latter of which will be distinguished by the pilot for the innovative high-efficiency irrigation under output 3.1.3 and the standard irrigation activities under output 3.1.4.

135. The training will include:

FFS Main Topic / Objective	Priority Target	Benefits	Main Climate Change Adaptation Benefit
Shift to high yielding, early maturing, drought tolerant and heat-resistant crop varieties, alternative crops.	Rainfed and irrigated farmers	Reduce water needs of plants and ensure higher resilience of crops to temperature and prolonged water deficit.	Farmers will be able to cope with the increased evapotranspiration caused by increasing temperatures and water deficit. This will potentially allow for increased productivity per unit of water and more stable income for households. • Improving soil water storage to maximize plant water availability by maximizing infiltration from rainfall; • minimizing unproductive water losses (evaporation, deep
Half-moon Technique to dig 20-40 cm diameter and 10-15 cm depth pits in the soil during to catch water with or without animal fertiliser. The technique is used to restore degraded drylands and increase soil fertility.	Rainfed farmers	half-moon can increase the yield of millet by 45 to 50% (870 to 900 kg / ha. With the addition of organic manure, the yield is between 1200 and 1600 kg / ha.	
Zaï / Tassa Technique to dig 2m diameter pits in the soil during to catch water with or without animal fertiliser. The technique is used to restore degraded drylands and increase soil fertility.		- Improvement of the emergence rate of sown seeds; - Significant increase of at least 25% in efficiency.	

[82] Sayed, M.A. and B. Abdala. 2013. Sudan Environmental and Climate Change Assessment. ECCA No. 3226-SD Rome: International Fund for Agricultural Development (IFAD).

[83] Brower, J. and J. Bouma, 1997. Soil and Crop Growth Variability in the Sahel: Highlights of Research (1990-95) at ICRISAT Sahelian Center. Information Bulletin No. 49. ICRISAT and the Agricultural University of Wageningen. Patancheru: ICRISAT.

FFS Main Topic / Objective	Priority Target	Benefits	Main Climate Change Adaptation Benefit
Stone ridge - Facilitate the infiltration of rainwater; - Improve agricultural productivity; - Regenerate herbaceous and wooded stands.		With a 33 m spacing between the ridges, runoff is reduced by 12%; soil losses are reduced by 46%.	percolation and surface run-off); • increasing soil water holding capacity; and maximizing root depth; • Application of conservation agriculture; • Modification of planting and harvesting dates; • Restore degraded drylands and increase soil fertility.
Filter bund - Facilitates the infiltration of rainwater; - Improves agricultural productivity.		Reduction of the "splash" effect and improvement of surface water infiltration, by reducing runoff speed and hence water erosion. Improvement of soil fertility by fixing atmospheric nitrogen by the roots, conservation of the filtering system of stone bunds and reduction of clogging, production of useful products (fodder, fruits, firewood and service, medicines).	
Conservation Agriculture (no/minimum tillage, mulching, crop rotation and restorative fallow practices).		Increase soil moisture, reduce land erosion due to rain washing and enhance the soils physical properties.	
Adapting the crop calendar to changing temperature and rainfall patters: modification of planting and harvesting dates.		Reduce risks of water shortage and increase chances of water availability in the critical phases of growth of the plants.	
Protected and semi-protected cultivation' practices for irrigated lands.	Irrigation farmers	Increase productivity per water unit and allow for higher production in limited space.	• Farmers will be able to cope with the increased evapotranspiration caused by increasing temperatures and water deficit. • Farmers will be able to use of supplemental irrigation from harvested rainwater in the critical stages of crop growth. They will be able to produce for more cycles, reduce the amount of inputs and water needed. This will allow for increased productivity per unit of water and more stable income for households.
Fertigation of crops and / or manure (organic) fertilisation			
Wicking beds[84] an excellent method of growing vegetables in arid, water-scarce regions as only up to half of the water is needed compared with standard top-down irrigation methods.		Increase productivity per water unit and allow for higher production in limited space, reduced risk of soil contamination (chemical and biological), reduce the level of pesticides needed and reduce the risk of soil borne diseases.	
Agronomic and soil manipulation Seed priming, seedling age manipulation, increasing soil fertility, addition of organic matter, tillage and soil mulching, etc.); Organic fertilizers micro dosing, planting density and changing planting dates, diversification (Planting different varieties or crop species), intercropping, Improved crop residue and weed management.	Rainfed and irrigated farmers		
Water management • Irrigation according to crop water requirement; • Selection of best irrigation method • Water use efficiency; • Water productivity concept; • Conjunctive water use; • Water conservation.	Irrigation farmers		

[84] https://www.fao.org/3/i4021e/i4021e.pdf

FFS Main Topic / Objective	Priority Target	Benefits	Main Climate Change Adaptation Benefit
Operation and Maintenance of high efficiency irrigation system • Operation of high efficiency irrigation system; • Running pumps; • Pump priming; • Valves opening/closing; • Flow meter reading; • Pressure meter reading; • De-clogging drip emitters; • Fertigation tank operation; • Collection and storage of laterals at the end of season.			

136. The output activities will include:

i. The hiring of two Master Trainers to design the ToF and FFS training programmes;

ii. Implement the ToF training and refresher training programmes for both countries.

Output 3.1.2 Implementation of the Rainfed Farmer Field Schools

137. The project area is predominantly characterised by non-mechanised rainfed agriculture, the rainfed FFS under this activity will be focused on those climate-vulnerable communities that do not have access to water sources for irrigation which are typically near wadis. These include most farmers such as those in Internally Displaced Peoples (IDP) and refugee camps as well as returnees, regular sedentary farmers, and agro-pastoralists that have started to settle as a form of adaptation to climate change. The FFS training programmes will be implemented by the MoA in Sudan and a competitively recruited Service Provider for Chad. The annual training programme training will last for 5 months during the traditional rainy season stretching from June – October, the FFS approach will focus on groups of 25 farmers that will comprise one FFS to take place on community donated common land. In accordance with FAO FFS guidelines[85] the minimum FFS training period is for 2 years (in this case also two growing seasons) which is the recommended minimum duration of a FFS. This is in order to identify emerging problems may be addressed and help ensure that learning activities may be covered more comprehensively and vital integration of both short and medium-term aspects in the design. The training programme will be based on output 3.1.1 above and the project aims to incrementally start the FFS with 50 in PY1 and PY2, an additional 100 for PY2&3 and 50 for the biannual cycle PY3&4. The objective is for each country to have trained 200 FFS groups of 25, for a combined total of 20,000 direct beneficiaries.

Activities will include:

i. Identification of communal land for FFS;

ii. Setting up and execution of FFS.

Output 3.1.3 High efficiency irrigation pilot implemented

138. The project will introduce innovative technology in the form of high efficiency drip irrigation systems. These will be installed on eight community FFS pilot plots (one pilot plot under the command of each water harvesting facility under output 2.2.3). It is foreseen that the pilot plots will be developed through a participatory approach in groups of 25 local community members who will be mobilized through the WUA committees under output 1.1.1 and will pool communal land as in-kind contribution to make a one-hectare communal pilot plot. It will further be ensured that 60% of these communal farms and its beneficiaries are entirely women-run for a total of 400 beneficiaries for the entire project (240 women and 80 youth in each country). To achieve this, the project will finance the installation of a high efficiency solar operated drip irrigation systems on each of these communal plots. The project will also provide for the operating and maintenance cost of the pilot plots for the duration of the project and train farmers on

[85] FAO (2016) Farmer Field School Guidance Document – Planning for Quality Programmes https://www.fao.org/family-farming/detail/en/c/413593/

the economic viability of their production plans as per output 3.1.1, to ensure the future maintenance and sustainability. The community members will be trained on growing high-value crops such as tomatoes and vegetables on these plots, a profit-sharing mechanism will be developed to share the return on an equal or proportional basis among the beneficiaries and money set aside for administration, maintenance and repair. To this end they will be provided with basic financial literacy training as well as water accounting and the importance of sustainably managing water supplies as well as demonstrating the benefits of the innovation to other farmers, while being encouraged to work in groups and form cooperatives to share resources and maximise productivity.

139. The Integrated Water Management (IWM) approach will ensure that the pilot beneficiaries and respective WUAs will also benefit from the conflict awareness training that will be developed as part of output 1.1.1. Any possible conflict that may arise among the beneficiaries or at community-level resulting from the communal pilot plot, or any other activity, will be referred to the community conflict mediators, community leader WUA representative and project staff; any community conflict will be directly overseen the by the Conflict Resolution Committee (CRC). The community-driven approach to the introduction of this innovative technology, helps promote the importance of cooperation and community learning, to overcome differences and to be able to overcome challenges as a group. This will be particularly relevant as the trainees and other farmers aim to pool their own resources to replicate the benefits of high efficiency irrigation systems on their own land for which the project will have constructed the SSDs and improved water wells. The promotion of in-kind contributions in land, time and labour is to avoid the model of fully subsidized systems to promote ownership and a sense of vested interest of the system among large number of stockholders and avoid potential conflict that may arise otherwise by several farmers contesting to individually offer their plots for the pilot installation.

Activities will include:

i. The design and installation of high efficiency on-farm drip irrigation system on community pilot sites;

ii. The implementation of the FFS programme.

Output 3.1.4 Irrigation FFS implemented

140. In addition to outputs 3.1.2 and 3.1.3, the project will support the training of 1300 smallholder farmers in (625 in Sudan and 675 in Chad) in climate resilient irrigation agricultural practices. This will be done through 52 irrigation FFS groups (25 in Sudan and 27 in Chad) on 1 ha demonstration plots of land that will be donated by the communities. The purpose of the FFS is teach famers how to maximise the rainwater harvesting and irrigation infrastructure potential that will be developed in output 2.2.3 and for farmers to replicate the techniques learned on the FFS that will be developed as part of output 3.1.1. In Sudan the FFS will be implemented the Ministry of Agriculture while in Chad the PMU will tender the FFS contract with the potential implementing partners being IARD / ITRAD, ANADER, or NGOs with the required network of extension agents and the capacity on the ground for outcome 3.1. The same benefitting FFS trainees will also receive support for the construction of the improved shallow wells under output 2.2.3 in order to be able to apply the FFS training and share the knowledge among the other community members.

Activities will include:

i. The design and installation of on-farm irrigation systems on community sites;

ii. The implementation of the FFS programme as per output 3.1.1.

Output 3.1.5 Seed multipliers established and operational

141. Project consultations have highlighted an insufficiency in data availability on the viability of drought-resistant seed varieties in both sides of the Assongha river. One of the main technical capacity needs that have been identified is the need for a better understanding by local producers of the types of seed varieties that are climate resilient. In order to help build climate resilience it will important to transfer knowledge of specific crop varieties that can cope with heat and drought,. Such information can help local extension services to help farmers adapt to the changes and sustain increase in agricultural production and productivity. Some of the main challenges surrounding seed production in the project area include: i) A lack of an informal sector (i.e., farmers) knowledge for producing/obtaining quality drought-resistant seeds; ii) Limited availability of improved seeds varieties that are developed and successfully cultivated elsewhere because there currently is no systematic governmental process for the procurement and dissemination of improved seed varieties to needy communities; and iii) Ineffective or unavailable extension service training programmes in the field of improved crop varieties due to in large part because the current extension services are unable to meet the extension service demand.

142. Consequently, seed supply from the formal sector is unlikely to be able to meet farmers' needs. In order to ensure that the project helps to develop a sustainable local climate-resilient seed production base and to help ensure that the project activities are able to supply adequate supplies of seeds, the project will support the development of local seed producers that will directly supply the project's needs. To achieve this, the project will work with the Agricultural Research Centre (ARC) in Sudan and the Institute for Agricultural Research and Development (IRAD) in Chad (in French the Institut Tchadien de Recherche Agronomique pour le Développement – ITRAD) both of whom FAO already collaborates with for its national projects in seed production. The partnership with the national research and seed distribution agencies will help ensure the strengthening of the local seed distribution network that already functions to the extent that seeds are sold informally on the local market. The project consultations have highlighted the need for supporting local seed producers in particular women producers with the knowledge and resources to access improved seeds and inter alia to sell them on the local market. The need for supporting local seed producers and in particular women producers has been raised repeatedly in the consultations as an important additional form of income as farmers already sell any surplus seeds on the local markets. With project support their capacity would be greatly increased and the sustainability prospects are high for them to continue to do so after the end of the project.

143. This output will build on the existing capacity both at the ARC in Sudan and IRAD / ITRAD in Chad and support them to use their extension services and experience to set up farmer-level multiplication farms. The project will help said institutions procure climate-resilient seed varieties to supply project farmer producers with foundations seeds and with the required training and support in seed multiplication. The project will help train 10 ARC and 10 IARD / ITRAD supervisors in two 10-day training courses with a refresher training in the third year. Subsequently the trainers will in turn train seed producers in 20 groups of 7 for 5-day sessions in PY1 and provide regular follow-up guidance and support to farmers with ad-hoc on-farm sessions. It is also foreseen for the producers to receive follow-up training in PY3 to help refresh the training material and introduce improvements through lessons learned and best practices. The refresher course will also enable the training of additional producers should some drop out or choose not to continue production for any reason. The project will support around 140 farmers through the research agencies supplying farmers with 1,900 kg of foundation seeds (950 per country). Through this output the project aims to: i) Generate awareness and improving farmers' access to seed developed varieties to reduce climatic risks and improving crop productivity; ii) Support the dissemination of new climate-resilient seed varieties through facilitation seed multiplication of the improved varieties; and iii) Introduce 'sustainable varieties' that are drought-, heat- and pest-resistant coupled with encouragement / promotion of these varieties through strengthened extension services.

Activities will include:

- The training of ARC and IARD / ITRAD supervisors / extension services;
- The technical and management training of smallholder seed producers;
- Provision of climate-resilient foundation seeds.

Outcome 3.2 Climate-resilient alternative income generating livelihoods implemented

144. The WFP Sudan Comprehensive Food Security and Vulnerability Analysis (CFSVA) in December 2020, shows that 70% of women in West Darfur engage in harvesting and post-harvest activities. Research also shows that women who engage in alternative IGAs meet the immediate food security needs of their families.[86] This is validated by the WFP Sudan Food Security Monitoring System (FSMS) in 2021 that shows that of the IDPs[87] surveyed IGAs were key coping mechanisms to reduce food insecurity as 69 percent of those with salaried work and 44 percent of households with business as main income were food secure as opposed do those that collected firewood, charcoal and livestock who were the most food insecure. During project design consultations with women-focused NGOs, women groups and individuals in both Chad and Sudan, there were frequent requests for support in helping women and specifically in teaching them how to organise into groups and work together, to develop committees, but also training in basic financial literacy and basic business management skills, but also the provision of donkey carts to bring produce to the market and simple mill grinders to ease their burden for post-harvest activities.

145. Reducing the vulnerability of women and relieving them of some of their burden is recognised as key in helping them better adapt to the increasingly adverse impacts of climate change. Women in the project area are some of the most vulnerable community members and are overburdened performing many core and unpaid

[86] Albatahani, A**.** 2015. Protracted Conflicts and Multiple Transitions: Women Negotiating and Driving Change. Khartoum,

[87] Although data was only available for Sudan and not the refugee camps in Chad, it is assumed that the results of the FSMS are similarly applicable in the refugee camps in Chad.

domestic and income generating functions - working generally longer hours than men, due to their multiple roles inside and outside the household. Women have been found to spend an average of 80 hours per week on unpaid activities, the equivalent of two full-time jobs.[88] Project consultations in Chad and Sudan have confirmed that this broadly reflects the situation in most rural areas in the project area. Consultations with women in Sudan and Chad have shown that it is the woman's role (among the many) is to collect firewood which is also really scarce meaning that women at times have to leave at 6am only to return at 6 pm or the next day. This is extreme hardship that exposes them to safety concerns and reduces the time they can spend on other income generating activities and in improving the food security situation of themselves and their households.

Output 3.2.1 Alternative Income Generating Activities

146. In response to the feedback received during consultations with individual women, women groups, NGOs in Chad and Sudan as well UN agencies, the SCCIWM project will develop an integrated programme for the reduction of climate vulnerability in the project area. The project will aim to achieve this through identifying and building the capacity of existing women groups and otherwise to developing new women groups. The groups will receive broad training by an experienced NGO / Service Provider (SP) on a range of key areas including basic financial literacy, nutrition, child health, Gender-Based Violence, basic sanitation practices (in combination with the CLTS output 2.3.1) and other life skills to empower women and increase their climate resilience. To achieve this, the project will tender for two NGOs / SPs, one in Chad and another in Sudan who will be linked up with each other and to learn from each other on experiences and best practices. The NGO/ SP will be tasked with the identification, formation and capacity building of the women groups and the execution of the output.

147. In all 600 individual women will benefit from this activity and will be trained in groups of around 12 women per group for a total of around 50 groups per country. The women groups will be identified and trained in annual cycles as per output 1.1.1 their training programme will need to last an initial 6 months and followed regularly for the duration of the project to ensure that they are given the appropriate technical support and encouragement. The selection, identification and training of community champions acting as focal points for each community and who support the SP/NGO in the regular group meetings will be key to the success of the approach. In addition to the life skill training above, the women will be introduced to the concept of running a basic family/group businesses. They will be trained on developing a basic group business plans then, if and when graduating they will be given the option to choose from certain limited types of activities that they will want to engage in for immediate income generation (such as to make and sell fuel efficient stoves that use 50% less wood. As a graduated group they may receive USD 1000 in-kind, (not cash) for packaging tools and equipment as well as communal infrastructure such as a mill or oil-press to produce flour, sesame or groundnut oil to add sell the produce locally. Consultations have also demonstrated high interest in adding value to post-harvest activities such as through food processing to make cheese and dry meat that can also be sold with support in basic packaging facilities / skills. Consultations show that in Sudan and Chad there are no basic national hygiene standards to adhere to in such production activities and in any case the reach of national governments in these areas is weak and would not be able to license business activities, provide hygiene certificates or enforce existing laws. The project training will therefore include basic hygiene practices that the women should follow and why.

148. This women-focused IGA output is inspired by Business for Action Learning and Innovation (BALI) approach[89] successfully piloted by FAO, IFAD, UN Women and WFP in Kyrgyzstan which is in turn based on the widely adopted Gender for Action and Learning System[90] (GALS) approach however due to the remoteness and harshness of the living conditions, full-scaled BALI programme is not advised.

List of eligible activities for IGAs	
1	Machinery for making oil e.g. sesame oil, groundnut oil, flour
2	Packaging equipment for selling on the local market
3	Raw materials for making energy-efficient stoves

[88] Ibnouf, F.O. 2009. The role of women in providing and improving household food security in Sudan: implications for reducing hunger and malnutrition. *Journal of International Women's Studies*, 10(4):144-167.
[89] https://gamechangenetwork.org/methodology/business-action-learning-for-innovation-bali/
[90] FAO, IFAD https://www.fao.org/3/cb1331en/cb1331en-01.pdf

List of eligible activities for IGAs	
4	Equipment for meat drying
5	Equipment for cheese making
6	Animal-drawn carts for bringing produce to market

Note: list items can be combined or allowances grouped together by of women groups.

Activities will include:

- Identification and formation of women groups and group champions;
- Implementation of the 6-month training programme and development of group business development plans to get the grant money for their proposed activities;
- Development of revolving fund where money can be saved and reinvested

Output 3.2.2 Communal women group moringa plantation pilots implemented

149. The lack of wood availability for energy needs (firewood and charcoal), and forage for livestock, has been identified as a real burden for women as they sometimes need to walk long distances to procure it. The overdependence on firewood is also one of the prime reasons for the for the lack of vegetative cover (inter alia trees) and the ever-encroaching desertification. One of the main challenges to being able to achieve the Great Green Wall Initiative (GGWI) in the project area is to sustainably meet the firewood needs of the project target groups. Following consultations with the national focal points for the GGWI in both Sudan and Chad it was requested that the project promote the development of woodlot gardens, or small plantations for fast growing indigenous trees that can be sold for firewood and charcoal. Consequently, the project aims to pilot small moringa plantations to be operated and owned by women groups, these aim to provide women in a given area with a source of firewood without having to travel long distances with all the risks to their personal safety that this would entail.

150. **Health.** The Moringa Oleifera is a fast-growing hardy indigenous tree with high production yields, multipurpose uses of all its vegetative structures (wood, leaves, flowers, immature pods, seeds, etc.), with nutritional relevance for humans and animals, it is traditionally used for medicinal purposes, in agroforestry systems, for water purification and as water coagulant. Some of the special properties of the moringa tree include the richness of the leaves in protein, vitamins A, B and C, and minerals – highly recommended for pregnant and nursing mothers as well as young children; it also has leaves during the dry season and during times of drought and is an excellent source of green vegetable when little other food is available; It is fast growing and drought tolerant; it has medicinal properties such as antibiotic, antitrypanosomal, hypotensive, antispasmodic, antiulcer, anti-inflammatory, hypo-cholesterolemic, and hypoglycemic properties.

151. **Climate-resilient.** Critically, there are climate-resilient hybrid varieties of moringa such as the PKM-1 developed in India,[91] that is fast growing and flowers within 90 – 100 days. Some of the other benefits includes better yields in short periods, bigger pods; ensures high fruit and oil yielding plants; are luxuriant fruit-bearing and cluster-bearing; the pods are green, fleshy and non-bitter; it grows into robust and softwood plants; its bushy nature makes a good alley in cropping for vegetables and pulse gardens; the leaf-litter gives maximum fertilization care for crops; exhibits uniform growth and thereby makes for twice-a year ratooning;[92] and has a high immunity against diseases and pests.

152. **Watering.** Growing moringa plants may not require watering except during hot weather when they may be irrigated once a week. Moringa responds well to irrigation and the yield can be doubled by irrigation as compared to rain-fed crops by up to 57 percent.[93]

153. **Shade.** The project will promote the use of morenga in intercropping on all farms and for these to be supplied by the plantations both through the selling of seeds or small trees. The development of 1ha moringa plantations will enable the development of ideal rapid growing conditions that will increase the wood harvesting for firewood,

[91] https://krushikendra.com/moringa-seeds-early-variety-pkm-1

[92] Ratooning is the agricultural practice of harvesting by cutting most of the above-ground portion but leaving the roots and the growing shoot apices intact so as to allow the plants to recover and produce a fresh crop in the next season

[93] R.Kumar, et. al (2013) Scientific Production Techniques in Moringa. Agricultural Reviews Volume : 35, Issue : 1 https://arccarticles.s3.amazonaws.com/webArticle/articles/1139.pdf

through optimal irrigation practices and also the provision of half-shade as FAO research shows that the optimum light condition for germination of all moringa species is half shade. While sowing in the hotter weather germination frequencies of Moringa oleifera and Moringa stenopetala amounted to only 40 and 52 percent in full light as compared with 94 and 92 percent in half shade. [94]

154. **Intercropping.** While this output will focus on the development of 1 ha moringa plantations it is possible and desirable, to practice intercropping with traditional household gardening crops which are traditionally cultivated by the women around the home in small plots of land which are not suitable for irrigation. According to the research[95] intercropping is can be conducted as follows:

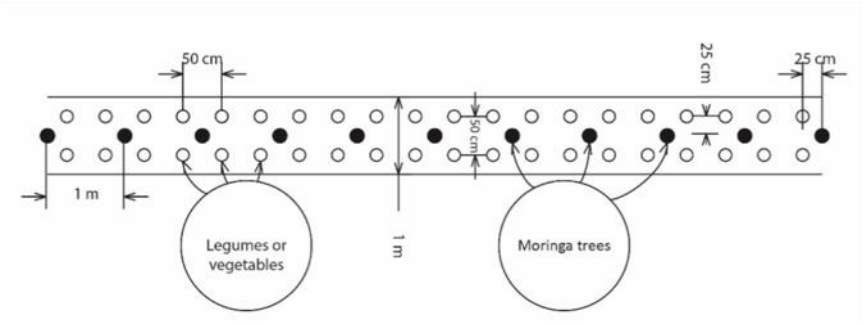


Figure 4. Diagram illustrating the spacing of moringa and legumes or vegetables

155. **Objective**. This output aims to function as an additional economic income for the women groups as longer-term income generating activities in addition to the short-term IGAs. The activity also aims to supply component 3 with moringa seeds and/ or saplings for intercopping in FFS and farmers plots of land. This will be achieved through the development of women group entrepreneurship in wood production that in turn aims to be achieved through the business management training provided by the NGO / SP identified for Output 3.2.1 above. This will help ensure that the women groups learn of the benefits of cultivating fast growing moringa trees to sell as saplings, firewood, charcoal, fodder, mulching or for consumption. This output aims to support in total 1200 women in groups (600 per country) of 50 developing 1ha pilots on common land that is offered as in-kind contributions by the community. The FFS for their training will be supported for a two-year cycle to help ensure continued support and increase the likelihood of sustainability. The Service Provider will continue to provide oversight and technical support in the third year. The labour will also be in-kind and no payments will be made to any beneficiaries for participation as this will weed out any one participating only for the monetary recompense and is essential for the sustainability of the activity. As with output 3.2.1 the NGO / SP will be required to provide the same ongoing support to the women in accordance with the BALI principles to give continuous and regular technical and motivational support for the success of the activity.

Activities will include:

- Development of pilot moringa plantations
- Conducting of FFS with same training activities as output 3.2.1
- Procuring of foundation climate-resilient seeds.

Component 4 Enhancing regional cooperation on water resource development-based food security, climate change adaptation and natural resource management

156. Chad and Sudan share a 1,400 km border that stretches from Libya in the north to the Central African Republic in the south however while Chad and Sudan have diplomatic relations, their bilateral relations are largely limited to security issues. International cooperation is essential to better enhance climate resilience and with the

[94] FAO The tree that purifies water: Cultivating multipurpose Moringaceae in the Sudan https://www.fao.org/3/r7750e/r7750e04.htm

[95] Motis, Timothy & Longfellow, Joy & Jani, Arun & Lingbeek, Brandon & D'Aiuto, Christopher & Bergen, Joshua. (2017). Productivity of Moringa oleifera augmented with intercropped tropical legumes. Acta Horticulturae. 85-96. 10.17660/ActaHortic.2017.1158.11. https://www.researchgate.net/publication/316832602_Productivity_of_Moringa_oleifera_augmented_with_intercropped_tropical_legumes

prospect of climate change worsening in the future, building regional platforms for technical and political cooperation for sustainable and climate-resilient natural resource management are essential in the effort to build the foundations for a more sustainable and peaceful future for the region.

157. Chad and Sudan have many features in common including similar environmental, climatic and climate change environments hereby enhancing the added value of sharing of knowledge, expertise, and also good practices. To this end the project will be building on the recent experience in reginal cooperation between Chad and Sudan but also Egypt and Libya with the support of the International Atomic Energy Agency (IAEA) and UNDP/ GEF[96,97] for a project that has recently upscaled by UNDP/GEF[98] for the sharing of the Nubian Aquifer, the largest fossil aquifer in the world.

158. As there currently is yet no regional umbrella platform that can function as a regional body to operationalise a binational NRM framework, the objective of this component is at the end of the four years to have the foundations of a regional framework in place that is able to function as a regional platform entirely owned and run by the two countries for technical cooperation and the sharing and management of natural resources. The project will be entirely owned and executed by national partners however as agreed with the two national governments, FAO will initially fulfil the role of executing this regional aspect of the project in view of handing over the responsibility of coordination to the respective countries. It will be one of the objectives of this component to foster the required cooperation and between the two parties to help construct the framework for such a platform. This task will be facilitated by FAO's long history of close cooperation and partnership with both countries and its involvement in the UNDP / GEF Nubian Aquifer project.

Outcome 4 Regional adaptive capacity for food security through regional cooperation increased

Output 4.1.1 Establishing regional platform

159. Climate change resilience requires meaningful, transformative and inclusive cooperation with consideration for a multitude of environmental, social and economic factors, at all levels. To foster innovative productive and successful regional cooperation, FAO will facilitate the coordination and implementation of a regional platform that will aim to develop cooperation on multiple levels and in areas key for regional efforts to adapt to climate change. As the Nubian aquifer project led by the IAEA and UNDP/GEF to the north has shown, the region is in urgent need for assistance in setting up frameworks for technical and political cooperation on key strategic issues such as climate change adaptation, improved management of scarce resources through sustainable natural resource management, cross-border migration and regional peace. The regional platform will be a much-needed forum for the two countries to build technical and political relations and to provide the opportunity to work together to overcome some of the biggest challenges facing the region that are largely driven by climate change and other directly related challenges. Consultations have shown that both countries are keen to develop such a platform and to upscale it in future and develop other opportunities for technical-level collaboration for sustainable natural resource management and climate change adaptation.

160. The platform will be developed through a series of virtual and in-person meetings between key actors that will include the Steering Committee members and technical experts from both countries as well as key relevant actors that will discuss key technical and regional issues related to the project components. The platform will be multi-purpose and will initially function as the forum for the regional inception workshop and it will also host the biannual Steering Committee. COVID travel restrictions permitting the project will hold biannual platform events in each respective country and the project will budget for the travel of a group of 5 people each time for 5 days, should this not be possible due to COVID-related travel restrictions then these will need to take place virtually. The platform events will include closed-door meetings to discuss technical issues and develop opportunities for cooperation particularly on the development of the water harvesting infrastructure along the Assongha river that forms the border between the two countries, but also on developing cooperation on the management of the Disa aquifer. The platform will also host relevant regional and national actors through events and workshops to share experiences and help build multi-level connections and relations between groups ranging from international organisations to national and state-level representatives, technical experts, NGOs, community representatives and donors.

161. The project will promote regional technical cooperation throughout the project activities and throughout the year. Technical experts in both countries have stressed the importance to set up binational technical committees to

[96] IAEA (2013) https://www.iaea.org/newscenter/news/chad-egypt-libya-and-sudan-agree-on-framework-for-joint-management-of-the-nubian-sandstone-aquifer-system

[97] https://www.iaea.org/sites/default/files/sap180913.pdf

[98] UNDP (2018) Enabling implementation of the Regional SAP for the rational and equitable management of the Nubian Sandstone Aquifer System (NSAS) https://www.thegef.org/project/enabling-implementation-regional-sap-rational-and-equitable-management-nubian-sandstone

discuss key areas of technical cooperation. One such example is in the collection of data about the Disa aquifer, and the aim is for these technical committees to set key agenda topics and points of discussion and areas that require regional agreements to help the regional platform to progress and become organic. The platform events will also be attended by invited external international and national technical experts in relevant fields and on specific topics and will be an opportunity to take stock of progress and set targets for the next phases of project implementation. The platform will furthermore be key in facilitating knowledge sharing and develop common natural resource management and monitoring plans (as per outputs 4.1.2 and 4.1.3). To this end it will facilitate the discussing of key technical and policy issues and foster the spirit of cooperation and development between the two countries. It will also function as the venue for combined technical training events.

Activities will include:

- Coordinating, organising and hosting of the platform events.
- Coordination throughout the year to ensure sufficient technical-level progress is being made on key technical and political areas of cooperation.
- Coordination for the agreement on the platform agenda and desired outcomes.

Output 4.1.2 Strengthening capacity of national organisations

162. A key element of the sustainability of the platform beyond the project cycle, is capacity development as Chad and Sudan vary in their capacities for field, laboratory monitoring, and groundwater modelling activities. The opportunities for cooperation that will be made possible through the SCCIWM project will be leveraged to equalize capacity among the countries. To assist in this, the project will develop a regional knowledge portal that will be coordinated by the binational project manager and supported by the national knowledge management officers in both PMUs. The regional knowledge portal will be structured around a regional knowledge management strategy that will be developed by the two KM officers and based on the knowledge gaps identified as part of the regional platform meetings and during the inception phase. The regional knowledge platform will be virtual and located on the project's website[99] in Arabic, French and English and will showcase the results of the project and resulting good practices and will function as a central KM point of reference for both countries. This portal will inter alia advertise all capacity needs and trainings that will be conducted at regional level. Trainings will be held virtually through webinars and national stakeholders across the two countries will be invited as will regional actors as appropriate. The Binational Project Manager supported by the national KM Officers will also arrange for exchange study tours financed by output 4.1.2 with other transboundary water management institutions. The regional training will include but will not be limited to capacity building for monitoring, hydrogeological mapping and modelling; defining regional policy and guidelines for water allocation, water use and priorities and activities and capacity building activities and exchanges with other regional water commissions will assist in the data analysis and in producing technical reports and maps and groundwater modelling. The proposed regional knowledge platform will inter alia help raise awareness about the key outputs of the project but also mainstream water resource information systems into national and regional platforms and contribute to policy development and institutional strengthening.

163. Ensuring the sustainability of the regional platform is key in helping to ensure durable and lasting cooperation in sustainable transboundary natural resource management. It will be important for the two member countries of the platform and EWS pilot developed by this component to be able to come together and develop future proposals for technical cooperation and to upscale this new platform initiative. To facilitate this process the project will conduct a study of the SCCIWM project to assist in exploring opportunities for upscaling of the project by national entities while making practical use of the tools in water monitoring developed as part of the SCCIWM. The commissioned study by an international research institution will include exploring the prospect of further developing joint management of the Disa aquifer including through the setting up a of binational entity for the joint management of the transnational resources and the implementation of the Regional Natural Resource Management Plan developed as part of output 4.1.4 below.

164. Activities will include:

- Develop regional KM platform and KM strategy including an assessment of institutional knowledge gaps
- Preparation of training material and modules for trainers, decision-makers, NGOs, water users (farmers, women's groups), etc.

[99] The website will be developed as part of output 1.2.1

- Initiate and maintain technical and management exchanges with key international groundwater centres of excellence and water management commissions / authorities including through joint Chad - Sudan exchange visits.
- Joint regional training modules carried out on groundwater governance, groundwater modelling, transboundary water management and the operationalisation of the surface water management tool developed as part of the project.
- The conducting of a study on upscaling the project based on the results achieved in the project.

Output 4.1.3 Regional tool developed and implemented for the identification and monitoring of water availability supporting decision making in drought planning and early response

165. **Natural Resource Monitoring System (NRMS)**. The regional platform will bring together all information being generated by both sides of the project in relation to the status of the water availability into a regional tool that will help in identification and monitoring of water availability and decision making in drought planning and early response mechanisms. The regional capacity building plan will train the same binational unit responsible for the implementation of output 2.1.1 and 2.1.2 comprising the Higher Council for Environment and Natural Resources (HCENR) and the Ministry of Irrigation and Water (MoIW) in Sudan and the Ministry of Environment and Water and Fisheries MoEWF) in Chad. The committee experts will discuss and agree on issues relating to data collection and will be responsible for the management of the data that will be generated. They will also be responsible for the inputting of the data into the regional information database tool that will be developed as a result of this output. The NRMS will be a flexible Early Warning System (EWS) pilot tool and natural resource management portal that will enable the systematic analysis of the relevant information retrieved from the aquifer mapping modelling data and ground water information and will be centralised and readily available in real time from the automatic groundwater monitoring stations and the Automatic Weather Stations (AWS) installed as part of output 2.1.3. The monitoring network and information management system that will be set up, will provide information on: groundwater trends (quality and quantity) in response to climatic fluctuations and water abstractions; the identification of the parts of the Disa aquifer subject to over-exploitation; document water quality conditions and trends, the interactions with surface waters and any incoming drought conditions. Incoming drought conditions will be flagged by the NRMS indicators, technical committees and the regional platform developed under output 4.1.1 and will coordinate with regional, national and international humanitarian actors to formulate appropriate drought mitigation measures. Project drought response mechanisms will be fully integrated into the training programmes of the project including with visual drought response strategies leaflets and communicate to the beneficiaries through radio programmes under the KM output 1.2.1.

166. Activities include:

- Designing and creating of NRM digital Early Warning System / portal for the centralisation and visualisation of the collected data.
- Making the NRMS operational.
- Report on the geological and hydrogeological situation and overexploitation including maps.

Output 4.1.4 Joint Regional Natural Resource Management Plan developed

167. **Regional Natural Resources Management Plan (RNRMP).** One of the key outputs of the regional platform component is the development of a RNRMP through the competitive recruitment of a binational research entity / consulting firm, referred to as Service Provider (SP). The RNRMP will involve a comprehensive mapping and analysis of the natural resources landscape in the project area with a view to develop a regional sustainable management plan of what are limited natural resources. The development of the RNRMP will depend on the information generated and mapping conducted from the successful implementation of the project activities and in particular the hydrological and climatic monitoring outputs under outcome 2.1 and the NRMS output above. This output will integrate this information with the mapping of the available natural resources and their sustainable use into one regional plan. The implementation of the regional natural resource monitoring information system will inter alia help identify the main challenges for the sustainable management of the available water supply. As part of the RNRMP the project will analyse the implications of the results of the aquifer mapping and groundwater monitoring stations on the development of sustainable livelihood management strategies by integrating the climate change research that will be conducted in output 1.2.7. The RNRMP will have broader implications on the development of future regional development planning and policy development. Once the information is available and a picture of

the NRM situation in the project area is known, the SP in coordination with FAO will hold extensive participatory consultations over a 6-month period involving targeted stakeholders from the governments, community representatives, civil society, international organisations. The SP will liaise closely with a committee of technical experts (representatives of key regional stakeholder groups) that will form the 'RNRMP Development Committee'. The committee will review the baseline information generated by the project and the natural resource mapping by this output and identify strategic priorities and produce informed outcomes and management actions and strategies that will form the RNRMP. The final RNRMP will be officially approved by the two countries as a key strategic document that will help develop future regional and national policy development and aim to improve the sustainable management of the scarce natural resources.

168. Activities will include:

- Mapping of natural resources in project area.
- Stocktaking and analysis of water modelling and mapping.
- Extensive consultations with broad range.
- Development and approval of a Regional Natural Resources Management Plan.

B. Innovative Approaches, Technologies and Mechanisms

Describe how the project would promote new and innovative solutions to climate change adaptation, such as new approaches, technologies and mechanisms.

169. As the border region is characterized by a multitude of challenges, innovative approaches that are sustainable and efficient are required. The proposed binational project has many pioneering aspects and has the potential to improve climate resilience, enhance levels of food security and nutrition, create economic opportunities, prolong peace, generate scientific knowledge and foster cooperation. The regional and transboundary cooperation being promoted through the project, and in component 4 specifically, will promote essential dialogue between communities that have historically experienced conflict over scarce natural resources aggravated by climate change and referred to as one of the first climate change conflict[100] in 2003 pitching communities that used to live side-by-side in harmony against one another. The dialogue and cooperation promoted by this project at international / regional, national, and community levels will demonstrate the benefits of cooperation to improve natural resource availability and the benefits of cooperation to adapt to climate change and hereby reduce future social tensions.

170. **Cooperation and partnership.** Chad and Sudan are neighbouring countries and share a 1,400 km border and have as yet engaged in precious little bilateral historical cooperation beyond at a security level. The first and foremost innovative approach that this project will support is one of fostering cooperation. A lack of access to water has been stated as one of the main reasons for communal conflict, and it is through cooperation that the project will aim to fill a knowledge gap and better understand the availability of the scarce, interdependent and transnational natural resources such as the underlying Disa aquifer and therefore the ability to sustainably manage it. The extent of cooperation between the two countries as being proposed in the SCCIWM project is a first of its kind in the Darfur – Chad area and will build on the experience being developed in the Nubian Aquifer GEF project between Chad, Sudan, Libya and Egypt.

171. The development of the regional platform between Chad and Sudan to be ultimately owned and run by the two countries, will also provide the opportunity to approve and develop transnational water infrastructure on the Assongha river that forms the border between the two countries. The absence of water in the area since the onset of climate change in the decades leading up to the 2003 conflict, has been identified by the UN Secretary General Ban Ki-moon one of the major causes of conflict in the area and consultations have repeatedly highlighted the importance of increasing access to water as one of the prime vectors for reducing social tensions. One example of the innovative opportunities made possible by the development of the regional platform are the new opportunities between the two countries is inter alia the construction of subsurface dams along the international border on the Assongha river as part of output 2.2.3, as this will require above all international political agreements.

172. **Regional NRM monitoring.** The project through the regional platform will promote the development of a joint natural resource management monitoring network that will bring together the knowledge generated by the activities in ground water and surface water monitoring. The project will promote innovative technologies in water mapping and the creation of a Regional Natural Resource Monitoring Network promoted in component 4, that will depend on

[100] https://www.wfpusa.org/articles/the-first-climate-change-conflict/

the data generated in both sides of the border (under outputs 2.1.1-2.1.3). The project area is characterised by the lack of centralised and digitalised knowledge of available water resources both at the national level and at the international level that inhibits national and regional planning and policy making. The project will make the mapping of the underlying aquifer possible through introducing innovative resistivity meters (see output 2.1.1) that are able to produce three dimensional maps (refer to annex 3). In addition to the groundwater mapping, the project will also map surface water infrastructure (output 2.1.1), install automated remote groundwater monitoring (output 2.1.2) and Automatic Weather Stations (AWS Output 2.1.3) that will relay the data to two terminals one in West Darfur (El Genenina) and one in Assongha. Through the regional platform in component 4, technical experts in national institutions will inter alia also be trained on information sharing and data gathering methodologies to ensure the compatibility of the data being collected. The data will be compiled by upscaling an initiative[101] by the Swiss Development Corporation in Chad to map water resources and develop an international / regional water resources and climatic website-based multi-lingual information management system to integrate the water- and climatic-related data generated by the project and promote easy access for planning, early warning action for the onset of drought and policy development.

173. **Regional Natural Resource Management Plan (RNRMP).** Ultimately the project will produce a RNRMP that will be the first of its kind in the region. The RNRMP will involve a comprehensive mapping and analysis of the natural resources landscape in the project area with a view to develop a regional sustainable management plan and it will have broader implications on the development of future regional development planning and policy development. The development of the RNRMP will benefit from the innovations brought by the cross-fertilisation of ideas and technologies promoted by the SCCIWM. The project will bring innovation in the form of cross-border fertilisation of ideas between Chad and Sudan. For example as a result of project consultations it became apparent that Chad does not currently construct hafirs (40,000m^3 water harvesting reservoirs) which is commonly done across the border in West Darfur. The innovative regional platform and the resulting regional technical-level committees will help facilitate the transfer of innovative knowledge and experiences.

C. Economic, Social and Environmental Benefits

Describe how the project would provide economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project would avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

Economic Benefits

174. The economic benefits of the SCCIWM project have been analysed in an Economic and Financial Analysis (EFA) that has been conducted based on the proposed activities in the project proposal. The analysis builds upon the precautionary principle, accounting for project benefits in a realistic and conservative manner with an analysis carried out to present the “with” and “without” project scenarios. The economic benefits to the SCCIWM target group would result from: (i) increased water availability for productive use; (ii) diversification of productive activities and sources of income thanks to increased access to knowledge and technical support through farmer field schools; (iii) increased food availability for rural poor, (iv) increased value-added of agricultural outputs; (v) enhanced adaptability to climate change; (vi) improved quality of agricultural produce, thus attracting higher prices at local market; and (vii) increased employment either for hired or family labour, for both on-farm and off-farm activities.

175. **Impact on household income.** The models analysed present positive returns in all the pre- and the post-financing scenarios. Therefore, it is possible to conclude that the activities proposed through the SCCIWM project are economically viable as the pre-financing results are positive and are very likely going to be taken up by farmers, given the financial support provided by the project. Tab 7 provides a consolidated summary of the impact on household income per farm size and in both scenarios concerning the target 0.5 ha size and the consolidated 1ha communal plots it is estimated that the increased access to water and agricultural infrastructure and capacities will result in around a 730% increase income vis-à-vis the without project scenario for farmers owning 0.5ha of land which is a net increase of USD 725%. The communal 1 ha plots will also bring significant economic benefits with estimated 500% increase in income from USD 210 to around USD 1,300 per year. In pure economic terms and based on the quantifiable economic benefits to households the project is considered an economically viable investment. The project economic Net Present Value (NPV) is of USD 1.47 million producing an economic internal rate of return (EIRR) of about 13% and will result in the AF investment being paid back over a period of 10 years.

[101] http://reseau.unosat.org:8080/geonetwork/srv/eng/catalog.search

Table 7. average annual household income models before and after the project (USD)

Type of crop / irrigation	Feddan / ha	Net income, USD (Without Project)	Net income, USD (With Project)	Increments (%)
Field Crop	0.6 (0.25 ha)	291	555	91%
High-value crop (irrigated land) and diversified income	1 (0.42 ha)	138	650	372%
Field Crop	1.5 (0.63 ha)	100	825	729%
High-value crop (irrigated land) and diversified income	2 (0.84ha)	248	1,521	505%
Field Crop	2.4 (1 ha)	210	1,297	517%

Social Benefits

176. The social benefits of the SCCIWM project are multiple. In total the project will target around 23,000 direct beneficiaries plus and additional 115,000 indirect as household members (on average around 6 members to a household). Around 20,000 beneficiaries will benefit from learning of climate-resilient rainfed agriculture techniques through Farmer Field Schools that will improve their ability to maximise agricultural productivity and improve soil fertility in harsh climatic conditions. (see table under output 3.1.1. on training subjects). The project will additionally train 400 smallholders through FFS with the pilot to introduce high-efficiency irrigation systems aimed at reducing the amount of water for irrigation while increasing the productivity of their 0,5 ha plots of land. Furthermore, in coordination with the water harvesting infrastructure that will be constructed in output 2.1.3, the project will support an additional 1,300 smallholder farmers with improved Multiple-Water Use (MWU) access to harvested water for irrigation for agriculture, livestock and sanitation purposes. Some of the beneficiaries without access to subsurface dams and improved hand-dug shallow wells will have access to additional water by way of the construction of 9 hafirs and 14 deep water yards, subject to geological and hydrological studies as well as Environmental Impact Assessments (EIA) to assess the availability and suitability of the location and water source.

177. 60% of the targeted communities will be women with the exception of the 1200 women that as part of output 3.2.1 and 3.2.2 will be entirely women focused for a total of over 14,000 women targeted. The social benefits related to the outputs under outcome 3.2 will include improved knowledge / awareness about key skills required to reduce their vulnerability. These include basic financial literacy, nutrition, child health, Gender-Based Violence and the importance of basic sanitation practices (in coordination with the Community-Led Total Sanitation - CLTS under output 2.3.1). The women will also learn essential skills in working in groups to increase their immediate short-term income through alternative income generating activities which was frequently requested during consultations. The project will also address the risks to their personal security by having to travel for entire days in the collection of firewood by providing them the skills and the means to cultivate fast growing 1 ha moringa tree plantations that have multiple social and environmental benefits. The project will also set youth quotas of 20% youth as it is primarily women and youth who are particularly vulnerable in the project area.

178. The project will have a strong WASH component that is not only aimed at reducing the vulnerability to the adverse effects of climate change but also to combatting COVID-19 effects of villages practicing open defecation in the bush and rivers and streams. To this end the project will promote the Community-Led Total Sanitation (CLTS) to all 62 WUA-supported villages that aims to make them open defecation-free. The project's sanitation programme will also distribute hand washing stations and soap to all WUAs to make use of the additional water provided for improved sanitation and combating COVID-19.

179. Beyond the targeting of the vulnerable categories of women and children, the project will additionally have a strong focus on ensuring 30% quotas for the inclusion of Internally Displaced People (Sudan) and refugee (Chad) camps as well as returnee villages. The types of activities that will be targeted at the camps will need to be identified as part of the outreach activity in output 1.1.1, for example to assess the proximity to wadis, the status of the deep wells and availability of sanitation infrastructure, as the camps tend to have better latrine and handwashing infrastructure than rural villages and access to agricultural land.

Environmental Benefits

180. Climate-adaptive and environmental benefits are at the basis of the SCCIWM project. With Adaptation Fund support the project will assist the Sudan Higher Council for Environment and Natural Resources (HCENR) and the

Ministry of Environment, Water and Fisheries in Chad to build the climate-resilience of key vulnerable target groups in the project area. The project target area has historically already been affected by climate change which has caused dramatic shifts in human relations with lasting effects on the social fabric of the community and leaving 215,000 people in refugee camps in Assongha, 336,000 people in IDP camps in Sudan and estimated 77,000 people in returnee villages. The project area is characterised by a rainy season of heavy rain typically from May – June until September – October and a dry season for the remainder of the year. It has been documented that increased competition for increasingly scarce resources such as water, is one of the major reasons for community-based conflict. Water scarcity in this area is influenced by a number of factors, which beyond the seasonal availability of rain, are also due to the lack of rainwater harvesting storage capacity and also the ability to sustainably manage the limited available water supplies. In order to be able to manage water supplies, it is necessary to identify and monitor water availability both on the surface and in the shallow water table as well as in the deep Disa aquifer.

181. **Access to water.** The environmental benefits that the project will bring will in the first instance be improving access to water through the construction of 39, 50,000m^3 subsurface dams (SSD) for an estimated water volume of 1.95 million m^3 per year stored in the SSDs. Each SSD will also have an additional estimated average of 150,000m^3 of water overflow that will recharge surrounding groundwater tables for a combined estimated total of 7.8 million m^3 of additional rainwater harvested per year as a result of the project investment. In addition to the SSDs, the project will also construct and rehabilitate 9, 40,000m^3 hafirs for a total estimated 480,000m^3 of additional water harvested. In total, it is expected that the project will result in the increased water harvesting capacity of around 8.3 million m^3. In addition to the water harvesting, the project will also construct 12 water yards that will tap the deep aquifer to meet water needs of the communities during the harsh dry months that would not otherwise have easy access to water such as a wadi. The water yards will on average be able to extract 80,000m^3 per year for annual total of around 950,000m^3. The construction of water yards will be subject to the geological and hydrological assessments as well as Environmental Impact Assessments (EIA) to assess the suitability of the location and body of water, made possible through the introduction of the resistivity meters for the 3-dimensional groundwater mapping and monitoring as part of the outputs 2.1.1, 2.1.2 and the Natural Resource Monitoring System (NRMS) in output 4.1.3.

182. **Water governance.** In order to improve the national and regional capacity to identify, monitor and sustainably manage the available groundwater, the project will be constructing 20 water monitoring stations, 10 in each side of the border; the proposed stations will have the capacity to monitor and relay water quantity and quality information. Consultations have shown a lack of a centralised ability to identify and monitor groundwater levels in West Darfur and a total absence of groundwater monitoring stations in the Assongha side of the project area. The project will therefore be installing remote water monitoring stations and developing a regional natural resource information database system to be able to monitor and manage the shared underlying aquifer in planning ahead, assist in policy development and in providing advance warnings for drought events. It will be able to provide information on groundwater trends (quality and quantity) in response to climatic fluctuations and water abstractions; the identification of parts of the aquifer subject to over-exploitation; water quality, conditions and trends; interactions with surface water; and any incoming drought conditions. The information database will form part of a regional monitoring network developed in output 4.1.3 and will support the development of the Regional Natural Resource Management Plan (RNRMP) in output 4.1.4.

183. **Soil fertility.** Another environmental benefit of the project is that of improving soil fertility. This will be achieved by making around 11,000 ha of soil climate resilient through soil management techniques as presented in output 3.1.1. The benefits include reducing the water need of plants and ensuring a higher resilience of crops to temperature increases and water deficits through shifting to high yielding, early maturing, drought tolerant and heat-resistant crop varieties; increasing the yield of millet by up to 50% or 900 kg / ha and 1600 kg / ha with the addition of organic manure; techniques that reduce runoff by 12% and soil loss by erosion of 46%; enhancing the physical properties of soils and increase in soil moisture through conservation agriculture.

184. **Agro-forestry**. The project will contribute to the Great Green Wall Initiative (GGWI) through the promotion of 50, 1ha moringa plantations operated by women groups. The moringa tree is an indigenous climate-resilient tree that needs very little water, is resistant to drought and in addition to being of nutritional relevance for humans and animals, it also is helpful for the improvement of soil fertility through the ability to fix nitrogen, but also in water purification and acts as a natural water coagulant useful when used in intercropping in the FFS. The sustainable production of a tree that can be ratooned twice a year, will also meet some of the firewood needs of the women and will generate additional income in the plantations to sell surplus wood. This activity will reduce the burden on women, promote afforestation, increase biodiversity, reduce deforestation and help combat desertification.

D. Cost-effectiveness

Describe or provide an analysis of the cost-effectiveness of the proposed project and explain how the regional approach would support cost-effectiveness.

185. Although the SCCIWM is a regional / transnational project involving two countries, the communities being targeted are very much environmentally, socially, economically and historically interlinked and interdependent. The regional approach helps ensure that the communities being targeted are considered as one rather than two separate unrelated communities. This is important for ensuring sustainable water management of a commonly shared water supply, sustainable land management as well as reducing the likelihood of social strife caused by climate change. The cost-effectiveness is assured in part through the implementation of concrete adaptation activities with community ownership and is the most sustainable means to achieve scalable long-term results at a landscape scale but also through the ownership and sustainable management at national institutional level for the stewardship of the scarce resources that the vulnerable communities depend on. Without Adaptation Fund support the countries would not have the resources to develop this regional approach with the objective to help these most vulnerable communities adapt to climate change, despite of the acute awareness of the extent of their vulnerability.

186. Chad and Sudan lie in regional political, cultural and economic fault lines with francophone Chad gravitating towards Central and Western Africa under the Economic Community of West African States (ECOWAS) and Sudan eastwards under the Intergovernmental Authority on Development (IGAD). There are currently no regional platforms that will allow for developmental and coordination and agreements for the West Darfur – Assongha region. Through the development of a new regional platform for technical and political dialogue and cooperation, the SCCIWM will help enable a regional approach to reduce the risk of reoccurrence of a regional problem caused by climate change and, one that has historically caused conflict, mass migration and forced displacement. The project area for all intents and purposes lies between two countries but at a landscape level it is closer to one community depending on common natural resources. The regional approach of the project will help generate innovative and important hydrological data locally in each individual country that will be brought together, monitored and coordinated at a regional level through the development of a dedicated regional platform based on technical cooperation between national institutions and civil society and local communities. This is the first time such an effort is being attempted for this historically climate-stricken region and it addresses a key knowledge gap about the availability of a common underground water resource and the ability to sustainably manage it.

187. At national levels, the project will produce concrete adaptation actions and will prove cost-effective through the introduction of innovative 3-D mapping technologies for the mapping of the underlying aquifer. At one level the mapping will enable to fill a knowledge gap about the health of the aquifer, in more tangible terms it will also improve and simplify the data gathering process for understanding which parts of the aquifer are being over exploited. This will for example be key in assessing the groundwater overexploitation in areas of high population density, such as refugee and IDP camps. The aim is for the aquifer in the entire project area to be mapped and the mapping will be conducted at every opportunity including during the installation of the 20 remote water monitoring stations. The water monitoring stations are innovative for the areas as currently there are no water monitoring stations in Assongha and limited capacity in West Darfur. They will collect and relay real-time water quantity and quality readings to a central server by way of telephone GPS and radio frequencies where there is no telephone network. Through the regional training promoted in the new platform in component 4, the capacity of national experts will be enhanced to ensure that the data that is being collected in both countries is comparable for the purposes of the regional monitoring network that will be set up through the regional platform and supported by binational technical working groups / committees. The data gathered will support the development of a Regional Natural Resource Management Plan, which without the project would not happen. The RNRMP will be agreed on by both countries for the sustainable management of the shared natural resources and will be help in future planning, policy development and in warning about incoming droughts.

188. The regional approach will also help ensure the cross-fertilisation of ideas and techniques such as the 40,000m^3 water harvesting hafirs that are traditional for the Sudanese side, but not in Chad. Consultations have demonstrated a keen interest by the Chadian authorities and technical experts to learn from Sudan about this technology and its implementation. The project will support the sharing of this knowledge and construction techniques between the implementing partners through the binational technical committees and the regional platform. To this end the project will help Chad pilot 3, 40,000m^3 hafirs in the project area for around 120,000m^3 of additional water stored for agricultural, livestock and sanitation purposes in the dry season in addition to the 6 hafirs to be constructed in Sudan.

189. Data in Sudan on the number of surface water infrastructure is scant and not entirely reliable or up to date, however the State Water Corporation (SCW) when interviewed stated that there are currently around 3 dams in the

project area of which two are reportedly out of use, while no supporting data was available for Assongha. The cost-effectiveness of the reginal project will also be ensured through the updating and mapping of the region's water infrastructures. The project will also construct 39 subsurface dams contributing additional 7.8 million m^3 of water harvested per year. SSDs are interesting for the project because they are less expensive than hafirs, they are also longer lasting, they store more water that is filtered by the soil and no water is not lost to evaporation in the hot dry climate.

190. Cooperation between Chad and Sudan has largely only focused on security matters; however the cost-effectiveness of the regional approach also lies in the fact that the regional platform in component 4 will help in the coordination and approval of SSDs along the Assongha river - that forms the de facto border between the two countries. The construction of SSDs to help local communities adapt to climate change along the border will require political-level coordination and approvals that will be possible as a result of the dialogue promoted by the regional platform developed by the SCCIWM project.

191. The cost-effectiveness has also been measured through a Economic and Financial Analysis (EFA) based on the proposed activities. And it was analysed that for the on-farm agricultural activities alone, there will be around a 730% increase income vis-à-vis the without project scenario for farmers owning 0.5ha of land which is a net increase of USD 725 per year. The communal 1 ha plots will also bring significant economic benefits with estimated 500% increase in income from USD 210 to around USD 1,300 per year. The project is also assessed to have economic Net Present Value (NPV) of USD 1.47 million producing an economic internal rate of return (EIRR) of about 13% and will result in the AF investment being paid back over a period of 10 years.

192. Information on alternative options including options with rationale and benefits for each of the proposed investments and solutions has been provided in the table below.

Out-come	Baseline scenario	Benefits of proposed solution	Alternative to proposed solution
1.1	The communities in the target area are scattered in a remote rural area where parallel governance structures exist. In both sides of the border the official government is present however its reach can be limited, and parallel community-based governance structures exist that ultimately also answer to the respective national governments, but in essence govern themselves. The community governance structures or customary institutions in the project area manage issues related to land allocation, natural resource management and also function as key actors in the community-level conflict resolution frameworks.	The outreach programme will ensure activities are transparently targeted, reduce the risk of elite capture and ensure that the investments selected for the specific village are relevant for the beneficiaries and that they are implemented in a manner which is appropriate and convenient for the participants. The proposed outreach approach will also help ensure women participation and that the project design is discussed in detail with communities. Ensuring community buy-in will also help in the development of community-driven conflict resolution mechanisms.	There is no alternative solution to having a community outreach programme, particularly in remote and isolated places like in West Darfur and Assongha. Building community ownership and awareness is a key element to ensuring project success and future sustainability. Consultations with national international and local stakeholders also have identified the need to have a community-based conflict resolution mechanism. These have been applied in all projects that have been reviewed in the area during the consultations. The project has applied the best practices identified and has measures in place for cross-border lessons learning exercises and best practices consultations for improving further.
1.2	The project area is characterised by a general lack of information. Information on climate change trends and risks are unavailable as are documented conflict drivers and 'connectors' among community members.	The project Knowledge Management (KM) activity under outcome 1.2 includes a USD 50,000 budget for KM related activities has been allocated for each country to develop radio programmes, posters and leaflets as part of a community-wide awareness raising campaign that will form part of the pilot drought early warning system (EWS), but also highlight the benefits of sustainable NRM and water use to better adapt to the challenges posed by climate change. This will include the production of simple picture-based educational leaflets on drought response strategies, the benefits of the agricultural practices, techniques and technologies being promoted by the project. Additionally, the	There is no alternative to knowledge management as KM is key to the success and sustainability of the project. The substantial budget allocated to this KM outcome reflects the substantial knowledge gaps that have been identified. Knowledge generation is key in combating climate change, promoting sustainable natural resource management and in ensuring project sustainability more generally. It further also helps in ensuring community conflict resolution and in promoting gender equality.

Out-come	Baseline scenario	Benefits of proposed solution	Alternative to proposed solution
		KM activities of the project will also include technical guidelines on best practices related to the project activities that will also be shared regionally. Climate change research and research on the mapping of the drivers of conflict and connectors will also be conducted to fill key identified knowledge gaps.	
2.1	The project target area is characterised by a lack of baseline data which is needed to be able to develop the Natural Resource Monitoring System (NRMS) that also contributes to a regional drought Early Warning System (EWS). The consultations have demonstrated that there is limited to no capacity in monitoring surface and ground water quality and quantity and in generating climate-related data.	The project will introduce innovative ground water modelling technology with the aim to map and conduct hydrological modelling of the cross-border flow of underground water. The outcome will also enhance the capacity in direct real-time ground water monitoring capacity through the installation of 10 piezometers per country that operate cost-effectively and automatically relaying information remotely to servers. The outcome will also construct two Automatic Weather Stations (AWS) to help generate much needed climatic data. The data generated will be available in real time and will help in assessing the early onset of drought. This will be communicated to the regional platform and for which structural and institutional appropriate response measures will be taken as well as trigger community awareness raising through radio programmes and the distribution of leaflets and drought awareness raising.	There is no alternative to generating baseline information on water availability and quality as well as generating in-situ climatic data. These baseline data gathering activities are fundamental to the regional efforts in climate change adaptation, sustainable natural resource management and sustainable development through the development of a regional tool for monitoring water and reporting on early drought onset indicators. The mapping of the underground aquifer is based on the best practices established by the countries of Chad and Sudan as part of the regional GEF/UNDP/IAEA project for the Nubian aquifer bordering Chad, Sudan, Libya, and Egypt and have been communicated through the consultations with technical experts during project formulation.
2.2	Because of climate change, a chronic lack of access to water is one of the key causes for community discontent and for tensions between farmers and the nomadic communities as well as between villages. Before the onset of climate change and the severe reduction in rainfall, as the UN Secretary General Ban Ki-moon said, communities lived in harmony. A UNDP survey showed that 40% of conflicts in the target area are over access to water. Technical consultations with FAO technical staff have highlighted that there is a directly correlation between the introduction of access to water and the reduction of community tensions.	The proposed activities will bring broad benefits to improved water harvesting and will result in making livelihoods more climate resilient. This will be done through the construction of 39 of 50,000m^3 subsurface dams (SSD) for an estimated water volume of 1.95 million m^3,an additional estimated average of 150,000m^3 of water overflow that will recharge surrounding groundwater tables for a combined estimated total of 7.8 million m^3 of additional rainwater harvested per year. The outcome will also construct and rehabilitate 9 of 40,000m^3 hafirs for a total estimated 480,000m^3 of additional water harvested. It is expected that the project will result in the increased water harvesting capacity of around 8.3 million m^3. Additionally, 12 water yards will be constructed that will ensure access to around 80,000m^3 per year for annual total of around 950,000m^3.	Access to water has been identified as a key and urgent adaptation demand from all consulted parties. Most projects engage in improved access to water and alternatives to the proposed activities were considered when developing these activities. It was, for example, initially considered to construct surface dams, however consultations with technical experts have warned that the flow of water in the wadis during the rainy season can be considerable and frequently surface dams are damaged and fall into disrepair. The project opted for sub-surface dams (SSDs) which are considered more sustainable as they are not subject to the force of surface water. The water also is not exposed to high levels of evaporation, the water being filtered is cleaner than surface reservoirs and does not promote the breeding of insects. The project also weighed the cost-effectiveness of SSDs and hafirs. For a storage capacity of 50,000m^3 a sand dam costs around USD 187,000 (USD 3.74/m^3), a hafir around USD 146,000 (USD 2.92/m^3) and a SSD 70,500 (USD 1.41/m^3). It was therefore decided to weigh the investment in favour of SSDs over hafirs and not include surface dams.

Out-come	Baseline scenario	Benefits of proposed solution	Alternative to proposed solution
2.3	Climate change poses an increased risk of disease or illness to the most vulnerable communities from exposure to pathogens and hazardous substances through increased environmental contamination, and/or increased risk of disease or illness resulting from a lack of access to adequate sanitation when systems are destroyed or damaged. People without access to basic services experience overlapping forms of disadvantage and are likely to face the worst effects. Women are particularly vulnerable due to limited access to basic sanitation services and awareness raising to combat the COVID-19 pandemic. It is furthermore estimated that in the El Geneina locality alone that 33% of the population practices open defecation. Statistics for Assongha were not available at the time of formulation.	The project promotes improved sanitation practices in the project area through a community-based approach to sanitation and by applying the Multiple Water Use (MWU) and Conjunctive Water Use (CWU) approach. The project promoted the Community-Led Total Sanitation (CLTS) has been widely adopted around the world. The objective and key request from women groups and organisations is to combat poor access to adequate sanitation that result in the widespread open defecation and negatively affects communities in terms of diarrhoea and cholera. To help combat the covid – 19 pandemic and improve gender sanitation standards which is a key climate change vulnerability factor, the project will also distribute handwashing stations and raise awareness of the need for basic sanitation. Women participation will be key in the decision-making process for the location and installation of hygiene services.	There is no alternative to the eradication of open defecation and promotion of hand hygiene to combat covid-19. Over the years the CLTS programme has demonstrated to be effective in the construction of community latrines. The approach described in annex 9 of the proposal, is based on years of experience and the knowledge that communities need to embrace and undergo a process of consultation among themselves for the construction and adoption of latrines and addressing the health hazard associated with open defecation. The alternative for the project to construct latrines directly has been widely reported to be ineffective as it does not help develop the paradigm shift in thinking. Communities simply do not use constructed latrines if they do not agree among themselves first and construct them themselves. The approach to have communities construct latrines from locally available resources also help ensure sustainability.
3.1	Global temperature increases will adversely impact the project target areas and the vulnerable sectors including rainfed agriculture and surface and groundwater resources. This ultimately increases the vulnerability of certain communities, such as poor sedentary as well as IDP / refugee farmers, agro-pastoralists that rely on rainfed agriculture. Declines in evapotranspiration reduced by 40 % and the impacts appear to be amplifying the effects of the drought. Evapotranspiration is strongly related to changes in plant growth, cereal formation and filling, end-of-season yields, and pasture biomass and climatic warming effects combine with decreases in rainfall to reduce evapotranspiration and crop yield. It is expected that climate change will threaten food security due to the impact of projected temperature increases and extreme weather events on crop nutrient content and yields.	AF funding will be used to enhance the climate resilience of around 20,000 vulnerable smallholder farmers with climate-resilient rainfed agriculture techniques through Farmer Field Schools (FFS) that will improve their ability to maximise agricultural productivity and improve soil fertility. The project will additionally train 400 smallholders through FFS to pilot high-efficiency and water saving irrigation systems and a further 1,300 smallholder farmers with irrigation capacity to build the agricultural climate resilience. In all the project will help make around 11,000 ha of agricultural land climate-resilient through sustainable soil management techniques. These will reduce the water needs of plants through the introduction of high yielding, early maturing, drought tolerant and heat-resistant crop varieties and land management techniques that reduce soil loss by 12% and erosion by up to 46%. The project will also support 140 farmers with climate-resilience foundation seeds for the commercial production of seeds.	The predominant form of agriculture in the project target area is rainfed agriculture. In terms of making rainfed agriculture climate-resilient, there are no alternatives to conservation agriculture and sustainable agricultural practices that help conserve water and restore soil fertility. Also the use of climate resilient crop varieties is the standard in climate change adaptation. These climate-resilient approaches are also going to be applied to those farmers benefitting from irrigation made possible from the water harvesting capacity being introduced in component 2. These include the FAO innovation of constructing solar powered improved water hand-dug wells that are concrete lined and longer lasting. In addition to this irrigation the project is also introducing a new pilot in the form of solar-powered high-efficiency irrigation systems for rural smallholder farmers that will reduce the amount of water used and improve agricultural output quality and quantity. These are considered improvements on the alternative.
3.2	Desertification and deforestation are key concerns on both sides of the border and it is the role of women and youth to collect and purchase wood and charcoal for energy needs. Women frequently have to spend entire days in search of wood or charcoal hereby exposing them to extreme hardship and personal safety risks. The daily need for wood and charcoal in a region that is characterised by desertification presents significant future	The project will support 50 women groups to sustainably grow 50 ha of indigenous, nutritious, climate resilient and fast growing moringa tree plantations. These will meet the firewood needs of women have multiple benefits as they are drought resistant, can be harvested twice a year for firewood but also have health benefits and are used traditionally for medicinal purposes. They will also be used in intercropping as they also facilitate the	Alternative options to the moringa 'plantations' were considered and these included Gum Arabic (Acacia Senegal) trees and other native shrubs that can be planted by the community. Acacia trees are very common and very popular in the area and form an increasing portion of the local economy and exports in Sudan and Chad. The reservations surrounding the planting of Gum Arabic trees are the long tree growth cycles that would reduce the

Out-come	Baseline scenario	Benefits of proposed solution	Alternative to proposed solution
	sustainability and hardship challenges for the environment and for the women and youth. Increased droughts and increased intensity of rainfall events will further erode and reduce the fertility of the soils in the project area.	filtering and coagulating of water and improve soil fertility. The outcome will also support 1200 women in alternative off-farm income generating activities (IGAs) these investments will be particularly useful for women to earn additional income	immediate firewood benefit to the local women. Fast growing trees with significant health and environmental benefits were deemed more beneficial and with a quicker return for the women groups making it more sustainable. WFP surveys also show that the promotion of IGAs for alternative income generating activities are one of the most viable options to reduce climate vulnerability by reducing rates of food insecurity through increased purchasing power. The IGAs being promoted clearly identified and resulted from community and stakeholder consultations. These therefore are not considered Unidentified Sub-Projects (USPs) and are the best options for the communities with a high probability of community uptake.
4.1	The project target area is one of shared natural resources and shared tribal kinship ties and frequent cross border movement irrespective of land borders. There are currently no projects in the target area that take a regional approach to addressing complex climate change adaptation challenges. Drought is a major risk factor in the target area and this is augmented by a) the lack of water harvesting capacity and b) by a lack of knowledge and monitoring of surface and ground water quantity and quality. Early response to the onset of drought conditions requires reliable and detailed water availability data and a regional framework for sharing this information to help promote a regional approach to tackling the risk of drought.	The project will be the first to address the transboundary water and drought issues through innovative approaches in aquifer modelling and surface and remote and automated groundwater monitoring. The regional nature of the SCCIWM project will help promote technical cooperation between the neighbouring countries and develop a reginal approach to drought monitoring as well as sustainable natural resource management. This will help develop the first regional Natural Resource Monitoring System (NRMS) that will help also in monitoring early onset of drought as a pilot Early Warning System (EWS). In the event of a drought the regional platform will be able to bring together the main institutional actors to develop a structural, institutional and regional drought response plan that will include the development of drought EWS community awareness radio programs and distribution of drought response leaflets /flyers during training. The regional approach of the SCCIWM will also enable the first Regional Natural Resource Management Plan.	Climate change adaptation depends on developing avenues of collaboration and opportunities needed to be capitalised on to build technical and political linkages to develop new avenues for cooperation and climate change adaptation. An alternative to the pilot Early Warning System (EWS) being proposed in the full proposal, was initially explored during the concept note formulation. This focused around a cost-intensive community response plan to be developed by communities in response to the risk of drought and flooding. Due to the fact that the risk of flooding has been revised down and removed from the proposal, a cost-intensive community-based approach has been deemed no longer a desirable approach, also because drought response training can be easily integrated into the FFS training programme. The SCCIWM drought EWS response mechanism will rely on integrating drought response strategies within the SCCIWM FFS training that will be triggered by regional awareness campaigns on the early onset of drought such as by radio programs and possibly others that will result from the regional platform consultations.

E. Strategic Alignment

Describe how the project is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist. If applicable, please refer to relevant regional plans and strategies where they exist.

Table 8. Project alignment with national policies and strategies

Country	Strategy / Plans	Project Alignment
Regional	African Convention on the Conservation of Nature and Natural Resources 2003	The convention enhances the 1968 Algiers Convention by the same name by expanding elements related to sustainable development, have agreed on measures to enhance environmental protection, to foster the conservation and sustainable use of natural resources; and to harmonize and coordinate policies in these fields with a view to achieving ecologically rational, economically sound and socially acceptable development policies and programs for the Convention area. Specifically the members of the African Union commit to specific action with regard to inter alia land and soil, water, vegetation cover. The project will be in compliance with the regional Convention through the promotion of enhancing access to sustainable sources of water, the promotion of soil conservation and regenerative agricultural practices as well as promoting sustainable sources of firewood and charcoal through the moringa gardens.
Sudan	• Intended Nationally Determined Contributions (INDC) • 2015 National Adaptation Plan (NAP) 2014 • National Adaptation Programme of Action (NAPA) 2007	The project is aligned to the national climate change adaption strategies outlined in the NAPA, INDC and NAP by aiming to promote: • Crop diversification and introduction of improved drought-resistant varieties/early maturing varieties (both field and horticultural crops) in areas affected by rainfall decease/ variability. • Diversification of income-generating activities in order to increase adaptive capacity of vulnerable farmers' communities in order to achieve food security/reduce poverty. • Enhancing the participation of women and youth in activities related to adaptation and environmental conservation in order to empower them and enhance their adaptive capacity. • Integrated management of the water resources. • Water harvesting (SSDs, hafirs) to assist vulnerable communities to adapt and build their resilience facing increasing vulnerability of water sources/resources. • Construction of a regional water monitoring networks for achieving water security. • Advance research related to climate change impacts on water sector e.g. Undertaking geophysical studies for sustainable ground water utilisation. • Improve community sanitation services.
	Sudan Policy and Strategy on Integrated Water Resources Management (2007-2022)	The Strategy included the focus of water services provided by women in remote rural areas and their effect on small scale crop production and animal husbandry practices. The project will be in alignment through the focus on women equality and empowerment in the provision of WASH services as well as improved water availability.
	National Plan for Development and Utilization of Water Resources (NPDUWR, 2014)	NPDUWR aims to establish water harvesting projects in rain-fed areas. The Plan also aims to improve crop production technology research and knowledge transfer. The project will be aligned with the National Plan by focusing on the provision of conjunctive water solutions and to enhance rain-fed water harvesting investments and promote drought-resistant crop varieties.
	Poverty Reduction Strategy Paper – PRSP (2012)	The PRSP aims to upgrade water-users-associations skills to increase use and improve management of irrigation water supplies, rehabilitate major and minor irrigation canals, expand pilot demonstration farms of innovative soil-moisture retention tillage operations, and expand improved water harvesting projects in dry areas of Sudan. The project will be aligned with the PRSP through the rehabilitation and establishment of improved irrigation water supplies, the construction of improved shallow water wells and the establishment of farmer field schools to demonstrate innovative water and soil moisture management techniques.
	National Food Security Policy – NFSP (2011)	The NFSP aims to mitigate the effect of water-use waste on the environment and to transfer successful and improved water-users-associations (WUA) practices to other irrigation schemes to reduce water loss. It aims to incentivise the private sector to invest in manufacturing of water pumps, drilling equipment, water pipes and tanks, and supplies of spare parts. The project will be aligned with the NFSP through the strengthening of WUAs and sharing of best practices in irrigation schemes from other pilot projects to reduce water loss. The project will also promote the construction of water infrastructure for enhancing the capture and storage, enhancing surface and underground water availability.
	Water Supply and Environmental Sanitation Policy – WSESP (2010)	The overall goal of the WSESP is to improve the health status and living conditions of the population and the economic growth of the nation by providing all of the population with adequate and sustainable access to WASH basic services and hygienic practices. The project will be aligned with the WSESP through the focus on FAOs SMART-Irrigation SMART-WASH initiative. This initiative aims to promote multiple water use (MWU) services in order to minimise waste and maximise water use in water scarce environments. The MWU will ensure that more water is available for sanitation purposes and combined with health and sanitation awareness raising mainstreamed into the training programmes will help build resilience against disease including COVID-19 as well as future climate-induced water scarcity events.

Country	Strategy / Plans	Project Alignment
	Sudan National Drought Plan (2018)	The goal of the National Drought Plan is to prepare at the national and state levels: (i) a drought preparedness system; (ii) regional efforts to reduce drought vulnerability and risk; and (iii) a toolbox to boost the resilience of people and ecosystems to drought. The project will be aligned with the National Drought Plan through the project's focus on helping the rural climate-vulnerable communities to adapt to future drought events as these are expected to increase in intensity due to climate change. The project will pilot a Natural Resource Monitoring System in output 4. for real-time water monitoring of surface and ground water availability. The data that is gathered will be processed centrally and inserted into an online information management system useful for the monitoring, planning and early action in case of water scarcity. Other elements of alignment include the regional approach to capacity building and knowledge sharing.
Chad	Vision 2030	Vision 2030 aims to ensure that Climate Change Adaptation (CCA) and mitigation actions and climate-related disaster risk reduction (DRR) are developed in a coordinated and efficient manner to develop resilience in the face of climate variability and adverse climate-related impact on agro -pastoral production systems in Chad and their contribution to food security and the well-being of populations. The project will be aligned with Vision 2030 through the promotion of climate resilient agricultural production. The main focus will be around monitoring available water sources and increasing water availability through the Conjunctive Water Use (CWU) as well as the MWU will ensure enhanced capacity at storing and making more efficient use of scarce water supplies. This will in turn enhance water availability to ensure increased agricultural sustainability and productivity. Through component 3 the project will train beneficiaries on the need for climate-resilient agricultural techniques and approaches such as climate-resilient crops and techniques aimed at increasing soil nutrient and moisture levels and reducing soil erosion.
	National Strategy to Combat Climate Change in Chad – NSCCCC, (2017)	This NSCCCC aims for the sustainable and coherent integration of the challenges in CCA and mitigation into national development policies as well as improving effective coordination of initiatives aimed at the fight against climate change. The project will be aligned with the objectives to strengthen the resilience of agricultural systems; promote actions to mitigate and adapt to climate change; prevent risks and manage extreme climatic phenomena; strengthen the capacity of institutions and actors in the fight against climatic change.
	• National communications to the UNFCCC (2001 and 2012) • National Adaptation Programme of Action – NAPA, (2009) • Intended nationally determined contributions – INDC (2015) • National Adaptation Plan (NAP)	The project will be aligned with the national priorities to adapt to climate change as detailed in the national communications to the UNFCCC, the NAPA and the INDC. This will be done through the focus on: i) managing water through the rehabilitation and /or creation and development of water harvesting and agricultural irrigation structures and the application of Integrated Water Resources Management (IWRM) and Water Governance; and ii) developing intensive and diverse cultivation, using improved inputs, (organic fertilisers including composts, adapted plant varieties), land and water conservation. LDCF funding has recently in 2018 been approved to support the development phase of the NAP process in Chad. There at present is no NAP for Chad and its development will be supported as part the UNDP/GEF project Chad National Adaptation Plan Project.[102,103,104.] The project consultative process included discussions with the UNDP NAP project, identifying synergies and important areas of potential overlap. The UNDP NAP project welcomed the SCCIWM project and encouraged coordination to avoid duplication so that they can focus limited resources elsewhere in Chad as they are aiming to target in 19 of the 23 provinces. The areas of particular relevance were the construction of piezometers for the monitoring of ground water levels in the Assongha Department and the modernisation of water monitoring capacities through integrated information systems.
	National Development Plan – NDP (2017-2021)	The main objectives of the NDP that are in alignment with the SCCIWM is that of achieving food security through rural agricultural investments. The main sectors relevant to this project are those of agriculture, water and the environment. The NDP aims to ensure the sustainable management of natural resources and implement policies to adapt to climate change; to combat climate change and preserving biodiversity; implement climate-resilient agricultural practices; and develop a mechanism for the prevention and management of risks and natural disasters.

[102] Global Envrionment Facility (GEF) https://www.thegef.org/project/chad-national-adaptation-plan
[103] United Naitons Development Programme (UNDP) https://www.adaptation-undp.org/projects/chad-national-adaptation-plan
[104] UNFCCC (2017) Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goalsGuidance Note https://www4.unfccc.int/sites/NAPC/Documents/Supplements/napgn-en-2017-financing-nap-processes.pdf

Country	Strategy / Plans	Project Alignment
	National Poverty Reduction Strategy Paper (2008 – 2011)	The NPRSP aims to: (i) promote good governance; (ii) reduce poverty through growth based on the development of rural areas and basic infrastructure; (iii) ensuring the development of human resources, particularly through education and health; (iv)improving the protection of vulnerable segments of the population; and (v) protecting ecosystems. The project will have a strong focus on reducing poverty of marginal, rural climate-vulnerable smallholders. It will do this through addressing the main poverty-inducing factors such as water insecurity, lack of knowledge on climate-resilient agricultural practices, and increasing the capacity to mitigate drought.
	Action Plan for the implementation of the National Framework for Climate Services of Chad, (2016-2020).	The Action Plan aims to consolidate and promote the production, provision, access, effective application of relevant and easily understandable meteorological and climate information and services, consistent with the objectives of the Global Framework on Climate Service. The Action Plan is structured around agriculture and food security; water resources; and health and the management of natural risks and disasters. In addition, it incorporates the government's priority actions in terms of economic recovery, the fight against food insecurity and malnutrition and poverty, including vulnerability and adaptation to the adverse and devastating effects of climate as detailed in the INDC. The project will be aligned with the Action Plan through the focus on inter alia collecting and monitoring water and climate data. Furthermore, through the CWU and MWU in component 2 the project will enhance sanitation through improved access to water and sanitation that will directly improve health.
	National Strategy on Water, Sanitation and Hygiene in the School Environment (2018-2030)	The objective of the National Strategy on Water, Sanitation and Hygiene in the School Environment is inter alia to promote the adoption of good hygiene practices by students and their families. While the project will not specifically target sanitation improvements in schools, it will be closely relevant to the national strategy to improve sanitation. The project will aim to improve access to and efficiency of the use of water for multiple purposes including for sanitation such as handwashing and open defecation-free villages (outputs 2.2.1 and 2.2.3).
	National Strategy and Action Plan on Biological Diversity.	The overall objective targeted through the Action Plan is to slow down in the short term the trend of loss of biological diversity and the degradation of its biotopes through sustainable participatory management strengthening current achievements. The specific objectives of the Action Plan include to: strengthen the conservation of ecosystems and endangered species and / or of marked importance; promote the sustainable use of biological resources of known or potential value; ensure a fair and equitable sharing of the benefits arising from the exploitation of biological resources (especially genetic). The project will be aligned with the Strategy and Action Plan through the promotion of climate-resilient and drought resilient indigenous crop varieties and moringa trees as well as agricultural techniques and approaches that will help reduce soil degradation and improve soil fertility.

F. National Technical Standards and Environmental and Social Policy

Describe how the project meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

193. The project complies with the Environmental and Social Policy of the Adaptation Fund, (see ESP risk assessment summary in section II – L and Annex 5). The project has been designed in consultation with national partners to minimise any negative environmental impact, resulting in net environmental benefits as detailed in section II – C above. The project is furthermore aligned to the national laws and decrees of Chad and Sudan as summarised in Table 9; the Project Management Units (PMUs) located within the Executing Entities respectively the Higher Council for Environment and Natural Resources (HCENR) and Ministry of Environment, Water and Fisheries (MoEWF) in Sudan and Chad will help ensure compliance with the relevant laws. The project screening processes through the conducting of topographic, hydrological, hydrogeological assessments as well as engineering feasibility studies for each proposed water infrastructure and their review and approval will add additional safeguards. Said assessments and studies will also extend to the irrigation schemes that will result from the construction of the water harvesting infrastructure for which permits are required from the Sudan Ministry of Irrigation and Water Resources as per the Water Resources Act of 1995 below.

194. **EIAs.** The procedures applicable to the SCCIWM project for assessing the project's possible environmental impacts differs between Chad and Sudan. **In Chad** for example in accordance with the Decree no. 630/PR/PM/MEERH/2010 'Portant Reglementation des études sur L'environnment' full-fledged EIAs are only

required for projects categorised as 'category 'A' projects[105]. Category 'B' projects are limited to une 'notice d'impact sur l'environnment' and the process for compliance is detailed in the aforementioned Decree no.630. **In Sudan** similarly as Chad and as detailed in Chapter III of the Environment Protection Act (EPA) 2001, all projects are required to develop technical feasibility studies that shall determine any potential environmental impacts. The feasibility study will need to demonstrate: i) the expected effect of the project on the environment; ii) any negative effects of the project which can be avoided; iii) sufficient explanation of the environmental sustainability of the project; iv) where the project the project utilises finite resources that the feasibility study details the 'continuity of utilization' of said resources; and v) the precautions adopted for containing any negative effects of the project. The SCCIWM foresees compliance with the EPA with the provision for the Technical Feasibility Report to be conducted under output 1.2.5 and in the case of Sudan the feasibility study will be reviewed and approved by the Higher Council for Environment and Natural Resources (HCENR) who are the main Executing Entity (EE) of the project in Sudan. In the case of Chad the Ministry of Environment Water and Fisheries, also the EE of the project, will be responsible for overseeing the completion and submission of the technical feasibility study (notice d'impact sur l'environnment') in compliance with its own national requirements.

195. **Coordination.** As per procedure **in Sudan** the project will coordinate with the WASH Cluster chaired by the UNICEF which includes other UN agencies, including FAO. FAO as all agencies, are fully aware of the required standards as set out in the guidance manual on applicable standards - as is the government that has approved the standards and which is represented in the cluster through the Ministry of Physical Infrastructure and Planning. The Cluster reviews proposed project activities for additional safeguards, planning and coordination and ensuring compliance with the guidance manual. **In Chad** there is also a WASH Cluster headed by the UNICEF and while the project will coordinate with the Cluster, it does not have a similar central role as in Sudan. The project will however also operate in annual cycles for which proposed activities will be screened and assessed for compliance with Chad national environmental and social standards. The screening and approval of activities will be planned the year before and will be submitted for the binational Steering Committee approval.

196. As annex 7 shows, at a local level community are governed by more traditional lines of authorities that ultimately also answer to the respective national governments, but in essence govern themselves. The community governance structures or customary institutions in the project area manage issues related to land allocation, natural resource management and also function as key actors in the community-level conflict resolution frameworks. In acknowledgement to their central role, under output 1.1.1, the project has a detailed beneficiary consultation process that will help ensure their full involvement and agreement / buy-in. The project will also fully engage with the 'customary institutions' when setting up and activating conflict resolution mechanisms as described in output 1.1.1 and 1.2.3.

Table 9. Table summarising SCCIWM legal alignment

Country	National Technical Standards	Description and Project Alignment
Sudan	Water Resources Act of 1995.	The Act establishes the National Council for Water Resources with the aim to manage the use of water resources to mitigate the effects of natural disasters resulting from drought, to protect these resources from pollution and degradation; to develop a long-term national water management program; supervise the withdrawal of water from rivers and groundwater for the purposes of irrigation, drinking, industry, hydro-power generation and sanitation; the Ministry of Irrigation and Water Resources issues permits for water withdrawal; allocation of specific quantities of surface or underground water for extraction; distribution of water for fair use; and organize the drilling of deep surface wells.
	Irrigation and Drainage Act of 1990.	The Act regulates any activity related to irrigation or drainage through requirement of permits from the Ministry of Irrigation and Water Resources.
	Combat Desertification Law of 2009.	The Law aims to achieve the elimination or mitigation of desertification; promote human development. It established the National Council to Combat Desertification; the General Secretariat; the State Council to Combat Desertification; and the National Fund to Combat Desertification. The Law regulates the cultivation of marginal lands; requires the allocation of 10% of all mechanised and semi-mechanised farms for the establishment of a tree belts; establishes legislation for environmental protection from solid and liquid factories waste, highly toxic pesticides; encourages the use of technologies that help land protection; promote

[105] https://www.eia.nl/documenten/00000438.pdf

Country	National Technical Standards	Description and Project Alignment
		educational programs and scientific research on soil protection, land reclamation, and water management and conservation.
	Environmental Protection Act of 2001.	The aims of this Act are to: (a) protect the environment; (b) develop and improve the environment as well as guide the use of natural resources; (c) make a connection between environment and development; (d) assure and confirm responsibilities of the competent Authorities for the protection of the environment; and (e) established the High Council for Environment and Natural Resources.
	Environment Health Act No. 1 of 2009.	This Act establishes the Environmental Health National Council, defines its composition, competences and powers; it regulates the air and potable water and combats disease vectors; It also regulates public health, hazardous waste, as well as solid and liquid waste among other general provisions
	National Biosafety Law No.15 of 2010.	Law prohibits the direct release of genetically modified organisms or products into the environment or food, feed or vaccine, or manufacturing, import or export GMOs, which could have risks to human health, biodiversity and the environment. It established the Bio Safety Council
	Law No. 569 of 1973 on food control.	The aim of this Law is to protect the public health by laying down requirements and rules for the distribution and sale of food. The Law is enforced by the Ministry of Health and prohibits the distribution and handling of harmful food; defines requirements and conditions for exported, canned and packed food; sets the standards for the control and inspection on food; and establishes the Consultative Committee for Food Control.
	Seeds law of 1990	The law regulates seed production and agricultural crops. In particular: the registration of seeds, seed breeders, and agriculture increase; seed preparation; and inspection; seed marketing and seed trade; and the importation and exportation of seeds. The project will be aligned with the Seed law through the engagement with the Agricultural Research Centre (ARC) to train and supply the seed producers in compliance with national regulations. FAO is also highly experienced in the production of seeds in Sudan which will support the project through technical support.
	Wildlife and National Parks Protection Act of 1986.	This Act protects wildlife, and conserves national parks; it regulates the development of the wildlife resources; and implements the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
Chad	Law nº 016 / PR / 99 for the Water Code.	The Law covers inter alia special conditions for the collection, treatment, storage, supply of drinking water and sanitation; conditions surrounding the use of water; the approval mechanism for hydraulic works; and offenses and penalties for non-compliance. All water resources are a collective asset forming part of the public domain of the State and their exploitation is subject to declaration or authorization by the Ministry of Water.
	Law nº 014 / PR / 98 defining the general principles of environmental protection.	This law establishes the fundamental principles for the sustainable management of the environment and its protection against all forms of degradation, in order to safeguard and develop natural resources and improve the living conditions of the population.
	Decree nº 630 / PR / PM / MERH / 2010 OF AUGUST 04, 2010 regulating environmental impact studies.	This decree sets out the procedures for implementing the environmental impact studies. It requires that the prior authorization of the Minister responsible for the environment be submitted to all developments, structures and works likely to have incidences and significant effects, as well as harmful consequences on the biophysical and human environment, in particular in particularly sensitive areas such as forests, arid or semi-arid areas prone to desertification, oases and wetlands.
	Decree nº 904 / pr / pm / merh / 2009 regulating pollution and nuisances to the environment.	This Decree defines the rules relating to pollution and environmental nuisances, in accordance with Title V of Law No. 014 / PR / 98 of August 17, 1998. It aims to protect the environment against any form of degradation, alteration and its sustainable management, as well as the improvement of the framework and the living conditions of the population are of public order.
	Order No. 0059 / MSP / DG187 / DACS / 96 regulating the import, distribution and use of	This decree regulates the import, distribution and use of pesticides that can be used in public health. The project will comply with national and international standards on pesticide use. training on pesticide use and management will be integrated into the training programme for component 3.

Country	National Technical Standards	Description and Project Alignment
	pesticides usable in public health.	
	Law No. 24 on Land Tenure and Customary Rights.	This law establishes the procedure for the registration of land ownership. This procedure consists in the establishment and registration of a title deed called a land title. The project will at all times ensure compliance with the land tenure laws, and that the rights to land tenure of the project beneficiaries are ensured beyond the project cycle, hereby ensure project sustainability.

G. Duplication

Describe if there is duplication of project with other funding sources, if any.

197. During the design process, all stakeholders, including donor- funded projects were consulted in order to avoid any potential duplication of efforts, resources or geographical coverage, and to ensure synergy between ongoing initiatives and the proposed project. While Chad and Sudan both have a range of climate initiatives in place there is a clear gap in regional transboundary projects across the Chad – Sudan border and specifically in the area between West Darfur and Assongha.

198. Of note and as outlined in the SCCIWM concept note, the design consultations included meetings with the UNDP / GEF project for the National Adaptation Plan in Chad. The meeting was productive in as much as the scope of the GEF project was clearer vis-à-vis the large size of Chad. The NAP project was planning on installing ground water monitoring stations in Assongha, and UNDP was relieved to learn of the AF proposal as there are clear synergies. The UNDP agreed not to continue with its focus on Assongha and to focus its resources for groundwater monitoring elsewhere in the country. During implementation the project will liaise with UNDP to further coordinate efforts, and include the synergies with the SCCIWM as part of the NAP in Chad.

199. Importantly this project will develop an innovative regional approach that will bring many opportunities for new collaboration that has not been attempted before bringing with it important chances for cross-fertilisation of ideas. Due to the absence of cooperation between the two countries the border area is politically not considered as one zone although local communities and tribes freely cross the border, there are no projects that address the transboundary aspects as the SCCIWM. Discussions with the GCF technical experts in Sudan at the Higher Council for Environment and Natural Resources (HCENR) who are executing the project provided important advice on the relevance of the project activities to West Darfur and the confirmation that the GCF is a nation-wide project with limited activities in the SCCIWM project area. The consultations confirmed that there is no duplication with this project.

200. More broadly all development projects in West Darfur and Assongha are coordinated through the WASH cluster which is in both cases led by the UNICEF and includes FAO and the governmental Ministry of Physical Infrastructure and Planning. This high-level of coordination will help ensure that there are no duplication of activities with future projects being developed. This coordination will also assist in developing synergies between projects. Below is a table summarising the review of projects and the assessment of duplication risk and synergies.

Other projects	Summary of project	Synergies with proposed project.
Chad		
AfDB / Green Climate Fund (GCF) – Programme for integrated development and adaptation to climate change in the Niger Basin (PIDACC/NB) USD 210 million (2018-2025)	This programme will implement a series of integrated and comprehensive actions that reduce the silting of the Niger River, improve natural resources management and enhance the population's ability to adapt to climate change. It also includes some mitigation activities, including through forestry and land use.	Multiple (9) countries but no geographical overlapping in Assongha. Synergies or lessons learned may be explored during design consultations.
UNDP / GEF - Chad National Adaptation Plan	The project will contribute to the advancement of the Chad National Adaptation Plan (NAP) process.	The UNDP / GEF NAP project was consulted during project formulation and the SCCIWM project

Other projects	Summary of project	Synergies with proposed project.
Advancement Project (USD 33.7 million)	To this effect, the objective of the project is to facilitate the integration of adaptation to climate change into the medium-and long-term planning and budgeting processes of climate-sensitive sectors.	was welcomed and encouraged coordination to avoid duplication so that they can focus limited resources elsewhere in Chad as they are aiming to target in 19 of the 23 provinces. The areas of particular relevance were the construction of piezometers for the monitoring of ground water levels in the Assongha Department and the modernisation of water monitoring capacities through integrated information systems.
AfDB / GEF – Strengthening rural and urban resilience to climate change and variability by the provision of water supply and sanitation in Chad. As part of the AfBD Programme d'approvisionnement en eau potable et d'assainissement en milieux semi urbain et rural de onze regions, (PAEPA SU MR phase 1) USD 36.5 million (2020-2024)	The project aims to increase access to drinking water and sanitation services, as well as through job creation, especially for the youth and women. This will be achieved through the construction of boreholes, micro-irrigation systems, hand pumps, public latrines as well as the installation of piezometers and employment.	The project is part of a larger AfDB project called Programme d'approvisionnement en eau potable et d'assainissement en milieux semi urbain et rural de onze regions, (PAEPA SU MR phase 1) and while there are potential synergies in sanitation and water-related activities there is no geographical overlap with the AF project. The project is located in the Logone region in the south of Chad bordering Cameroon. It is also located in Borkou in central-northern Chad, Tibesti on the border with Niger and Libya, and Ennedi on the northern border with Sudan and Libya. Several attempts have been made to contact the AfDB and the project unit to learn from their experience thus far, unfortunately no response has been received for consultations.
IFAD / GEF – Enhancing the Resilience of the Agricultural Ecosystems USD 32 million (2015-2022)	The overall goal is to contribute to the sustainable improvement of food security and incomes of rural households and improve the resilience of agricultural systems and the economy of rural households to climate chance and external shocks.	The project focuses on the Sahelian areas of Chari Baguirmi, Hadjer Lamis, Guéra and Batha. There is no geographical overlap with the SCCIWM project.
World Bank – Chad Local Development and Adaptation Project. USD 54.5 million (2020-2025)	The objective is to improve the management of natural resources and the livelihood of populations in selected climate vulnerable areas in and around the Ouadi Rime and Ouadi Achim (OROA) reserve in Chad.	The project is taking place in Ouadi Rime and Ouadi Achim in the centre and northern parts of Chad. There is no geographical overlap with the SCCIWM.
Sudan		
GCF / UNDP - Building resilience in the face of climate change within traditional rain fed agricultural and pastoral systems in Sudan USD 25.6 million (2021-2026)	The overall goal is to promote a paradigm shift in dryland pastoral and farming systems through i) an integrated approach by increasing resilience of food production systems; ii) improving availability / access to climate resilient water sources; and iii) strengthening capacities of institutions/communities on climate resilience.	Project locations include: West Darfur, Central Darfur, East Darfur, Western Kordofan, South Kordofan, Kassala, Red Sea , Northern and Khartoum state. Consultations were had with the GCF project focal point and it was explained that the GCF project is national in scope and only has limited involvement in the SCCIWM project area. Additionally, the GCF project also is being executed by the HCENR, which will help ensure the required consultations during execution to avoid duplication.
United Nations Environment Programme (UNEP) – The Wadi El Ku catchment management project – phase 2 USD 1,1934,000 (2017-2022) North Darfur	The project aims to expand and promote scientific information for improved integrated water resources management (IWRM) and early warning systems. It will also demonstrate and promote improved agricultural and natural resource management approaches and cooperation mechanisms.	The project is located in North Darfur therefore there is no geographical overlap or duplication. Consultations with project consultants have highlighted the important lessons learned in terms of community consultations and involvement in the decision-making process. These have been adjusted to the SCCIWM context and in-depth consultations have been included in output 1.1.1 to enhance ownership and joint decision making.
AfDB – Sustainable Rural Water Supply and Sanitation	The objective of the project is to improve households' livelihoods and resilience against	North and South Kordofan – no geographical overlap or duplication.

Other projects	Summary of project	Synergies with proposed project.
Project for North and South Kordofan UA 25,2 million (2019-2024)	climate variability and change through provision of reliable water and sanitation services and economic empowerment.	
GEF – World Bank Sustainable Natural Resources Management Project USD 23.5 million (2020-2023) in Gedarif and Khartoum	To increase the adoption of sustainable land and water management practices in targeted landscapes. Overarching goal: Reduce environmental degradation and vulnerability of rural poor and marginalized people to climatic impacts.	The project is located in Gedarif and Khartoum which as contextually different to the conditions in West Darfur. There is not duplication with this project.

H. Learning, Knowledge Management and Lessons Learned

If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

201. Effective knowledge management – including the collection, generation and dissemination of information – is an important component of climate change adaptation. Learning from adaptation activities and being able to transform knowledge into products that are targeted at various audiences is essential to effective climate change adaptation. Output 1.2.1 will form the key KM effort with radio programmes that inter alia will also function as the pilot drought EWS system awareness raising mechanism. This will form part of a community-wide awareness raising campaign that will also highlight the benefits of sustainable NRM and water use to better adapt to the challenges posed by climate change. This will include the production of simple picture-based educational leaflets on drought response strategies, the benefits of the sustainable agricultural practices, techniques and technologies being promoted by the project. Outcome 1.2 will furthermore generate and disseminate project information, experiences and results on an ongoing basis. The overall responsibility of the Knowledge Management (KM) and communication will rest with the two national KM and communication experts that will be part of the two Project Management Units in the respective countries. They will be overseen by national coordinators and the binational project manager. The KM officers will inter alia be responsible in coordination with the respective national coordinators, M&E officers, for the delivery of: research on mapping of the drivers of conflict; the dissemination of the results of the Regional Natural Resource Management Plans (RNRMP) in component 4; the comprehensive climate research that will be conducted on the project area; the production of technical FAO approved publicly available guidelines that will bring together the experiences and lessons learned in key thematic areas; and the mapping of the drivers of conflict and peace-making. The KM officers will also be responsible for the development of the project website that will be integrated with the regional platform under component 4 and for the sharing of generated knowledge for the respective countries on the website.

202. Component 4 will also be key in the KM strategy of the SCCIWM project. The regional element of the project through the regional platform will be a key knowledge sharing avenue that will enhance the value of the knowledge generated as part of this project. Output 4.1.2 will see the development of a regional knowledge platform based on the project website supported by the development of a knowledge management strategy that will address capacity needs through the delivery of trainings such as virtual regional training workshops. The regional training will include but will not be limited to capacity building for monitoring, hydrogeological mapping and modelling; defining regional policy and guidelines for water allocation, water use and priorities and activities and capacity building activities. Exchanges with other regional water commissions will assist in the data analysis and in producing technical reports and maps and groundwater modelling. The regional training programme will be supported by the KM output 1.2.1 for the sharing of lessons learned and best practices by international training by experts to demonstrate project results to national and international partners for future replication and upscaling. This platform will inter alia help raise awareness but also mainstream water resource information systems into national and regional platforms contribute to policy development and institutional strengthening. Virtual trainings, seminars and workshops will be delivered through the platform and the sharing of experiences between the technical experts of both countries. Key to the outputs of the project is also the development of the Regional Natural Resource Management Plan (RNRMP) and the Natural Resource Monitoring System (NRMS). The resulting interactive and digital online information database will be integrated into the project website and regional knowledge platform and will make accessible the innovative three-dimensional mapping of the Disa sandstone aquifer and the water level and quality data generated by the ground water stations. This information will be shared widely with the other actors on the ground and with

the humanitarian and WASH clusters so as to better plan for any natural disasters as well as support future policy development.

I. Consultative Process

Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

203. An extensive consultation process was conducted from June until October 2021, in addition to the consultations conducted for the Concept Note in 2020. The full list of consultations is available in annex 6. The design of the SCCIWM project was conducted in close collaboration with the FAO offices in Khartoum, Sudan and N'Djamena, Chad who assisted in facilitating the arranging of meetings. The main challenges facing the design team have been caused by the unprecedented global COVID-19 pandemic that has severely limited international travel. For practical reasons and for ensuring the physical the safety of everyone, the majority of the meetings were held remotely over the internet. The project activities were informed and validated also by community consultations. This was initially achieved for the concept note design by way of community survey questionnaires through video conferences and telephone calls with sedentary farmers as well as vulnerable categories such as women, refugees, IDPs and returnees in the project area. The design of the full proposal built on the concept note findings and validated them through extensive consultations with national ministries, NGOs, multilateral agencies but also through community consultations. The project design team involved international and national consultants, the latter of which were able to meet with a wide range of beneficiaries. These included farmers, refugees, IDPs, NGOs, women groups, NGOs focused on women's affairs and other community-based organisations. The main challenges in conducting the consultations were the remoteness of the villages, difficulty of access by road particularly during the rainy season that to some extent limited the ability to physical access communities. In addition to the 9 communities that were consulted in the concept note, a further 10 communities were met in person in West Darfur and Assongha. These included IDPs, refugees and farmers. The consultations with male and female groups were held separately in compliance with the AF Gender Policy on consultations. Once the global vaccination programmes were rolled out and international travel restrictions were eased, the team was able to travel to Sudan and Chad in the month of October for 2 weeks where consultations were held in person with ministries and other national stakeholders. This mission was important to validate the proposal design and present it to the national parties for their approval.

204. The main findings of the community consultations validated the understanding that access to water was one of the main challenges facing the daily lives of the local communities. All communities report that access to sufficient clean water is a critical problem and as one of the top priority issues to be addressed. People in the villages used to depend almost primarily on traditional hand dug wells located along the beds of the wadis in both Chad and Sudan, although deep wells also tend to be accessible further away, but are insufficient. During the rainy season the wadi water and the scattered ponds provide important water sources however these dwindle during the dry season and access to water becomes particularly critical during the months of April-June when many of the wells dry up or the water becomes very deep. This is mitigated to some extent through access to water yards, hand pumps and dams although insufficient to meet the needs of everyone as most of these sources are either poorly functioning or not functioning at all. Access to water is a main concern for women who traditionally are the people that have to travel long distances to collect water. The main concerns surrounding women in all consultations were also the long distances that they have to travel to collect / purchase firewood and charcoal. It was not uncommon for women to have to travel for 30km over 24 hours to collect wood and hereby exposing women to sexual harassment and risks to their personal safety. Other women concerns that were raised both at community level but also NGOs and women group representatives, included access to basic tools for agricultural production and transport to the market as well as training in small income-generating activities (IGA) that World Food Programme (WFP) surveys have demonstrated are key in reducing extreme poverty and reducing malnutrition.

205. **Refugees / IDPs**. Despite refugee camps in Chad appearing to have better access to sources of water and sanitation than remote villages and also IDP camps in Sudan, there are frequent complaints about the quality of the water. This is a concern that project will aim to address through mapping and modelling ground water quantity, quality and water flows. Sanitation standards are reportedly better in camps than villages as well as women have reported having knowledge of and practicing basic sanitation practices. Refugees and IDPs remain highly vulnerable particularly as they are not allowed to own their own land for agricultural activities and either need to rent land or crop share. WFP reports that the main area that can help refugees and women are promoting IGAs and giving them the skills to earn an income. Other areas related to the difficulty in accessing firewood and charcoal will

be addressed by promoting moringa tree plots to be cultivated by women groups also in the proximity of refugee camps that will allow women to reduce the distance they need to walk to purchase the energy source.

206. The project design also benefitted from successful collaboration with other UN Agencies namely the United Nations Office for Coordination of Humanitarian Affairs (UNOCHA) for helping in coordination and getting contact details of stakeholders and partners on the ground. Cooperation with United Nations Higher Commissioner for Refugees (UNHCR) helped ensure access to IDP and refugee camps and also UNICEF was instrumental in connecting and coordination. Cooperation from the World Food Programme (WFP) was also important in community profiling that inter alia helped in developing the targeting strategy of the proposal. This was made possible through the sharing of the Comprehensive Food Security Assessment household and the Food Security Monitoring System household questionnaire results. This enabled the collection of data in the project area on: household (HH) composition by gender; Distribution of HH educational level; Distribution of households by type of main source of drinking water; Percentage of HH by type of toilet facility; Average household size; Main income sources for households; Percentage of farmers; Land ownership status; Average production and post-harvest losses; Percentage of women engaged in different harvesting and post-harvest processes; Percentage of HH rearing livestock; and the percentage of HH engaged in non-agricultural livelihood.

207. **Free, Prior and Informed Consent (FPIC) and do no harm principles.** The consultative process during design and implementation has and will follow the FPIC and do no harm principles which are extended to non-Indigenous Peoples, of which there are none in the project area. Adherence to the FPIC principle needs to be assured before supporting any development intervention that might affect the land access and use rights of communities, FAO will ensure that their free, prior and informed consent has been solicited through inclusive consultations based on full disclosure of the intent and scope of the activities planned and their implications. The project will also adhere to the "do-no-harm principle" at all times. A broad range of development interventions, particularly those concerned with agricultural intensification, such as irrigation or technology-based agricultural production effectively adding value to land. Under such circumstances, there may be the risk that the rural poor, especially women, may lose out to more powerful groups. The project must be designed and implemented in such a way that it 'does no harm' to the land tenure interests of the rural poor, especially those of women, other vulnerable groups. Careful measures will always be considered to avoid elite capture or forced displacement of people, and to address conflicting claims.

J. Justification for Funding

Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Adaptation reasoning following project structure change from the Concept Note.

208. Following full proposal consultations,[106] a number of structural changes to the project vis-à-vis the original concept note were needed to improve on the concept note and to ensure that the project was viable while still retaining a strong adaptation reasoning. This has resulted in the budgetary reallocation and reduction of component 1 by 70% and a 60% increase for component 3 after a reassessment of flooding as not being a critical adaption risk to the target area. This has been compensated by maximising the concrete climate-adaptive benefits through climate-resilient agricultural techniques in component 3. Component 1 of the concept note "Developing integrated water resource information systems for climate change adaptation in regional agriculture" has been revisited and integrated into the regional element of component 4 of the full proposal. This was done to better leverage the regional dimension of the said component and to allow for a full outreach and community awareness raising and diagnostic process to be included as output 1.1.1. The adaptation reasoning of the original component 1 of the concept note, hinged on the development of an innovative Early Warning System based on proven technology from a previous FAO pilot in Lebanon. The proposed output 4.1.3 of the full proposal will still aim to develop an integrated regional database of water usage and the potential for water harvesting as detailed in the concept note. The full proposal, however, removes the focus on flooding as this was discovered not to be as a big risk as it was anticipated at the concept note stage. Consultations pointed out that flooding has devastating impacts in eastern Sudan, not as much in the West Darfur – Assongha target area.

209. The original concept note also focused on the need for 'pilot sites to be equipped with in-situ data acquisition devices for drought and flooding monitoring, which would have been directly connected to a local knowledge institution / NGO' for data collection. As mentioned, in the full proposal, flooding has been removed and drought monitoring has been centralised and automated with automatic data relaying technology that will simplify the data collection process and avoid the need for in-situ data collection by an NGO or service provider or the development

[106] Refer to annex 6 for full list of consultations

of people-centred EWS response plans. It is considered that this approach is cheaper, more cost-effective and more effective. The centralisation and automation of water data collection will enable a more centralised approach to the pilot drought EWS that will focus on integrating drought response training in the FFS and developing radio messages for drought warnings and the distribution of drought response strategies through KM output 1.2.1 in the training. As with component 1 of the concept note, the full proposal will still aim for an integrated approach to monitor water demand and water supply that will inter alia help in future planning of groundwater extraction infrastructure. These elements are needed to create effective water distribution and to significantly improve sustainable water management particularly but not limited to, the refugee and IDP camps. The monitoring of surface and ground water will also enable regional, national structural and institutional drought EWS responses in coordination with national and international humanitarian actors through the regional platform.

Component 1 Outreach, Capacity Building, Conflict Resolution and Knowledge Management

Baseline scenario

210. The historical conflict in 2003 in Darfur region has been characterised by the U.N. Secretary-General Ban Ki-moon in 2007 as having being at least in part caused by climate change and the trends in dramatic 40% reduction in rainfall since the 1980s. These have transformed an area where Arab nomadic herders once lived amicably with settled farmers sharing their water the livestock and for the first time in living memory, into one where there was no longer enough food and water for all, leading to the conflict of 2003. Consequently, according to data obtained from OCHA through design consultations, there are currently around 336,000 Internally Displaced People (IDPs) in West Darfur, around 19% of the total population (1.8 million) and around 77,000 returnees (IDPs that have returned to their villages). In the Chad side of the project area there are according to OCHA also around 215,000 Darfur refugees which represents 20% of the total population (1.07 million). In addition to these people there are also many vulnerable people among the settled farmer population in both Assongha and West Darfur who have to contend with migrating nomadic herders in search for water and forage. In 2019 a conflict analysis survey undertaken by UNDP shows that among 800 respondents in Darfur 67% perceived conflicts as related to land disputes; 59% as between pastoralists and farmers and 40% reported water as source of conflict. Compounding the tangible societal effects of climate change is the absence of research on climate change in this area and at the same time there are also considerable knowledge gaps on the availability of water, data which is needed for disaster risk reduction, future planning and the development of a Regional Natural Resource Management Plan (RNRMP).

Additionality (with AF resources)

211. The AF project aims for social inclusion and the targeting of the most vulnerable, to do this it will set targets of 30% for the inclusion of IDPs, refugees and returnees, 60% for women and 25% for youth (18-35) to benefit from the project. AF resources will also focus on community engagement, outreach and the mitigation / resolution of possible intra-community disagreements that may happen during project execution. One of the objectives of the project is to focus on sustainable land management to increase soil fertility and access to water that aims to address some of the perceived main drivers of conflict; consultations with technical experts have frequently highlighted that increasing access to water for example has palpably reduced social tensions in previous projects. Key aspects will be the community engagement and outreach strategy and building the body of knowledge that will help improve the knowledge base surrounding the impact of climate change and also the drivers of conflict and connectors (the factors that have historically driven conflict resolution). The mapping of this information will be useful for helping to get a better understanding of the complex dynamics that may drive the intercommunal conflict and what approaches and techniques have proven to be most successful in resolving them. This research has been a key request from experts working for more than a decade in West Darfur. Being able to understand these dynamics better will help in the improvement of the conflict mitigation strategy and training programme developed under component 1 which is already based on best practices and recommendations resulting from consultations with experts in the project area. The training programme will be updated throughout the annual cycles to reflect any best practices.

212. The project will have a detailed outreach strategy aimed at direct and sustained community engagement and involvement. This will be fundamental to ensure project success as well as for a foundation for the conflict mitigation strategy. Community engagement will be flexible and rest on identifying and engaging with existing community institutions as entry points which could include the Community Development Associations, Village Councils, Community Based Organisations, Water User Associations (WUAs) etc. with the aim to liaise and coordinate the identification and implementation of the project. The outreach engagement plan is summarised section 1.1.1 and will be implemented in four phases and one exploratory visit phase with the overall objective to build community trust and ensure their engagement. This process will help identify their representatives who in turn will help identify – through community consensus- who the participating farmers will be, who will form the WUAs, the Community-Led Total Sanitation (CLTS) and who will be the conflict resolution mediators that will be one male and one female.

The project will also set up state-level conflict resolution committees (CRCs) that will be trained by the respective Service Providers in the best practices for conflict resolution. The CRCs will comprise the Service Provider, project staff, key state-level actors and community-based organisation representatives. They will meet to discuss key conflict resolution responses and coordinate with the mediators to ensure conflict resolution.

Component 2 Investment in Natural Resource Management and Climate Resilient Community Infrastructure

Baseline Scenario

213. The project area is characterised by the critical vulnerability of the target groups caused primarily due to the lack of sufficient sustainable water for the dry season which stretches from around September / October until May / June. According to the State Water Corporation (SWC) in Sudan the area of West Darfur is severely lacking sustainable sources of water and it is estimated that in the Sudan project area there are around 3 dams of which two are out of use and an undetermined number of hafirs. The number of water yards (deep drilled water wells) was not available and the status of the underlying Disa sandstone aquifer that underlies the entire project area also remains unknown. Recent research in Sudan[107] has estimated that due to the porous nature of the aquifer, that water quantity and quality varies significantly between the wet and the dry periods, to date however there has been no attempt at mapping and monitoring the availability of the underground water supplies or the modelling of the aquifer. This is of particular concern given the high density of people living in refugee and IDP camps that depend on water yards tapping into the aquifer and the extent of dependency on water wells during the dry season. The availability of water infrastructure in the Assongha department in Chad is also still largely unmapped and unknown despite some efforts by the Swiss Development Agency to conduct the digital mapping of the geology and hydrology of all of Chad including available water points, although also this has been described as being unreliable as it is in need of updating. Consultations have however determined a distinct lack in water infrastructure vis-à-vis their Sudanese neighbours. In Chad for example there is no tradition to construct hafirs, Chad also does not have any ground water monitoring stations in the project area, which is a point that was discussed with the Ministry of Urban and Rural Water and the UNDP /GEF in the NAP project, all of which is necessary to enhance the climate resilience of the most vulnerable.

214. A lack of access to safely managed sanitation puts people at risk of infectious diseases which is exacerbated by climate variability and change. Climate change increases the risk of disease or illness resulting from a lack of access to adequate sanitation when systems are unavailable, destroyed or damaged. Poor and vulnerable groups face the most immediate and severe consequences from climate change as people without access to basic services experience overlapping forms of disadvantage and underdevelopment. Data on sanitation in Assongha is not currently available while for the villages in West Darfur it is estimated that 33% still practice open defecation, a statistic that is expected to be worse in Assongha. Data on personal hygiene and washing of hands is also not available for the project area, although with chronic water absence, projections are not optimistic. The practice of defecating in the bush while contaminating the environment and spreading disease, is also a practice that exposes women to personal security issues and harassment. Consultations with United National Population Fund (UNFPA), UNWOMEN and women groups and NGOs that have been consulted have all pressed the importance of the development of latrines close to the inhabited areas to reduce the insecurity risk to women from gender-based violence (GbV).

Additionality (with AF resources)

215. In order to enhance the climate-resilience of the vulnerable target groups (settled farmers, agro-pastoralists, refugees, IDPs and returnees) the project will focus on an integrated water management approach that aims to enhance access to water for agricultural, livestock watering and sanitation purposes as well as fill the knowledge gap surrounding water availability and usage for enhanced natural resource management. In terms of concrete adaptive initiatives that the AF will fund, these include around 39, 50,000m^3 subsurface dams (SSD) for an estimated water volume of 7.8 million m^3 and construct 160 improved shallow water wells for Multiple Water Use (MWU) purposes. The project will also construct and / or rehabilitate 9, 40,000m^3 hafirs for a total estimated 480,000m^3 of additional water harvested per year. In total it is expected that the project will result in annual increases in water harvesting capacity of around 8.3 million m^3. Additionally, the AF will help finance the construction / rehabilitation of 12 water yards with average total annual extraction capacity of 950,000m^3.

216. The project will also be constructing 20 automatic water quality and depth monitoring stations, 10 in each side of the border, with the capacity to monitor and automatically relay information on water quantity and quality.

[107] Ali, Khalid & Elsheikh, Abdalla & El Khidir, Sami. (2020). Determination of Hydrogeological Parameters of Alluvial and Disa Sandstone Aquifers of West Darfur State, Western Sudan.

This additional information will improve the national and regional capacity to identify, monitor and sustainably manage the available groundwater supplies and contribute to the Regional Natural Resource Management Plan that will be developed as part of the regional collaboration between Chad and Sudan resulting from the regional platform that will be developed in component 4. The Multiple Water Use (MWU) approach promoted by the project will help ensure that the increased water availability will also reduce the population's vulnerability to a lack of sanitation. AF resources will through outputs 2.3.1 and 2.3.2 provide all the communities supported by each of the 62 Water User Associations (WUA) with improved access to water with hand washing stations and training on the importance of personal hygiene. These stations will be installed hand-in-hand with the Community-led Total Sanitation (CLTS) activity that through the outreach programme in output 1.1.1 and the Service Provider recruited under output 2.3.1 will map the communities in the project area that still practice open defecation and target them through the CLTS activity for the social acceptance and construction of home-made latrines.

Component 3 Improving food security through climate-resilient agricultural practices and technologies

Baseline Scenario

217. Although climate change forecasts for the region are characterised by a high degree of uncertainty, what is known is that the region has historically been impacted by severe droughts that have had devastating impacts on access to water and food. This has been caused by a 10 – 20% decrease in summer (rainy season) precipitation and an increase in 1 °C over the past 30 years. Over the past 20 years, declines in evapotranspiration reduced by 40 % and the impacts appear to be amplifying the effects of the drought. Evapotranspiration is strongly related to changes in plant growth, cereal formation and filling, end-of-season yields, and pasture biomass and climatic warming effects combine with decreases in rainfall to reduce evapotranspiration and crop yield. It is expected that climate change will threaten food security due to the impact of projected temperature increases and extreme weather events on crop nutrient content and yields.

218. Desertification and deforestation are also key concerns in the region. On both sides of the border it is the task of women and the youth to collect and purchase wood and charcoal for energy needs and consultations have shown that women frequently have to spend entire days in search of wood or charcoal or to have to return the following day to their villages hereby exposing them to extreme hardship and personal safety risks. The daily need for wood and charcoal in a region that is characterised by desertification presents significant future sustainability and hardship challenges for the environment and for the women and youth. Increased droughts and increased intensity of rainfall events will further erode and reduce the fertility of the soils in the project area.

Additionality (with AF resources)

219. The predominant form of agricultural production in the project area is non-mechanised rainfed agriculture. AF funding will be used to enhance the climate resilience of around 20,000 of these vulnerable smallholder farmers with climate-resilient rainfed agriculture techniques through Farmer Field Schools that will improve their ability to maximise agricultural productivity and improve soil fertility. The project will additionally train 400 smallholders through FFS to pilot high-efficiency and water saving irrigation systems and a further 1,300 smallholder farmers with irrigation capacity to build the agricultural climate resilience. In all the project will help make around 11,000 ha of agricultural land climate-resilient through sustainable soil management techniques. These will reduce the water needs of plants through the introduction of high yielding, early maturing, drought tolerant and heat-resistant crop varieties and land management techniques that reduce soil loss by 12% and erosion by up to 46%. The project will also support 140 farmers with climate-resilience foundation seeds for the commercial production of seeds. The seeds will initially supply the project with its seed requirements although farmers will benefit from additional income as seed surpluses are commonly sold on local markets, however not of the climate-resilient varieties. The project will therefore impart knowledge on the production of climate-resilient seeds but also increase the public availability of improved seeds to the general public.

220. The project will additionally help ensure that 50 women groups are supported with the capacity and knowledge to sustainably grow 50 ha of indigenous, nutritious, climate resilient and fast growing moringa tree plantations. The trees will meet some of the firewood needs of women while also helping towards the objectives of the Great Green Wall Initiative. Moringa trees have multiple benefits as they are drought resistant, can be harvested twice a year for firewood but also have health benefits and are used traditionally for medicinal purposes as the leaves are rich in protein, vitamins A, B and C, and minerals. The moringa tree is also known for its antibiotic, anti-trypanosomal, hypotensive, antispasmodic, antiulcer, anti-inflammatory, hypo-cholesterolemic, and hypoglycemic properties. The harvested wood can be used by the women groups and sold for additional income and trees will be purchased by the project to supply the FFS for intercropping as they also facilitate the filtering and coagulating of water and improve soil fertility that is beneficial for agricultural production.

221. The women groups will also be trained in alternative off-farm income generating activities (IGAs) these investments will be particularly useful for women to earn additional income as WFP surveys shows that women engaged in IGAs have reduced rates of food insecurity through increased purchasing power. Alternative forms of income that reduce the reliance on climate-vulnerable on-farm agricultural activities is a key climate change adaptation approach, therefore the SCCIWM will support 1200 women in the production of handmade fuel-efficient stoves that use 50% less wood and can be produced and sold on the local market. The activities that women will be able to engage in will also include packaging tools and equipment as well as communal infrastructure such as a mill or oil-press to produce flour, sesame or groundnut oil to add value to existing produce and to sell locally. Adding value to post-harvest activities is a key adaptive income-generating activity and can also include food processing to make cheese and dried meat that can also be sold with support in basic packaging facilities / skills.

Component 4 Enhancing regional cooperation on water resource development-based food security and climate change adaptation in agricultural and policy development

Baseline Scenario

222. Chad and Sudan have diplomatic relations that tend to focus primarily on security-related matters. While the two countries share similar climatic and environmental environments and communities along the West Darfur and Assongha border are from some of the same tribes, the two countries gravitate to separate regional socio-economic spheres of influence. Chad for example to the Economic Community of West African States (ECOWAS) and Sudan to the East African Intergovernmental Authority on Development (IGAD), this however does not preclude the possibility of dialogue and collaboration. Climate change adaptation depends on developing avenues of collaboration and every opportunity needs to be capitalised on to build technical and political linkages between the two countries particularly those that aim to directly improve the livelihoods of communities in one of the most vulnerable regions in the world.

223. Over the last 3 decades rainfall has decreased over eastern Africa and the Sahelian region is experiencing the full impact of climate change with rainfall deficits and severe droughts. Insufficient rainfed irrigation means that crops fail or are destroyed, while livestock struggle to find water for drinking and sufficient pasture. Historical drought events in Sudan in 1984 and 1990 have seen severe reductions in GDP of around 20 percent as agricultural production ground to a halt. The scarcity of natural resources is leading to conflict and migration as near surface temperatures have increased over the last 50 years and land is deteriorating and losing its fertility under the combined effects of drought and floods.

224. The limited research that has been conducted on the Disa aquifer has shown that the water levels appear to fluctuate considerably between the wet and dry seasons due to the highly porous sandstone. This vital although limited research has only been conducted on the Sudanese side of the border area in West Darfur. The SCCIWM has had detailed consultations with Sudanese technical experts from the Groundwater Department of the Ministry of Irrigation and Water Resources who are also closely involved in the UNDP/GEF/IAEA Nubian aquifer project(s) to the north. During the consultations, the importance was pressed for the need to enhance current available data on the Disa aquifer as water flows freely across the border underground and it is important to understand how, where and in which direction, including identifying areas of natural abundance and scarcity. Water availability is influenced by rainfall but also human and livestock use and it is equally important to understand the extent of interaction between surface and ground water. This is currently not fully understood and requires data acquisition which is key to conduct the required complex hydro-geological modelling of the Disa aquifer. The technology, knowhow and support for the infrastructure needed for the modelling and monitoring of the waterflows in the aquifer across both sides of the border is currently not available and requires external support and coordination through AF funding to materialise. The natural resources of the project area also need to be mapped out and a regional management plan agreed upon for a comprehensive understanding of the regional natural environment and a strategy to manage it sustainably in view of the current and future adverse impacts of climate change.

Additionality (with AF resources)

225. In component 4 AF funding will promote regional cooperation through the development of a regional platform. The platform will bring together a range of technical stakeholders to discuss project progress and agree on regional priorities and any action to be taken in terms of sustainable natural resource management and climate change adaptation. To develop the platform FAO will coordinate the two parties and arrange for biannual meetings in the respective countries, COVID – 19 travel restrictions permitting. The biannual meetings will be multifunctional in purpose proving opportunities for workshops, events, inviting international technical experts to exchange ideas either virtually or in person. The venues will offer opportunities for training and capacity building in key areas relevant to the project that will be identified through the development of a regional knowledge management strategy and assessment of institutional knowledge gaps in both countries. The training will include training workshops, formal

training, ad hoc trainings such as webinars, and exchanges with other transboundary water management institutions. The objective is for institutional capacity and building a framework for future cooperation.

226. The capacity building will help ensure that both sides are sufficiently trained to undertake the implementation of the development of the Natural Resource Monitoring System (NRMS). A key outcome of regional platform in the development of a digital platform or portal that will function as a database where the aquifer modelling and mapping and climatic reports will be centralised and readily available in real-time from the automatic groundwater monitoring stations and the Automatic Weather Stations (AWS). The surface water infrastructure in the project area will also be mapped and uploaded onto the portal. The aim is to be able to easily identify water wells and cross-reference this data with the aquifer modelling data identifying areas of potential drought. The portal will share the comprehensive analysis that will be conducted of the natural resources landscape in the project area and also the climate change research that will be conducted under the knowledge management outcome 1.2 widely, with a view for the sustainable management of limited natural resources. This information and the training programme will help towards policy development and the development of a Regional Natural Resource Management Plan.

227. The NRMS will form part of the piloted Early Warning System (EWS) and will enable the collection and centralisation of real-time ground and surface water monitoring as well as climate-risk data that will help in providing early drought warning. Through the regional platform, component 4 will support a sector-wide institutional and humanitarian response mechanism for drought response. Component 4 will provide a regional platform where the benefits of integrating EWS as part of an IWM approach can be shared amongst national and international stakeholders and partners. The EWS of the project will form an overarching response mechanism to mitigate risks associated with drought that will be fully integrated into the other components and form an integral part of the IWM approach of the project. Part of the function of the EWS will be to provide a centralised and easily accessible database in both countries documenting information on geography, hydrology, environment including climate, agriculture and technical and socio-economic dimensions. This information will play a central role in building the understanding of the potential climate risks as well as being a resource whereby it will be possible to better identify locations and the types of interventions that are most needed. These could include the identification of areas with most critical underground water exploitation levels and where vulnerable refugees and IDPs are located, also where a greater concentration of water augmentation infrastructure could be needed under component 2 to reduce the vulnerability to a drought event.

228. The function of the NRMS / EWS pilot will not be to only provide data for component 2, but it will also form an integral part of component 3. Through the FFS training and KM resource material in output 1.2.1, communities will be taught how to respond and to mitigate risks of drought through the development of climate-resilient agriculture techniques, drought-resistant crops and efficient on-farm technologies. These will be central to the integrated approach to build drought response mechanisms through advanced planning. Advanced knowledge of droughts by means of radio will enable communities to plan ahead of disasters. Response mechanisms can include, for example, early harvesting of crops or better community control of water usage rates during period of water scarcity. Such approaches and response mechanisms will be fully integrated into the training in component 2 and 3. Communities will be made aware of an early onset drought event through the use of radio programmes and news outlets. All the components aim to be mutually reinforcing and to develop a ‘virtuous circle’ cycle of development and climate-resilience.

K. Sustainability

Describe how the sustainability of the project outcomes has been taken into account when designing the project.

229. The sustainability of the project stems from the participatory approach promoted throughout all project activities, that allow local communities and authorities to build ownership of the project and help ensure lasting results. Long-term sustainability will be sought primarily by i) emphasising the active participation of communities in the implementation and management of project interventions; ii) strengthening the community-level technical capacity to ensure stakeholders have adequate knowledge and skills to maintain the benefits of the project interventions; iii) training communities extensively on climate- resilient agricultural techniques; and iv) the maintenance of water-efficient irrigation technology. It builds on the successes and lessons learned of the pilot projects implemented by FAO in Burkina Faso, Lebanon, Morocco and Uganda. These technologies have been demonstrated to reduce water consumption, reduce labour costs, increase production for more and better-quality agricultural produce. Crucially however, the FAO pilots have shown that there is great appetite among farmers to adopt modern water efficient agricultural technologies. This project will upscale efforts by FAO that have proven to be sustainable through a widely participatory and consultative approach that will welcome beneficiary inputs and ultimately ownership at the smallholder, extension worker, national and regional levels.

230. The project has integrated a number of sustainability measures that have been adopted from best practices resulting from the design consultations. Primarily, the project under output 1.1.1 has developed a comprehensive community engagement campaign through a series of six phases, including a preparatory and exploratory phase. The inclusion of the communities and its traditional leaders in local decision-making processes underlies the sustainability of the entire project and will help ensure the buy-in and commitment of the traditional chiefs and local communities not only for the future maintenance of the of the infrastructure but to build ownership and help bring about meaningful gender transformation. The outreach programme will also help build the sustainability surrounding the conflict resolution system that is based on best practices in the region. Through extensive community consultations and the setting up of local and grassroots conflict resolution and dialogue structures, communities will be given lasting skills in reducing inter-community tensions, including with nomadic herders passing through. Building on the aforementioned community consultations, the development of Water User Associations (WUA) within each community will be occured. Training and awareness raising is core to the sustainability of the surface water infrastructure through which the project will build the capacity of the WUAs and introduce a water tariff system as explained in output 2.2.2. The resulting revolving fund, which has been requested during community consultations, will be managed by the community members that rely on the hafirs and water yards. The activity is designed so that it is the WUAs that will be actively involved in the determination of the revenue collection systems to meet future maintenance expenses. The training in tariff structure will help ensure the future maintenance of the water infrastructure and that: (i) the tariff structure will be responsive to the low income and the poor segments of the communities, with high-volume consumers paying higher rates to subsidize low quantity consumers; and (ii) water users genuinely unable to pay, the community shall make considerations to cover the cost from the charges collected from the rest of the community members. On the other hand, the sub-surface dam (SSD) by its nature of being buried underground requires minimal maintenance which will be imparted by the constructor during construction hereby ensuring its sustainability.

231. The sustainability of the EWS that is being piloted in the SCCIWM project relies on the commitment that both countries have shown to take ownership of the pilot and the regional platform. The approach of modelling underground water resources and cooperating regionally between Chad and Sudan is not new and has already been piloted in the Nubian Aquifer project to the north. The Nubian project is currently being upscaled by GEF/UNDP to build on the lessons learned of the initial pilot and further develop a lasting institutional and governance framework that is specific to the four countries involved (Chad, Sudan, Egypt and Libya). The SCCIWM EWS pilot adopts some of the similar strategies for sustainability, namely in making it a requirement in output 4.1.2 for the two countries to develop future proposals for technical cooperation and to upscale the new regional platform and EWS initiative. The project will assist in the process by conducting research on project upscaling as detailed in output 4.1.2 with the aim to further developing the joint management of the Disa aquifer and EWS pilot including through the possibility of setting up a of binational entity for the joint management of the transnational resources and the implementation of the Regional Natural Resource Management Plan developed as part of output 4.1.4. Further support to upscale and consolidate the gains made by the SCCIWM project will be sought through tapping into international donor and climate finance as country resources are limited in both Chad and Sudan.

232. Project sustainability will be further strengthened through the training programmes that will be implemented for all components. The project area is one of environmental precariousness with significant stresses on limited water resources. The project will be environmentally sustainable as it will conduct detailed hydrological, geological studies and feasibility assessments and work to increase ground and surface water availability. A central tenet of the project will be to promote conjunctive and multiple water-use based on the principle of striking a water balance ensuring that the project will not extract more water than it is putting back underground or making available in surface storage. Estimates show that with the exception of the water yards, the estimated water consumption will be less than the capacity of the water harvesting infrastructure to store water. It is estimated that from the SSD there will be around 300,000 m^3 of water overflowing that will go to replenish the underground water table and aquifer, this is in addition to the estimated 340,000m^3 surplus of water after the estimated irrigation, livestock and sanitation needs have been taken into account. The water harvesting infrastructure will therefore be water net positive with around 640,000m^3 it is estimated that the 6 water yards with an average 4 hours a day of water extraction may consume around 475,000m^3 per annum. This means that the project would be environmentally sustainable as it would operate on the basis of an estimated net water surplus of around 164,000m^3 per year. Environmental sustainability will be further ensured through the climate-resilient agricultural training that will be provided to climate-proof 10,000 ha of rainfed agricultural land. The project will result in reduced water need of plants and a higher resilience to temperature increases and water deficits through shifting to high yielding, early maturing, drought tolerant and heat-resistant crop varieties; and the demonstration of techniques that reduce runoff by 12% and soil loss by erosion of 46%; enhancing the physical properties of soils and increase in soil moisture through conservation agriculture.

233. The Economic and Financial Assessment conducted by the project projects that the SCCIWM will be economically sustainable as households will see between 500 and 700% increase in income vis-à-vis the without project scenario. This will help the project be sustainable as communities continue to apply the lessons learned for improved livelihoods. In addition to the economic benefits the project will also produce nutrition and health benefits through improved food security but also provision of alternative Income Generating Activities (IGAs) to engage among other things in off-farm income-generating activities such as the production of moringa trees that will improve health through the beneficial properties of the trees but also help reduce hardship burdens on women while also generating a form of income and help in consolidating vulnerable and degraded land, increase soil fertility.

234. Long-term sustainability will be ensured through the regional approach that will build regional institutional capacity. The project will aim to level out and raise national institutional technical capacity with up-to-date approaches and technologies for transboundary sustainable natural resource management. The development of technical cooperative networks and the introduction of new water monitoring capacity and technologies will lay the foundations for a sustainable cooperative environment. This will be further strengthened by the development of a Regional Natural Resource Management Plan and the support provided by the SCCIWM project to prepare a viable plan for future regional upscaling.

L. Environmental and Social Impact Risks

Provide an overview of the environmental and social impacts and risks identified as being relevant to the project.

235. SCCIWM aims to address the most important adaptation measures that have been proposed by the the governments of Sudan and Chad in the national climate change adaptation and environmental management strategies. The ESP screening in annex 5 and summarised in this section, demonstrates that the project will have negligible to no potential socio-environmental risks. The investments to be undertaken by the project will promote climate resilience and take into consideration the vulnerability of the target areas in terms of climate- risks such as drought, increased water shortage, land degradation, and poverty.

236. The proposed investments and capacity development plan also aim to help marginalised climate vulnerable beneficiaries out of poverty through sustainable alternative sources of income by increasing awareness about environmental management and climate change. Smallholder farmers will be shown how to shift to sustainable climate adaptive techniques that will help adapt to concrete environmental and climatic risks, such as increased drought, reduced water availability, increased land degradation and overall reduced livelihoods. The project has been categorised a category ‘B’ project for the potential risks associated with the construction of large water infrastructure and the use of organic fertilisers, both of which have appropriate safeguards in place.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	X	As detailed in section II – F the project will be in compliance with relevant laws, degrees and acts in both countries. Through consultations the project will also comply with traditional laws and customs. The project will also help promote communal dialogue and conflict resolution between sedentary farmers and herders in particular, should this be required. It will also map of the drivers of conflict and conflict resolution ‘connectors’; the identify and train conflict resolution mediators, train community leaders and the creation and training of Conflict Resolution Committees (CRCs) in both countries.
Access and Equity	X	The project will not reduce or prevent communities in the targeted areas from accessing basic services. The project will take a number of transparent steps that will help ensure that the benefits of the project are being distributed fairly with no discrimination nor favouritism. Project ensures access and equity through a comprehensive and inclusive outreach programme in output 1.1.1. The project will also advertise broadly through the mass media (radio, social media, town hall and village meetings, workshops etc.) for the implementation of an outreach/mobilisation strategy.
Marginalized and Vulnerable Groups	X	Marginalized and vulnerable groups including internally displaced people and refugees, women and youth have been extensively consulted during the proposal development process to ensure that their identified threats, priorities and mitigation measures are reflected. This project will empower vulnerable groups to make decisions on concrete adaptation actions, valuing their traditional and local knowledge. The project will target the most vulnerable groups by targeting 60% women, 25% youth, and 30% refugees, IDPs and returnees. This project will encourage women, and youth to choose

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		adaptation activities in a transparent and participatory manner. Additionally, this project will respect land, property and customary rights.
Human Rights	X	The Most recent Office of the High Commissioner on Human rights (OHCHR) Special Procedures Report for Darfur (2018) highlights a number of human rights concerns namely: • Sexual and gender-based violence and conflict-related sexual violence. To address this risk the project has integrated gender-based violence (GBV) awareness into all project training activities. • The situation of internally displaced persons lacking adequate food, safe drinking water and adequate health care. The project addresses this concern by directly targeting vulnerable IDP camps with quotas of 30% participation for project activities that will help alleviate the absence of access to food, water and sanitation. The OHCHR most recent Special procedures report for Chad highlighted a number of issues that the project will try to address, namely: • Violence Against Women and concerns relating to the prevalence of violence against women and girls as a problem deeply rooted in the country's patriarchal and traditionalist society. Particularly women refugees are found to be vulnerable to GBV. The project has mainstreamed training on GBV into all project training activities. • Women victims of multiple forms of discrimination. The report recommends that the development of long-term strategies for the empowerment of rural women needs to be a priority. The project will promote gender equality and include women quotas of 60% and promote women participation in rural decision-making bodies.
Gender Equity and Women's Empowerment	X	The extensive consultations have ensured that gender considerations are integrated into each activity. The project targeting strategy has a gender quota of 60% and will promote women leadership in public spaces and decision-making power for climate change adaptation and food security and nutrition. The project also has a dedicated outcome 3.2 that focuses on enhancing their skills, providing them with income generating activities which is inter alia key for women in the camps as reported by WFP. Women through the support for moringa plantations in output 3.2.2 will also have support in reducing their burden for access to firewood but also to a nutritious plant that has key health benefits. The project will also enable women and men to have equal voice and influence in community-based organisations; challenge social norms that perpetuate inequalities between men and women; promote women empowerment through access and control of productive assets and the home; Strengthen and ensure the representation and participation of women in local decision-making bodies, the contribution of women to decision-making within the household or the community alongside that of men will be promoted; Raise awareness through training for women, men, communities and leaders on gender-based violence; and literacy classes promoted aimed at helping to counteract discriminatory factors against women and unequal power relations.
Core Labour Rights	X	Sudan and Chad have been members of ILO since 1956 and 1960 respectively. Sudan has ratified 7 fundamental conventions on forced labour; the right to organise and collective bargaining; equal renumeration; abolition of forced labour; discrimination; minimum age; and child labour. The 2020 Report of the Committee of Experts to the 180th International Labour Conference, on the Application of Convention and Recommendations (CEACR) reports concerns vis-à-vis Sudan on forced labour. In response to this risk, the project will at all times ensure workers rights are respected at all times and upheld to international standards. Chad has ratified 8 fundamental conventions on forced labour; the right to organise and collective bargaining; equal renumeration; abolition of forced labour; freedom of association; discrimination; minimum age; and child labour. One of the main concerns of the CEACR for Chad was that of forced child labour. The project will ensure that at all times international labour standards will be applied at all times.
Indigenous Peoples	X	For the design of the project, significant and extensive consultations at community level took place over a year involving community organizations, Ministries officers, and different stakeholders. During the community consultations the project design team did not identify Indigenous Peoples in the project area. The project will however endeavour, should Indigenous Peoples be identified during the implementation, to apply the Free, Prior and Informed Consent (FPIC) as per the FAO Manual and to ensure alignment with UNDRIP and the FAO Policy on Indigenous Peoples and to include Indigenous Peoples in project activities under the do-no-harm and inclusivity principles.
Involuntary Resettlement	X	The project will not engage in involuntary resettlement. All consultations will be based on the Free, Prior and Informed Consent (FPIC) Principle. Should a situation of resettlement or economic displacement arise during the implementation of the project that was not anticipated during design, the

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		implementers and FAO will ensure that a consultation and negotiation process is undertaken with the potentially affected people, according to the FPIC and do-no-harm principles. In case no agreement is reached, the project implementers will modify the specific interventions associated with the affected people, or halt them if changes are not possible. In the case where project implementers fail to undertake a consultation and negotiation process with the affected people, according to the FPIC and do-no-harm principles, the conditions and terms of the agreement could be considered to be breached and suspended, following FAO normal procedures for suspension.
Protection of Natural Habitats	X	The project is not expected to have any negative impact on critical natural habitats including those that are (a) legally protected; (b) officially proposed for protection; (c) recognised by authoritative sources for their high conservation value, including as critical habitat; or (d) recognised as protected by traditional or indigenous local communities. Based on design consultations the project area (West Darfur and Assongha) does not contain natural habitats that are legally protected; officially proposed for protection; recognized by authoritative sources for their high conservation value, including as critical habitat; or recognized as protected by local communities.
Conservation of Biological Diversity	X	The project area has not been found to contain UNESCO biosphere reserves or RAMSAR sites applicable to this ESP. The project will also not be introducing invasive species, the only species will be indigenous to the project area and the project area also does not contain any species red listed by the International Union for Conservation of Nature (IUCN).
Climate Change	X	The project will not have any negative impact on climate change. The project does not promote any drivers of climate change (energy, transport, heavy industry, building materials, large-scale agriculture, large-scale forest products, and waste management), it will therefore not contribute to climate change as it is based on the premise of assisting smallholders to adapt in a climate neutral fashion.
Pollution Prevention and Resource Efficiency	X	The project will not pose any significant risks to resource efficiency or pollution for water, land or fertiliser use and no further assessments will be required. The project will bring environmental benefits in integrated water management (IWM) and climate change adaptation and generally improved access to water and reduced inefficiencies in water management. The project will also map surface and underground water availability with the aim to create hydrological modelling and develop management plans. The SCCIWM will develop a natural resource monitoring network and a regional Natural Resource Management Plan that will aim to help increase resource efficiency.
Public Health	X	With a focus on improved access to conjunctive and multiple water use including a concerted effort to supply handwashing infrastructure and a programme to eradicate open defecation in the project area, the project will have direct positive impacts on health and indirectly through improved livelihoods and nutrition. It is expected that the project will also improve health situations in relation to COVID-19 through improved hygiene and awareness raising.
Physical and Cultural Heritage	X	There is no risk that the project will impose adverse impacts on the physical and cultural heritage. Sudan ratified the Convention Concerning the Protection of World Cultural and Natural Heritage in 1974 and Chad in 1999 and extensive consultations have shown there to be no national cultural heritage sites in the project area, the project area also does not contain UNESCO World Heritage Sites.
Lands and Soil Conservation	X	The project will not have negative impacts on lands and soil conservation. The project has been designed in a fashion that reduces any risk posed by it to the environment, it is also not expected to pose any risks to lands as well as promote land, soil and water conservation.

PART III: PROJECT IMPLEMENTATION ARRANGEMENTS

A. Arrangements for project implementation

Describe the arrangements for project / programme management at the regional and national level, including coordination arrangements within countries and among them. Describe how the potential to partner with national institutions, and when possible, national implementing entities (NIEs), has been considered, and included in the management arrangements.

237. The SCCIWM project will be executed by the Higher Council for Environment and Natural Resources (HCENR) in Sudan and the and the Ministry of Environment Water and Fisheries (MoEWF) in Chad through two Project Management Units (PMUs) embedded in the respective ministries as per the organigram in annex 4. The project will be coordinated at the national level through two national coordinators located in both ministries. The PMUs will coordinate the implementing partners with a specific focus on financial management and procurement, climate change adaptation, activities related to gender and youth, communication and knowledge management. The PMUs will recruit additional specialists as needed, who will be responsible for the day-to-day management and implementation of project activities, covering overall management / supervision, fiduciary management and monitoring and evaluation. Coordination support will be provided by the FAO country offices in Sudan and Chad and additional technical support will be provided by the FAO Regional Offices and FAO Headquarters in Rome as required. With the agreement of the HCENR and MoEWF, FAO will be executing output 4.1.1, hosting and coordinating the regional platform and related activities. The project will also have an FAO binational project manager coordinating the two PMUs and ensuring the successful execution of component 4. He / she will report and be accountable to the Binational Steering Committee (BSC) and be located either in El Geneina, the regional capital of West Darfur or in Abece, the closest large urban centre in the larger Ouaddaï region.

238. **Binational Steering Committee (BSC).** Overall project management will be coordinated through the BSC comprising, the HCENR, MoEWF, FAO and any other invited executing entities as required. The BSC will: (i) monitor the project objectives and the quality of interventions, (ii) the integration of the programs and strategies of the various sectors in the region, (iii) the monitoring of institutional measures and setting of implementation deadlines; (iv) assuring the adequacy of resources with the planned tasks; (v) analyse and approve the annual project activity report and review the Annual Work Plan and Budget ("AWPB"); vi) follow-up with national authorities to ensure that technical standards are maintained, review monitoring reports and ensuring alignment with the Environmental and Social Policy of the AF. Overall project management, financial monitoring and reporting to the AF will be coordinated by FAO, the Multilateral Implementing Entity (MIE). FAO will provide technical, fiduciary and managerial support throughout all stages of project implementation.

239. **National Coordinating Committees (NCC).** Each country will have its own NCC chaired by the respective principal Executing Entity, the identified implementing partners and the binational project manager, the national coordinators and FAO Country Offices. The NCCs will meet twice a year and be changed by the Executing Entity, it will comprise the respective PMUs state-level technical staff of the implementing ministries and other Service Providers. The main tasks of the NCC will be to (i) coordinate the planning and intervention approach of the project; (ii) develop synergies with other similar projects and programs and to avoid any duplication; (iii) the identification and implementation of communication strategies, (iv) piloting and validation of the training program, (v) exchange and sharing of experiences and dissemination of good practices; (vi) identification of partnership opportunities between organisations and women's organisations in the region and internationally; vii) the negotiation / validation of technical proposals; (vii) review and adoption of the AWPB; viii) periodic monitoring of the achievements of project activities and the implementation of partnership agreements with other regional services; and ix) the integration of the various interventions to increase efficiency and reduce intervention and supervision costs.

240. **Local Coordination Committees (LCC).** The LCC will be established at each cluster or groups of clusters in the project area that will form one of the targeting strategies of the project. It will be chaired by the Execution Entity delegate comprising technical staff, extension units / facilitators, identified community representatives and community leaders, conflict resolution mediators, local women groups and NGOs representatives, presidents of administrative councils, representatives of the PMU. To ensure sustainability, particularly with regards to the basic infrastructure, the municipalities and customary authorities will be part of the LCCs and will be involved in the process of planning and monitoring implementation. The LCCs will meet at least once a quarter and will to ensure: (i) coordination of field missions and contribute to the selection of local beneficiaries; (ii) support the community-

based organisations; (iii) the identification and resolution of technical and socio-economic problems encountered during project implementation; and (iv) support for the establishment of income- generating activities (IGAs), moringa plantations, FFS and their supervision along the production process.

241. **Binational Project Manager (BPM).** The BPM will coordinate with the two national project coordinators (NPC) and will be responsible for overseeing binational implementation, management, administration and technical supervision of the project. The BPM will report directly to the BSC and will have the technical backup support from the respective FAO Country Offices and HQ as required. S/he will be responsible, among others, for: working with the two NPCs to ensure coordination of project activities, the timely identification of project risks and the identification of appropriate mitigation measures; high-level coordination with the BSC to facilitate the successful implementation of project activities and resolving bottlenecks and project delays; ensuring the timely reporting and financial management; the coordination and close monitoring of the implementation of project activities at the binational, national and local levels; tracking the project's progress and ensuring timely delivery of inputs and outputs; ensuring and reviewing the quarterly progress reports identifying challenges and following with the NPCs; ensuring timely preparation and submission of requests for funds, financial and progress reports and completing the binational annual AF Project Performance Report (PPR).

242. **National Project Coordinators (NPC).** The NPCs will report to the BPM and will oversee daily implementation, management, administration and technical supervision of the project within the framework delineated by the BSC. S/he will be responsible, among others, for: The coordination with relevant initiatives; ensuring a high level collaboration among participating institutions and organisations at the national and local levels; ensure compliance with all operational provisions during implementation, including the timely reporting and financial management; coordination and close monitoring of the implementation of project activities at the national and local level; tracking the project's progress and ensuring timely delivery of inputs and outputs; providing technical support and assessing the outputs of the project PMU consultants (monitoring and evaluation, knowledge management and administrative and financial managers) hired with AF funds, as well as the products generated in the implementation of the project; ensuring timely preparation and submission of requests for funds, financial and progress reports; submitting quarterly progress reports and drafting the annual AF Project Performance Report (PPR) for the respective countries.

B. Project Risks

Describe the measures for financial and project / programme risk management.

243. Financial and project risk management measures will be assessed throughout project design and implementation with regular technical supervision missions by FAO. Potential risks related to project implementation and response measures are described in the table below. The overall risk rating for this project is low, the Binational Project Manager will monitor risks quarterly and report on the status of risks to the Binational Steering Committee (BSC) that will be responsible for managing these risks as well as the effective implementation of mitigation measures. The Monitoring and Evaluation (M&E) system will serve to monitor outcome and output indicators, risks to the project and mitigation measures. The BSC will also be responsible for monitoring the effectiveness of mitigation measures and adjusting mitigation strategies accordingly, as well as identifying and managing any new risks that have not been identified during Project preparation, in collaboration with project partners.

244. The quarterly project reports and the annual AF Project Performance Reports (PPRs) are the main tools for risk monitoring and management. The PPR includes a section covering the systematic monitoring of risks and mitigation actions that were identified in the previous PPRs. The PPRs also include a section for the identification of possible new risks or risks that still need to be addressed, risk rating and mitigation actions, as well as those responsible for monitoring such actions and estimated timeframes. FAO will closely monitor project risk management and will support National Executing Entities in the adjustment and implementation of mitigation strategies where necessary.

Table 10. Financial and Project Risks and Response Measures

Risk	Category	Response Measure	Final Risk Assessment
The Governments of Chad and Sudan do not maintain the momentum and support required to accomplish project	Medium	The project relies upon the Governments of Chad and Sudan to take action and decisions within a set period of time in a coordinated fashion. The project responds to this risk by providing firm timeframes for the completion of activities and has a Binational Project Manager (BPM) that will identify potential bottlenecks and delays in advance and put in place timely	Low

Risk	Category	Response Measure	Final Risk Assessment
interventions within the time-frame.		mitigation strategies to ensure streamlined implementation. The BPM will be supported by the respective FAO Country Offices and FAO HQ to help ensure that any obstacles to execution as promptly addressed and resolved. The project will also have a Binational Steering Committee and the Regional Platform that will be opportunities to ensure both countries are on track for implementation and to find appropriate solutions to bottlenecks.	
The project is not able to catalyse coordination and cooperative approaches between divergent Government Agencies.	Medium	The main Execution Entities in the project are the Higher Council for Environment and Natural Resources in Sudan, and the Ministry of Environment Water and Fisheries in Chad. Both have experience in project execution and will benefit from FAO technical support at Country Office and HQ accordingly where needed.	Low
Social conflict may arise as a result of project activities	Medium	The project has an extensive programme to reduce the likelihood and impact of conflict that has been design based on consultations and best practices and will benefit from the mapping of drivers of conflict in output 1.1.1. Improving access to water and agriculture have been surveyed by UNDP to be some of the main methods of reducing the likelihood of conflict. The project will also train conflict mediators and have a conflict mitigation committee that will focus on addressing any conflict issues that related to project activities.	Low
Low interest in adopting Latrines	Low	The project will adopt an organic approach through the Community-Led Total Sanitation (CLTS) methodology to engage with the local communities in a participatory approach that will help ensure ownership and uptake of latrine use. The objective is to eradicate open defecation in the project area	Low
Local government office extension agents become unsupportive and/or unwilling to remain engaged in project activities	Low	The project will invest in local level awareness-raising, capacity strengthening and leadership mobilization for state-level officials to ensure adequate understanding of project objectives. Activities will emphasize exploiting synergies with ongoing extension services and promoting state/federal coordination on adaptation.	Low
Covid-19 adversely impacts the ability to implement project actions in a timely manner.	Medium	While the risk is beyond the control of the project, every effort will be made to reduce the risk of covid-19 infection by way of this project. The project has a focus on raising awareness about Covid-19 and improving access to hand sanitation facilities that will help combat covid-19 infection. As part of the project all project beneficiaries will be taught the most up to date health and safely requirements to limit the risk of contagion.	Medium

C. Environmental and Social Risk Management

Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

245. Based on the ESP risk screening exercise (annex 5) and in line with the Environmental and Social Policy of the Fund the overall risk ranking for this project is Category B. The screening for risks for the 15 environmental and social principles of the Fund have been summarised in section II-L. The project has been designed to reduce the chance of any ESP risk vis-à-vis the 15 principles as project implementation procedures are designed to avert any such risks, and are consistent with the environmental and social policy of the fund. Under component 1 and 3 the risks are low and will not require any further environmental screening or assessment. Component 3 activities in building water infrastructure, may present the project with some minor risks associated with environmental impacts of the constructing large infrastructure. The project has a detailed process of screening that is detailed in section II – F of this proposal and will help ensure that the appropriate hydrological, geological assessments are being conducted prior to the commencement of construction. The project will at all times be in compliance with national environmental regulations which will be ensured by the project executing entities who are those responsible for the

conducting and reviewing of Environmental Impact assessments that will be screened for and conducted as required. The project will additionally require that the EIAs be conducted and approved prior to implementation.

246. **Grievance and Redress.** The project will also comply with FAO Grievance and Redress Mechanism[108] at all times that will help ensure that any issues arising from project implementation will be addressed appropriately. Any person, group, or representative of a person or group, who is potentially directly affected by a FAO programme, is permitted to file a complaint. Complaints are received in person, and by mail, email, telephone and facsimile. FAO is committed to ensuring that its programmes are implemented in accordance with the Organization's environmental and social standards. In order to better achieve these goals, and to ensure that beneficiaries of FAO programmes have access to an effective and timely mechanism to address their concerns about non-compliance with these obligations, the Organization, in order to supplement measures for receiving, reviewing and acting as appropriate on these concerns at the programme management level, has entrusted the Office of the Inspector-General with the mandate to independently review the complaints that cannot be resolved at that level. The FAO grievance and redress procedures are presented in annex 5.

D. Monitoring and Evaluation Arrangements

Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

247. **Project Monitoring and Evaluation (M&E)** will be under the oversight of the PMUs and the Project Manager, and led by the M&E officers who will work closely with the implementing partners. The M&E system should: (i) Collect gender- disaggregated data in meeting the gender targets in compliance with the AF Gender Policy; collect data on the AF indicators as described in section III-E; produce, organise and disseminate the information needed for the strategic management of the project, (ii) document the results and lessons learned for internal use and for public dissemination on the achievements and (iii) respond to the information needs of Adaptation Fund, FAO and the Governments on the activities, immediate outcomes and impact of the Project. A project Implementation Manual (PIM) including monitoring and evaluation will describe a simple and effective system for collecting, processing, analysing and disseminating data will be prepared in the first six months.

248. A computerized and geo-referenced database will be developed that will enable the generation of a M&E system will be regularly fed from data collected in the field by the implementing partners and the various studies carried out as part of the projects' implementation. Trainings will be organised to strengthen the capacities of the various stakeholders involved in the monitoring and evaluation system.

249. Day to day monitoring of implementation progress will be the responsibility of the project teams, based on the project's Annual Work Plan and its indicators. During the first months of the project, the project teams will complete and fine-tune baseline data for each indicator and will define and fine-tune performance. Specific targets for the first year of implementation, progress indicators, and their means of verification will be developed at the Inception Workshop (below).

250. **Project Inception Workshop.** Two national and one regional inception workshops will be conducted within two months of the project start up with the full project team, relevant government counterparts and FAO. The inception workshop is crucial to building ownership for the project results and to plan the first-year annual work plan. A fundamental objective of the inception workshop will be to present the modalities of project implementation and execution of AF-only activities, and assist the project team to understand and take ownership of the project's goals and objectives.

251. **A project inception workshop report** will be prepared immediately following the inception workshops and submitted to the Adaptation Fund. It will include: (i) a detailed First Year/Annual Work Plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project; (ii) the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan; (iii) a detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners; (iv) a section on progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation.

252. **Baseline study.** A baseline study will be conducted that will collect data and serve as the basis for the assessment of how efficiently the project been implemented and whether results have been achieved. The baseline will include the target group and a control group which will be essential to determine the attribution of results to programme activities.

[108] https://www.fao.org/3/i4439e/i4439e.pdf

253. **Quarterly Progress Reports** will also be prepared by project implementing partners in the field, and submitted to the PMUs to ensure continuous monitoring of project activities and identify challenges to adopt necessary corrective measures in due time.

254. **Annual Project Report (APR).** The project team will prepare an APR to reflect progress achieved in meeting the project's Annual Work Plan and assess performance of the project in contributing to intended outcomes through outputs and partnership work. The format of the APR will include the following issues: (i) an analysis of project performance over the reporting period, including outputs produced and, where possible, information on the status of the outcome; (ii) the constraints experienced in the progress towards results and the reasons for these; (iii) the three (at most) major constraints to achievement of results; (iv) Annual Work Plan (AWP) and other expenditure reports; (v) lessons learned; (vi) clear recommendations for future orientation in addressing key problems in lack of progress.

255. **Project Performance Report (PPR).** In accordance with the Environmental and Social Policy, Monitoring and Evaluation of projects, the PPR shall address all environmental and social risks identified during project assessment, design, and implementation and report on sex-disaggregated targets presented in the results framework and AF indicators presented in section III-F. The annual PPR shall include a section on the status of implementation of the environmental and social management plan, including those measures required to avoid, minimise, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary. The PPR includes among others, information related to financial data, procurement, risk assessment, rating, project indicators, lessons learned. In addition, it includes the results tracker that needs to be filled. This will be done i) at inception where baseline-related information will be submitted, as well as planned targets at project/programme completion; ii) at mid-term; and iii) project/programme completion when the final PPR will serve as a project completion report.

256. **Supervision** will be by FAO (under its direct supervision framework and guidelines), with a supervision mission mobilized at least once per year. Additional implementation support from FAO on specific identified issues will be mobilized if considered necessary by FAO or recommended by the supervision mission. The composition of the supervision missions would be based on an annual supervision plan. The supervision plan would highlight, in addition to the routine supervision tasks (fiduciary, compliance and programme implementation), the main thematic or performance areas that require strengthening and would imply deployment of additional inputs for capacity building, in-depth analytical studies or review of existing policies.

257. **Mid-term Review (MTR).** The MTR will assess operational aspects such as programme management and implementation of activities as well as the extent to which the objectives are being fulfilled and corrective actions needed for the programme to achieve impact. Depending on the achievements the programme and the resources available, the possibility of scaling up the activities to other regions will also be considered in consultation with the government. In compliance with the ESP and Gender Policies, the mid-term and terminal evaluation reports shall also include an evaluation of the project performance with respect to environmental and social risks.

258. **A Terminal Evaluation** will be conducted three months before project closure which will include the programme completion survey. The Terminal Evaluation will follow the AF guidelines[109]

259. The proposed Budgeted Monitoring and Evaluation Plan is presented in the table below.

Table 11. FAO M&E budget

M&E Activity	Responsibility	Timeframe	Budget USD	Source
3 Inception workshops	Project Manager and FAO	Within first three months of after project approval	33,000	Outputs 1.2.2 and 4.1.1
Mid-Term Review	External Evaluator, Technical consultants, and Binational Coordinator	At mid-point of project cycle	20,000	FAO IE Fee
Final External Evaluation	External Evaluator, Technical consultants, and Binational Coordinator	End of project cycle	30,000	FAO IE Fee

[109] https://www.adaptation-fund.org/wp-content/uploads/2015/01/Guidelines%20for%20Proj_Prog%20Final%20Evaluations%20final%20compressed.pdf

M&E Activity	Responsibility	Timeframe	Budget USD	Source
Annual Project Report (APR)	Binational coordinator/ national coordinators/ monitoring assistants	Annual	40,000	PEC
Project Performance Reports (PPR)	Binational coordinator/ national coordinators/ monitoring assistants	Annual	40,000	PEC
Project Monitoring	Binational coordinator/ national coordinator/ monitoring assistants	Four times a year	30,000	PEC

E. Results Framework

Include a results framework for the project / programme proposal, including milestones, targets and indicators.

Project Strategy	Project Objective Indicators	Baseline	Target	Means of verification	Assumptions
Component 1 Outreach, Capacity Building, Conflict Resolution and Knowledge Management					
Outcome 1.1 Community-based organisations empowered on adaptive management of natural resources, with a focus on climate-smart water and soil conservation.					
Output 1.1.1 Community mobilisation and peacebuilding	Community outreach is conducted, and capacity built		Outreach programme implemented	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and Terminal Evaluation Report (TER) • Attendance lists	Good participation and involvement of local communities.
Outcome 1.2 Knowledge is generated and disseminated					
Output 1.2.1 Knowledge generation and dissemination programme implemented	Knowledge products produced and disseminated		Farmer success stories collected; knowledge produced synthesised into knowledge products; video clips, radio programmes, posters, leaflets produced and distributed.	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER	Good participation and involvement of local communities.
Output 1.2.2 Inception workshops conducted	No. of inception workshops are conducted		2 national and 1 regional inception workshops are conducted	• Inception workshop report	Good participation and involvement of local communities.
Output 1.2.3 Baseline assessment.	Baseline conducted		Baseline assessments for the project area are conducted	• Baseline assessment • Progress reports • Supervision mission reports	Good local security and not rainy season that would impede movement.
Output 1.2.4 Development of guidelines	Guidelines developed on climate-resilient agricultural practices based on lessons learned and best practices		Guidelines developed and published on project and FAO website.	• Guidelines • Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports	Project has produced relevant best practices to develop into guidelines
Output 1.2.5 Project Implementation Manual (PIM) and Technical Feasibility Report	Project Implementation Manual and pre-feasibility assessment conducted		2 project-wide PIM and Prefeasibility Studies are conducted	• PIM and feasibility studies • Progress reports • Supervision mission reports	Good technical capacity of consultant(s) to develop PIM and TFR

Project Strategy	Project Objective Indicators	Baseline	Target	Means of verification	Assumptions
Output 1.2.6 Mapping of drivers of conflict.	No. of studies on drivers of conflict in the project area are undertaken		2 studies mapping the local drivers of conflict and historical connectors are conducted	• Reports on mapping of drivers of conflict • Progress reports • Supervision mission reports	Good participation and involvement of local communities.
Output 1.2.7 Improved climate risk understanding of project area through comprehensive research	A comprehensive climate change research is conducted including on stocktaking and future projections on risks to water, ecosystem vulnerability, food security, nutrition and sanitation		A project area-wide climate change research is conducted.	• Climate risk assessment output • Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER	Access to sufficient baseline information to conduct assessment and contracting of qualified consulting entity.
Component 2: Investment in Natural Resource Management and Climate Resilient Community Infrastructure					
Outcome 2.1 Enhanced adaptive capacity through water resource assessment and monitoring to increase food security and agriculture preparedness					
Output 2.1.1 Mapping of surface and ground water	Disa Sandstone aquifer mapped within project area		A comprehensive 3-D mapping of the Disa sandstone aquifer is conducted within the project area	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER	Good participation and involvement of local communities.
Output 2.1.2 Ground water monitoring	No. of automatic ground water monitoring stations installed subject to feasibility assessments		20 automatic ground water monitoring stations are installed and operational, providing regular data to the Regional Natural Resource Monitoring System (output 4.1.3)		Good participation and involvement of local communities.
Output 2.1.3 Climate Data Gathering	No. of Automatic Weather Stations (AWS) are installed		2 AWS are installed and operational, providing regular climatic data to the Regional Natural Resource Monitoring System (output 4.1.3)		Good participation and involvement of local communities.
Outcome 2.2 Climate-resilient water infrastructure implemented					
Output 2.2.1 Infrastructure surveys and EIAs	No. of Surveys and EIAs conducted		62 Survey Topographic hydrological and hydrogeological assessments as well as 62 EIAs conducted for water infrastructure.	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER	Good participation and involvement of local communities.
Output 2.2.2 An integrated ToF training programme is designed	Facilitator training programe designed and implemented		1 training programme designed and ToF implemented	• Project M&E reports • Progress reports	Good participation and involvement of local communities.

Project Strategy	Project Objective Indicators	Baseline	Target	Means of verification	Assumptions
and implemented to train on maintenance of climate-resilient water infrastructure.	No. of Water User Associations trained		62 WUAs are trained	• Supervision mission reports • AF PPR reports • MTR and TER • Training programme • List of attendants	
Output 2.2.3 Design and installation of water harvesting and multiple water use infrastructure	No. of Sub-surface dams (SSD) constructed		39 SSDs constructed	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER	Good participation and involvement of local communities.
	No. of solar powered concrete wells constructed		160 improved shallow water wells constructed.		
	No. of hafirs constructed		9 hafirs constructed		
Output 2.2.4 Design and construction of water yards	No. of water yards designed and constructed.		12 water yards constructed		
Outcome 2.3 Communities receiving the Multiple Water Use (MWU) Sanitation Services					
Output 2.3.1 Implementation of CLTS programme	CLTS programme designed and implemented		2 CLTS programmes designed and implemented in Chad and Sudan	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER • Training programme • List of attendants	Good participation and involvement of local communities.
Output 2.3.2 Installation of handwashing stations	No. of WUAs to receive hand washing stations		62 WUAs to receive handwashing stations and hygiene / Covid training.		
Component 3: Improving food security through climate-resilient agricultural practices and technologies					
Outcome 3.1 Livelihood activities made climate resilient through application of climate-resilient agricultural practices					
Output 3.1.1. A rainfed and irrigation agriculture training programme is designed and implemented	No. of training programmes implemented		2 training programmes implemented per country, 1 for supervisors and coordinators and 1 for the training of facilitators.	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER • Training programme • List of attendants	Covid does not restrict international travel
Output 3.1.2 Implementation of the Rainfed Farmer Field Schools	No. of Rainfed FFS implemented		200 FFS per country implemented in 2 year cycles (total 400)	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER • Training programme List of attendants	Good participation and involvement of local communities.
	No. of beneficiaries trained		20,000 smallholder rainfed farmers (10,000 per country, in total 12,000 women and 5,000 youth) to receive climate-resilient training		

Project Strategy	Project Objective Indicators	Baseline	Target	Means of verification	Assumptions
Output 3.1.3 High efficiency irrigation pilot implemented.	No. of high-efficiency irrigation pilot FFS implemented		16 pilot FFS implemented	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER • Training programme • List of attendants	Good participation and involvement of local communities.
	No. of farmers to receive training		200 smallholder farmers per country (total 400 of which 240 women and 100 youth) to receive training		
Output 3.1.4 Irrigation FFS implemented	No. of irrigation FFS implemented		52 2-year FFS training programmes implemented (25 in Sudan and 27 in Chad)		
	No. of farmers to receive training		625 in Sudan and 675 smallholders in Chad (in total 1,300 of which 780 women and 325 youth) to receive training		
Output 3.1.5 Seed multipliers established and operational	No. of smallholder farmers established as seed producers / multipliers		140 smallholder seed producers established per country (280 in total, 168 women and 70 youth)		
Outcome 3.2 Climate-resilient alternative income generating livelihoods implemented					
Output 3.2.1 Alternative Income Generating Activities (IGA)	No. of women receiving IGAs		600 women per country (1,200 in total, 300 youth) to have set up and made IGAs operational	• Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER • Training programme • List of attendants	Good participation and involvement of local communities.
Output 3.2.2 Communal women group moringa plantation pilots implemented	Ha of moringa plantations developed		50 ha of moringa plantations are set up and operational		
Component 4 Enhancing regional cooperation on water resource development-based food security, climate change adaptation and natural resource management					
Outcome 4.1 Regional adaptive capacity for food security through regional cooperation increased					
Output 4.1.1 Establishing regional platform	Development of binational NRM platform		Framework for development and upscaling of regional platform finalised and agreed.	• Regional Platform created • Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER • List of attendants	Covid permits international travel
Output 4.1.2 Strengthening capacity of national organisations	Capacity strengthening programme implemented		Regional training needs assessment conducted, and joint training programme implemented	• Project M&E reports • Progress reports	National political and international Covid conditions enable joint training

Project Strategy	Project Objective Indicators	Baseline	Target	Means of verification	Assumptions
				• Supervision mission reports • AF PPR reports • MTR and TER • Training programme • List of attendants	
Output 4.1.3 Regional tool developed and implemented for the identification and monitoring of water availability supporting decision making in drought planning and early response.	A regional NRMS system is implemented and operational		A regional digital integrated NRM monitoring system is implemented and fully operational providing quarterly reports.	• NRMS system developed • Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • MTR and TER • Evaluation Report	Good technical capacity and technological take-up of both parties and willingness to work together and share information.
Output 4.1.4 Joint Regional Natural Resource Management Plan developed	A RNRMP is developed and approved		A RNRMP is approved for the sustainable management strategies for the shared resources in the project area.	• RNRMP developed • Project M&E reports • Progress reports • Supervision mission reports • AF PPR reports • TER	Willingness of both countries to cooperate and share information.

F. Alignment with the Adaptation Fund Results Framework

Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Project Outcome(s)[110]	Project Outcome Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Outcome 2.2 Improved water supply augmentation and integrated water resource management through conjunctive and multiple water use	Number of climate-resilient water harvesting infrastructure constructed	**Outcome 4:** Increased adaptive capacity within relevant development sector services and infrastructure assets	**4.2.** Physical infrastructure improved to withstand climate change and variability-induced stress	**5,386,300**
Outcome 3.1 Livelihood activities made climate resilient through application of climate-resilient agricultural practices	Hectares of agricultural land made climate-resilient	**Outcome 5:** Increased ecosystem resilience in response to climate change and variability- induced stress	**5.** Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	**3,400,600**

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

Project Outcome(s)[110]	Project Outcome Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Outcome 3.2 Climate-resilient alternative income generating livelihoods implemented	Number of people with climate-resilient livelihoods	**Outcome 6:** Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	**6.2** Percentage of targeted population with sustained climate-resilient alternative livelihoods	**828,360**
Project outputs(s)	**Project output Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Output 2.2.3 Design and installation of water harvesting and multiple water use infrastructure	• No. of Sub-surface dams (SSD) constructed • No. of solar powered concrete wells constructed • No. of hafirs constructed	**Output 4:** Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	**4.1.2.** No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	**4,152,300**
Output 3.1.2 Rainfed FFS implemented **Output 3.1.3** High efficiency irrigation pilot implemented **Output 3.1.4** Irrigation FFS implemented	Hectares of agricultural land made climate-resilient	**Output 5:** Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	**5.1.** No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	**2,971,440**
Output 3.2.1 Alternative Income Generating Activities (IGA) **Output 3.2.2** Communal Woodlots Implemented	Number of people with climate-resilient livelihoods	**Output 6:** Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	**6.2.1.** Type of income sources for households generated under climate change scenario	**828,360**

Type of Core AF indicator	Target
Number of Beneficiaries	The project will directly target 22,900 beneficiaries and 137,400 indirect beneficiaries (average of 6 members to a household): • 20,000 (12,000 female and 8,000 male, 5,000 youth) direct beneficiaries through rainfed agriculture. • 1,300 farmers (780 women and 325 youth) beneficiaries of irrigation FFS. • 400 beneficiaries (240 women and 100 youth) to receive high efficiency irrigation. • 1,200 women of which 300 youth to receive IGAs.
Assets Produced, Developed, Improved, or Strengthened	The project will produce physical infrastructure that will increase resilience and adapt to climate change. These include: • 20 automatic ground water monitoring stations • The installation of 2 Automatic Weather Stations • 39 Subsurface Dams • 160 improved shallow wells • 9 hafirs • 12 Water Yards

G. Project budget

Include a detailed budget with budget notes, broken down by country as applicable, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
Component 1 Outreach, Capacity Building, Conflict Resolution and Knowledge Management													
Outcome 1.1 Community-based organisations empowered on adaptive management of natural resources, with a focus on climate-smart water and soil conservation.													
Output 1.1.1 Community mobilisation and peacebuilding	Implementing partner (service Provider) costs for implementation of output 1.1.1	Contractual Services	15,000	30,000	30,000	-	75,000	15,000	30,000	30,000	-	75,000	**150,000**
	Community mobilization and sensitization workshops, transport supporting equipment	Outreach programme	25,000	25,000	25,000	-	75,000	25,000	25,000	25,000	-	75,000	**150,000**
	Stakeholder awareness workshop	Workshop	3,500	-	-	-	3,500	3,500	-	-	-	3,500	**7,000**
	Mapping the role of customary institutions	Local Consultants	5,000	-	-	-	5,000	5,000	-	-	-	5,000	**10,000**
	Training to strengthen the role of customary institutions in NRM and conflict resolution mediators (connected with output 1.2.6)	Training	13,000	13,000	13,000	-	39,000	13,000	13,000	13,000	-	39,000	**78,000**
	Technical support in the in the implementation of the outreach programme and mapping	Technical Assistance	12,000	24,000	24,000	-	60,000	12,000	24,000	24,000	-	60,000	**120,000**
Sub-total			73,500	92,000	92,000	0	**257,500**	73,500	92,000	92,000	0	**257,500**	**515,000**
Outcome 1.2 Knowledge is generated and disseminated													

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
Output 1.2.1 Knowledge generation and dissemination programme implemented	PMU Climate change awareness raising campaign (Radio programmes, posters, flyers, video clips etc)	Contractual services	12,500	12,500	12,500	12,500	50,000	12,500	12,500	12,500	12,500	50,000	**100,000**
Output 1.2.2 Inception workshop	Inception Workshops	Workshop	11,000	-	-	-	11,000	11,000	-	-	-	11,000	**22,000**
Output 1.2.3 Baseline assessment	Baseline assessment	Local consultants	20,000	-	-	-	20,000	20,000	-	-	-	20,000	**40,000**
Output 1.2.4 Development of guidelines	Hiring of consultant for the development of guidelines based on climate-resilient agricultural practices and mainstreaming based on the lessons learned and best practices	Local consultants	-	-	8,000	8,000	16,000	-	-	8,000	8,000	16,000	**32,000**
Output 1.2.5 Project Implementation Manual (PIM) and Technical Feasibility Report	A team of consultants to develop a Project Implementation Manual and Technical Feasibility Report to assist in project implementation	Local Consultants	16,000	-	-	-	16,000	16,000	-	-	-	16,000	**32,000**
Output 1.2.6 Mapping of drivers of conflict.	A team of national consultants to map context-specific drivers of social conflict and development of conflict resolution strategies through identifying historical connectors and resolved conflict. (linked to output 1.1.1)	Local consultants	12,000	-	-	-	12,000	12,000	-	-	-	12,000	**24,000**

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
Output 1.2.7 Improved climate risk understanding of project area through comprehensive research	Hiring of expert international consultancy for a comprehensive climate risk assessment	Contractual services	25,000	-	-	-	25,000	25,000	-	-	-	25,000	**50,000**
Sub-total			96,500	12,500	20,500	20,500	**150,000**	96,500	12,500	20,500	20,500	**150,000**	**300,000**
Component 1 total			**170,000**	**104,500**	**112,500**	**20,500**	**407,500**	**170,000**	**104,500**	**112,500**	**20,500**	**407,500**	**815,000**
Component 2: Investment in Natural Resource Management and Climate Resilient Community Infrastructure													
Outcome 2.1 Enhanced adaptive capacity through water resource assessment and monitoring to increase food security and agriculture preparedness													
Output 2.1.1 Mapping of surface and ground water	Specialised services in water monitoring software development	Contractual services	15,000				15,000	15,000				15,000	**30,000**
	Designing training programme and training of national staff to conduct water use mapping and in using computer software and use of database (10 technicians)	Training	6,000				6,000	6,000				6,000	**12,000**
	Procuring of groundwater resistivity meters and computer equipment	Equipment	21,469				21,469	21,472				21,472	**42,941**
	Transport support for implementing partner in water mapping	Transport	6,000	6,000	6,000	6,000	24,000	6,000	6,000	6,000	6,000	24,000	**48,000**
	Technical support for implementing partner to conduct mapping	Local consultants		24,000	24,000	24,000	72,000		24,000	24,000	24,000	72,000	**144,000**
	Bi-national technical workshop support (transport, refreshments)	Miscellaneous	1,000	1,000	1,000	1,000	4,000	1,000	1,000	1,000	1,000	4,000	**8,000**

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
	Technical support	Technical Assistance	1,300	1,300	1,300	1,300	5,200	1,300	1,300	1,300	1,300	5,200	**10,400**
Output 2.1.2 Ground water monitoring	Design, procurement and installation of ground water monitoring equipment	Contractual services	30,500	25,000	25,000	-	80,500	30,500	25,000	25,000	-	80,500	**161,000**
	Design and implementation of training programme on water and climate related information acquisition.	Training	8,000	-	-	-	8,000	8,000	-	-	-	8,000	**16,000**
	Bi-national technical committee meeting support (transport, refreshments)	Miscellaneous	1,000	1,000	1,000	1,000	4,000	1,000	1,000	1,000	1,000	4,000	**8,000**
	Technical support for the installation and operation of the motoring stations.	Technical Assistance	7,800	7,800	7,800	-	23,400	7,800	7,800	7,800	-	23,400	**46,800**
Output 2.1.3 Climate Data Gathering	Procurement and installation of AWS	Contractual Services	-	52,500	-	-	52,500	-	52,500	-	-	52,500	**105,000**
	Technical support in the installation of the AWS	Technical Assistance	-	1,300	-	-	1,300	-	1,300	-	-	1,300	**2,600**
Sub-total			98,069	119,900	66,100	33,300	**317,369**	98,072	119,900	66,100	33,300	**317,372**	**634,741**
Outcome 2.2 Improved water supply augmentation and integrated water resource management through conjunctive and multiple water use													
Output 2.2.1 Infrastructure surveys and EIAs	Topographic survey, hydrological and hydrogeological investigations	Local consultants	11,000	10,000	10,000	-	31,000	11,000	10,000	10,000	-	31,000	**62,000**
	EIA of water harvesting and multiple water use infrastructure	local consultants	11,000	10,000	10,000	-	31,000	11,000	10,000	10,000	-	31,000	**62,000**
Output 2.2.2 An integrated ToF training programme is designed and	Design and implementation of faciliator and WUA training programmes.	Training	14,000	34,000	34,000	-	82,000	14,000	34,000	34,000	-	82,000	**164,000**

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
implemented to train on maintenance of climate-resilient water infrastructure.	Technical support in the implementation of the technical training programme	Technical Assistance	3,900	10,400	10,400	-	24,700	3,900	10,400	10,400	-	24,700	**49,400**
Output 2.2.3 Design and installation of water harvesting and multiple water use infrastructure	Design and construction of subsurface dams, 50,000 m³ including feasibility studies.	Contractual services	141,000	564,000	564,000	-	1,269,000	141,000	634,500	705,000	-	1,480,500	**2,749,500**
	Design and construction of concrete wells & solar pumps (output 3.1.4 + 3.2.2)		-	65,200	65,200	-	130,400	-	65,200	65,200	-	130,400	**260,800**
	Design and construction of hafirs	Contractual services	116,800	233,600	350,400	-	700,800	116,800	233,600	-	-	350,400	**1,051,200**
	Operation and maintenance water harvesting infrastructure	WUA technician support	4,200	6,300	6,300	-	16,800	-	9,100	7,700	-	16,800	**33,600**
	Technical review and support in the implementation of water harvesting infrastructure.	Technical Assistance	7,800	10,400	10,400	-	28,600	7,800	10,400	10,400	-	28,600	**57,200**
Output 2.2.4 Design and construction of water yards	Design and construction of new water yards including tubewell and solar pumping system	Contractual services	180,000	120,000	120,000	-	420,000	180,000	120,000	120,000	-	420,000	**840,000**
	Support equipment for WUAs	Equipment	2,100	1,400	1,400	-	4,900	2,100	1,400	1,400	-	4,900	**9,800**
	For technical review and support in the implementation of water yard infrastructure	Technical Assistance	10,400	10,400	2,600	-	23,400	10,400	10,400	2,600	-	23,400	**46,800**
Sub-total			502,200	1,075,700	1,184,700	0	**2,762,600**	498,000	1,149,000	976,700	0	**2,623,700**	**5,386,300**
Outcome 2.3 Communities receiving the Multiple Water Use (MWU) Sanitation Services													

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
Output 2.3.1 Implementation of CLTS programme	Service provider to design and implement CLTS programme including workshops and transport	Contractual services	-	35,000	35,000	-	70,000	-	35,000	35,000	-	70,000	**140,000**
Output 2.3.2 Installation of handwashing stations	Provision and installation of WASH infrastructure	Equipment	-	16,000	15,000	-	31,000	-	16,000	15,000	-	31,000	**62,000**
	Technical support consultant	Technical Assistance	-	10,400	10,400	-	20,800	-	10,400	10,400	-	20,800	**41,600**
Sub-total			0	61,400	60,400	0	**121,800**	0	61,400	60,400	0	**121,800**	**243,600**
Component 2 total			**600,269**	**1,257,000**	**1,311,200**	**33,300**	**3,201,769**	**596,072**	**1,330,300**	**1,103,200**	**33,300**	**3,062,872**	**6,264,641**
Component 3 Improving food security through climate-resilient agricultural practices and technologies													
Outcome 3.1 Livelihood activities made climate-resilient through the application of climate-resilient agricultural practices													
Output 3.1.1. A rainfed and irrigation agriculture training programme is designed and implemented	Experts hired to design training programme and to train supervisors, coordinators and implementing partner facilitators	Training	14,000	21,000	9,000	3,000	47,000	14,000	21,000	9,000	3,000	47,000	**94,000**
	Technical support provided in quality assurance for technical level of training programme	Technical Assistance	1,180	2,360	2,360	1,180	7,080	1,180	2,360	2,360	1,180	7,080	**14,160**
Output 3.1.2 Implementation of the Rainfed Farmer Field Schools.	Costs related to setting up and operating Farmer field schools: travel, workshops, on-farm inputs.	Training	125,000	375,000	375,000	125,000	1,000,000	125,000	375,000	375,000	125,000	1,000,000	**2,000,000**
	Implementing partner support in rainfed FFS	Local consultants	21,250	63,750	63,750	21,250	170,000	21,250	63,750	63,750	21,250	170,000	**340,000**
	Technical support provided to introduce and maintain soil	Technical Assistance	7,080	9,440	9,440	7,080	33,040	7,080	9,440	9,440	7,080	33,040	**66,080**

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
	management measures												
Output 3.1.3 High efficiency irrigation pilot implemented.	Experts for the design, approval and installation of on-farm irrigation systems	Local consultants	-	16,000	16,000	-	32,000	-	16,000	16,000	-	32,000	**64,000**
	Costs related to setting up and operating Farmer field schools: travel, workshops, on-farm inputs.	Training	-	20,000	20,000	-	40,000	-	20,000	20,000	-	40,000	**80,000**
	Implementing partner support in on-farm irrigation	Local Consultants	-	7,500	7,500	-	15,000	-	7,500	7,500	-	15,000	**30,000**
	Operation and maintenance of on-farm irrigation systems	WUA technician support	-	4,000	4,000	-	8,000	-	4,000	4,000	-	8,000	**16,000**
	Technical support provided for the expertise in high-efficiency irrigation systems	Technical Assistance	-	9,440	9,440	-	18,880	-	9,440	9,440	-	18,880	**37,760**
Output 3.1.4 Irrigation FFS	Costs related to setting up and operating Farmer field schools: travel, workshops, on-farm inputs.	Training	-	62,500	62,500	-	125,000	-	67,500	67,500	-	135,000	**260,000**
	Implementing partner support in on-farm irrigation	Local Consultants	-	10,000	10,000	-	20,000	-	10,000	10,000	-	20,000	**40,000**
	Technical support provided for the implementation of the FFS	Technical Assistance	-	9,360	9,360	-	18,720	-	9,440	9,440	-	18,880	**37,600**
Output 3.1.5 Seed multipliers established and operational	Training and workshop costs for seed multiplication. Training of Service	Training	45,000	-	22,500	-	67,500	45,000	-	22,500	-	67,500	**135,000**

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
	providers and farmers												
	Experts in smallholder seed multiplication	Local Consultants	12,500	12,500	12,500	12,500	50,000	12,500	12,500	12,500	12,500	50,000	**100,000**
	Purchase of foundation seed supplies	Equipment	3,800	3,800	-	-	7,600	3,800	3,800	-	-	7,600	**15,200**
	For the implementation and support seed multiplication farmers	Technical Assistance	7,080	9,440	9,440	9,440	35,400	7,080	9,440	9,440	9,440	35,400	**70,800**
Sub-total			236,890	636,090	642,790	179,450	**1,695,220**	236,890	641,170	647,870	179,450	**1,705,380**	**3,400,600**
Outcome 3.2 Climate-resilient alternative income generating livelihoods implemented													
Output 3.2.1 Alternative Income Generating activities	NGO training workshop, travel and follow-up costs to deliver IGA training and support for women groups	Contractual services	21,428	42,858	42,857	42,857	**150,000**	21,428	42,858	42,857	42,857	**150,000**	**300,000**
	IGA Tool support package to beneficiaries	Equipment	-	18,000	16,000	16,000	**50,000**	-	18,000	16,000	16,000	**50,000**	**100,000**
	For the implementation and support of IGAs	Technical Assistance	3,540	9,440	9,440	9,440	**31,860**	3,540	9,440	9,440	9,440	**31,860**	**63,720**
Output 3.2.2 Communal plantations Implemented	NGO to set up of the 50 ha of plantations per country, conducting of training, workshops and travel	Contractual services	-	50,000	50,000	-	**100,000**	-	50,000	50,000	-	**100,000**	**200,000**
	Tools and materials to set up and operate moringa plantations	Equipment tools	-	27,000	27,000	-	**54,000**	-	27,000	27,000	-	**54,000**	**108,000**
	For the implementation and maintenance of the plantations	Technical Assistance	-	9,440	9,440	9,440	**28,320**	-	9,440	9,440	9,440	**28,320**	**56,640**
Sub-total			24,968	156,738	154,737	77,737	**414,180**	24,968	156,738	154,737	77,737	**414,180**	**828,360**

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
Component 3 total			**261,858**	**792,828**	**797,527**	**257,187**	**2,109,400**	**261,858**	**797,908**	**802,607**	**257,187**	**2,119,560**	**4,228,960**
Component 4 Enhancing regional cooperation on water resource development-based food security, climate change adaptation and natural resource management													
Outcome 4.1 Regional adaptive capacity for food security through regional cooperation increased													
Output 4.1.1 Establishing regional platform	Travel costs of Platform Participants	Travel	7,000	7,000	7,000	7,000	28,000	7,000	7,000	7,000	7,000	28,000	**56,000**
	Operational costs of hosting events	Workshops and meetings	15,000	15,000	15,000	15,000	60,000	15,000	15,000	15,000	15,000	60,000	**120,000**
Output 4.1.2 Strengthening capacity of national organisations	Assessment of training needs and implementation of regional training and Design and implement of joint regional training of joint harmonized database	Training	10,000	14,000	10,000	10,000	44,000	10,000	14,000	10,000	10,000	44,000	**88,000**
	Exchange visits with key international groundwater centres of excellence and water management commissions / authorities	Travel	8,000	8,000	-	-	16,000	8,000	8,000	-	-	16,000	**32,000**
	Study upscaling the SCCIWM project	Study	-		-	10,000	10,000	-	-	-	10,000	10,000	**20,000**
Output 4.1.3 Regional tool developed and implemented for the identification and monitoring of water availability supporting decision making in drought planning and early response	Specialized services to create a web-based platform and provide technical support and maintenance	Contractual services	-	15,000	-	-	15,000	-	15,000	-	-	15,000	**30,000**
	Binational report on the including new geological and hydrogeological maps	International Consultant	-	4,000	-	-	4,000	-	4,000	-	-	4,000	**8,000**

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
Output 4.1.4 Joint Regional Natural Resource Management Plan developed	Development of regional NRM plan and design of a regional monitoring network	Contractual services	-	-	-	20,000	20,000	-	-	-	20,000	20,000	**40,000**
Component total			40,000	63,000	32,000	62,000	**197,000**	40,000	63,000	32,000	62,000	**197,000**	**394,000**
Project total			**1,072,127**	**2,217,328**	**2,253,227**	**372,987**	**5,915,669**	**1,067,930**	**2,295,708**	**2,050,307**	**372,987**	**5,786,932**	**11,702,601**
Project Execution Costs													
Binational Project Manager			60,000	60,000	60,000	60,000	**240,000**	60,000	60,000	60,000	60,000	**240,000**	**480,000**
Two national coordinators			14,300	14,300	14,300	14,300	**57,200**	14,300	14,300	14,300	14,300	**57,200**	**114,400**
Two Administrative and Financial managers			17,500	17,500	17,500	17,500	**70,000**	17,500	17,500	17,500	17,500	**70,000**	**140,000**
Two M&E experts			17,500	17,500	17,500	17,500	**70,000**	17,500	17,500	17,500	17,500	**70,000**	**140,000**
Two Knowledge Management and communication experts			16,250	16,250	16,250	16,250	**65,000**	16,250	16,250	16,250	16,250	**65,000**	**130,000**
2 drivers			4,000	4,000	4,000	4,000	**16,000**	4,000	4,000	4,000	4,000	**16,000**	**32,000**
2 cars			31,000				**31,000**	22,000				**22,000**	**53,000**
8 Motorcycles			3,600				**3,600**	3,600				**3,600**	**7,200**
Travel and vehicle maintenance costs			10,000	10,000	10,000	10,000	**40,000**	10,000	10,000	10,000	10,000	**40,000**	**80,000**
2 Printer			400				**400**	400				**400**	**800**
Security			2,903	2,902	2,903	2,903	**11,611**	2,904	2,904	2,903	2,903	**11,614**	**23,225**
Total PEC (9.3%)			177,453	142,452	142,453	142,453	**604,811**	168,454	142,454	142,453	142,453	**595,814**	**1,200,625**
Total Project costs													**12,903,226**
MIE financing requested (8.5%)													**1,096,774**

			Sudan					Chad					
Description	**Activity**	**Note**	**PY1**	**PY2**	**PY3**	**PY4**	**Total Cost Sudan USD**	**PY1**	**PY2**	**PY3**	**PY4**	**Total cost Chad USD**	**Overall cost**
Total Financing requested													**14,000,000**

Table 12. Calculation of Project execution fee for output 4.1.1

Comp.	USD	Execution fees %	USD
Component 1	815,000	9.50%	77,425
Component 2	6,264,641	9.50%	595,141
Component 3	4,228,960	9.50%	401,751
Output 4.1.1	176,000	1.50%	2,640
Output 4.1.2-4.1.4	218,000	9.50%	20,710
A)	**11,702,601**	**B)**	**1,097,667**
Applicable Execution % Over All Components		C = B/A	9.38%
Total Components and Execution Fees Amount		D = A+B	12,800,268
Execution Fees Amount		E= D*C	1,200,625
Total project costs		**F = A+E**	**12,903,226**
Project Execution Fees		G=E/F	9.30%
FAO fees		H	8.50%
Project Management Fees (FAO 8.5%)		I = F*H	1,096,774
Amount of financing requested		**J = F + I**	**14,000,000**

260. The 1.5 percent cap is applied to output 4.1.1. This reduces the total percent of the executing fees over the four components to 9.38 percent. As the percent of the execution fee is calculated over the components and the execution fee together, the final total execution fee comes to 9.3%

General Budgetary Notes:

261. **Local consultants:** Includes consultants hired to complete studies and disseminate results.

- Under component 1, this includes a customary institutions expert, experts for the conducting of the baseline assessment, technical experts to develop the Project Implementation Manual and Technical Feasibility Report, community conflict experts to map the drivers of conflict.
- In component 2, it includes consultants to conduct the underground mapping in support of the Executing Entity, topographical, hydrological and hydrogeological experts and Environmental Impact Assessment experts.
- In component 3, it includes support to the Executing Entity responsible Farmer Field School experts, on-farm irrigation experts, seed multiplication experts.

262. **Travel:** All travel costs are included in the budget estimates where appropriate with the exception of component 4 where specific travel allocations have been made for international travel in the development of the Regional Platform and exchange visits.

263. **Equipment:**

- Under component 2 equipment includes equipment needed to complete assessments such as the resistivity meters and computer and server equipment for the mapping of the Disa aquifer; stationary supplies in support of the Water User Associations (WUA), pedal handwashing equipment.
- Under component 3 equipment includes seed inputs, packaging supplies, equipment / supplies for fuel-efficient stoves, machinery for making oil e.g. sesame and / or groundnut oil, cheese making equipment, carts; and equipment for moringa plantations such as production of seedlings, fertiliser, and on-farm tools.

264. **Workshops and meetings:** includes rent of spaces, catering, transportation costs for participants and related logistical costs.

265. **Contractual Services:** includes fees for contracted partners and service providers to execute project activities such as the project outreach, the awareness raising campaign, the climate change risk assessment, software development, procuring and installing of ground water monitoring equipment, installation of the automatic weather stations, construction of water infrastructure; and the recruitment of the service providers for the community-led total sanitation activity, the income generating activities (IGA), the development of the moringa plantations.

266. **Training:** includes experts to lead and organize training activities including logistical costs.

267. **Technical Assistance:** includes additional assistance to strengthen implementation capacities of proposed activities for communities and government organizations in the implementation of the outreach activity; in component 2: ground water monitoring and water infrastructure implementation activities; support in the sanitation activity; component 3 in the implementation of the agricultural activities such as FFS, irrigation systems, seed multiplication, IGAs and moringa plantations.

268. **MIE Management Fees.** The MIE Management Fees will be utilized by FAO as the Multilateral Implementing Entity (MIE) to cover the costs associated with the project preparation and management oversight including financial management and quality assurance, implementation reports supervision, and project completion and evaluation oversight.

H. Disbursement Schedule

Include a disbursement schedule with time-bound milestones.

	Disbursement Schedule with Breakdown by EE					
	Executing Entity	**Upon signature of agreement (2022)**	**One Year after Project Start (2024)**	**2025**	**2026**	**Total**
Sudan	HCENR	252,868	428,038	402,037	138,237	**1,221,180**
	MoIWR	560,369	1,077,400	1,186,400	33,300	**2,857,469**
	Meteorological Authority	0	53,800	0	0	**53,800**
	MoA	236,890	636,090	642,790	179,450	**1,695,220**
Chad	MoEWF	995,158	2,187,608	1,996,007	318,687	**5,497,460**
	MHUR	50,772	32,300	32,300	32,300	**147,672**
	Meteorological Agency	0	53,800	0	0	**53,800**
MIE	FAO	389,907	328,906	328,906	328,906	**1,376,625**
Total Project Funds		**2,485,964**	**4,797,942**	**4,588,440**	**1,030,880**	**12,903,226**
IE fee		274,193	274,194	274,193	274,194	1,096,774
Total		**2,760,157**	**5,072,136**	**4,862,633**	**1,305,074**	**14,000,000**

269. The FAO allocated funds include output 4.1.1 and the PEC as Project Management Unit (PMU) consultancy contracts will be issued for the PMU which will operate from within and as part of the HCENR and MoEWF respectively.

PART IV: ENDORSEMENT

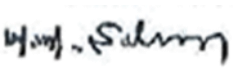
A. Record of endorsement on behalf of the government[111]

Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project. Add more lines as necessary. The endorsement letters should be attached as an annex to the project proposal. Please attach the endorsement letters with this template; add as many participating governments if a regional project:

Mr Porgo Hounly, Ministry of Environment, Fishery and Sustainable Development - Chad	Date*: December 13, 2021*
Professor Rashid M Hassan, Secretary General, Higher Council for Environment and Natural Resources - Sudan	Date*: December 12, 2021*

B. Implementing Entity certification

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project contact person's name, telephone number and email address

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 (……list here…..) and subject to the approval by the Adaptation Fund Board, commit to implementing the project 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.	
 *Maher Salman* Implementing Entity Coordinator	
Date: December 31, 2021	Tel. and email: 0039 06 57054718 Maher.Salman@fao.org
Project Contact Person: Maher Salman	
Tel. And Email: 0039 0657054718; Maher.Salman@fao.org	

6. 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.

Annex 1: Endorsement Letters

Republic of Chad
Transitional Military Council
Presidency of the Republic
Prime Ministry
Ministry of Environment, Fishery and Sustainable Development
General Directorate of the Ministry
National Designated Authority
N°_____/CMT/PR/PM/MEPDD/DGM/AND/2021

Letter of Endorsement by Government

The National Designated Authority

N'Djamena, December 13th 2021

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for **"Strengthening Resilience to Climate and Covid-19 shocks through Integrated Water Management on the Sudan – Chad border area (SCCIWM)"**

In my capacity as designated authority for the Adaptation Fund in Chad, I confirm that the above regional project proposal is in accordance with the government's regional priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the region.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by FAO and executed by the Ministry of Environment Water and Fisheries. Output 2.1.1 will be executed by the Ministry of Urban and Rural Water, output 2.1.3 will be executed by the National Meteorological Agency and output 4.1.1 will be executed by FAO.

Sincerely,

Mr. Porgo HOUNLY

Ministry of Environment, Fishery and Sustainable Development

Republic of the Sudan
The Council of Minister's
جمهورية السودان
مجلس الوزراء
المجلس الأعلى للبيئة والموارد الطبيعية
The High Council for Environment & Natural Resources (HCENR)
HCENR
الأمين العام
Secretary General

December 12, 2021

To: *The Adaptation Fund Board*
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for ***"Strengthening Resilience to Climate and Covid-19 shocks through Integrated Water Management on the Sudan – Chad border area (SCCIWM)"***

In my capacity as designated authority for the Adaptation Fund in Sudan, I confirm that the above regional project proposal is in accordance with the government's regional priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the region.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project/programme will be implemented by FAO and executed by the Higher Council for Environment and Natural resources (HCENR). Outputs 2.1.1, 2.1.2, 2.2.3 and 2.2.4 will be executed by the Ministry of Irrigation and Water Resources. Output 2.1.3 will be executed by the Meteorological Authority, outputs 3.1.1 to 3.1.5 will be executed by the Ministry of Agriculture and Natural Resources and output 4.1.1 will be executed by FAO.

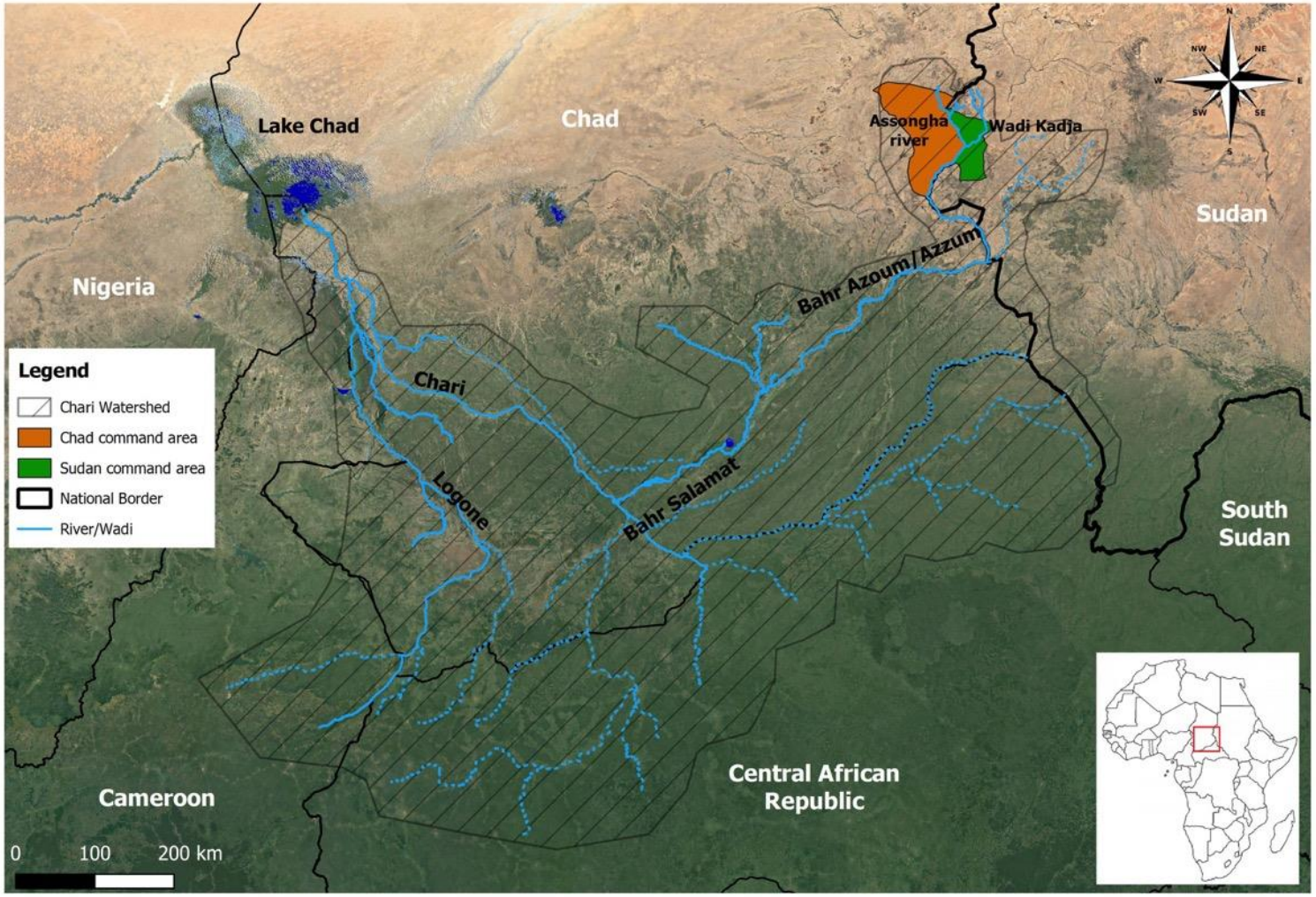
Sincerely,

Professor Rashid M Hassan, Secretary General

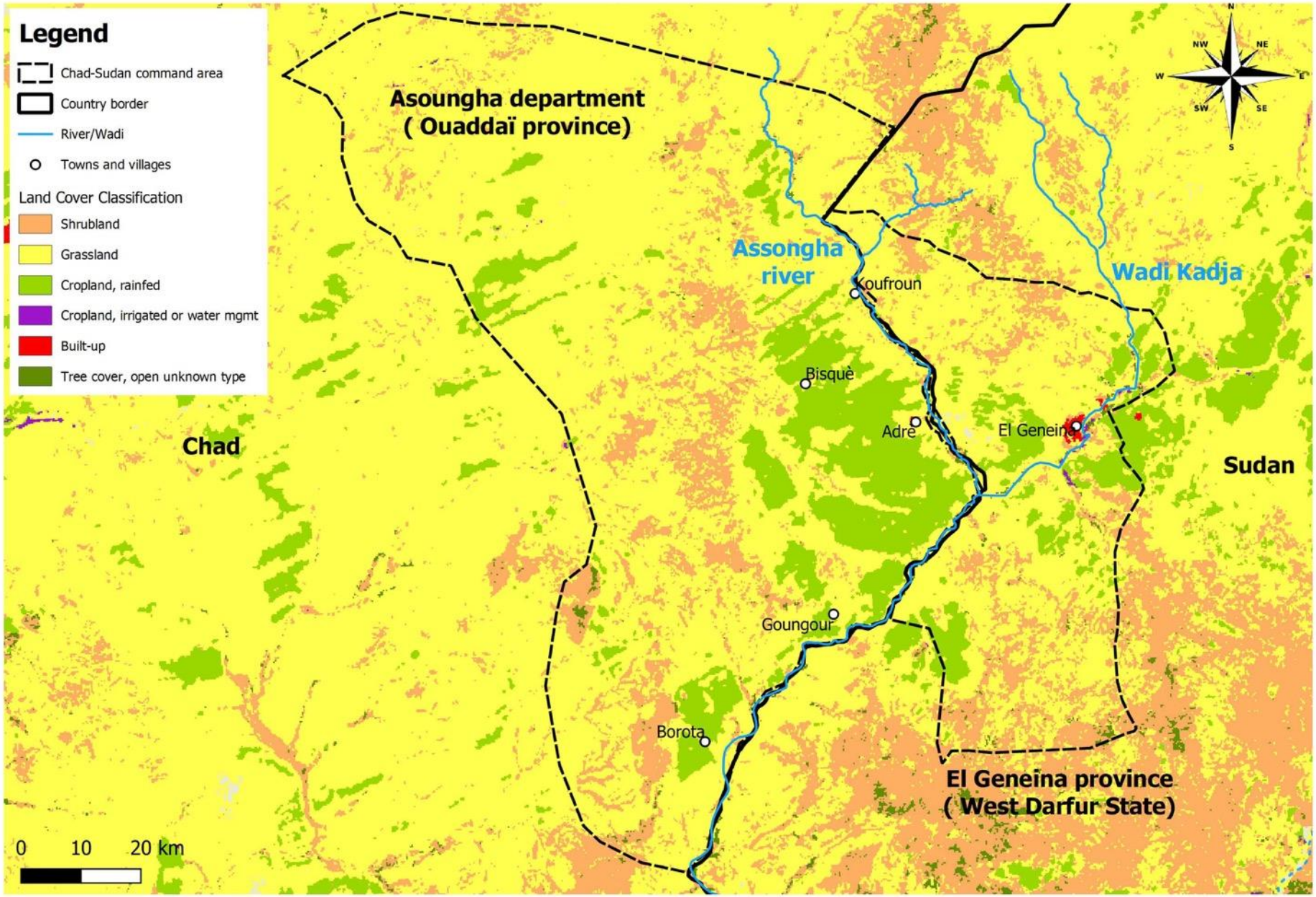
The Higher Council for Environment and Natural Resources

Head Office / Mek Nimir Avenue, Khartoum, Suda
المقر / مباني مجلس الوزراء سابقاً - شارع المك نمر
هاتف: ٧٨٤٢٧٩ ١٨٣ ٢٤٩+ - فاكس: ٧٨٧٦١٧ ١٨٣ ٢٤٩+ - ص.ب: ١٠٤٨٨ الخرطوم
Tel: +249 183 784279 - Fax: +249 183 787617 P.O.Box: 10488 Khartoum
Web: www.hcenr.net E-mail: hcenr2005@yahoo.com

Annex 2: Project Command Area



Note: The size of Lake Chad is defined as per the EU Global Surface Water: https://global-surface-water.appspot.com/download. Water seasonality only extends to Lake Chad location and is defined as: "the intra-annual behaviour of water surfaces for a single year (2019) and shows permanent and seasonal water and the number of months water was present."


Legend
Chad-Sudan command area
Country border
River/Wadi
Towns and villages
Land Cover Classification
Shrubland
Grassland
Cropland, rainfed
Cropland, irrigated or water mgmt
Built-up
Tree cover, open unknown type
Asoungha department
(Ouaddaï province)
Assongha
river
Wadi Kadja
Koufroun
Bisquè
Adré
El Geneina
Chad
Sudan
Goungour
Borota
El Geneina province
(West Darfur State)
0 10 20 km
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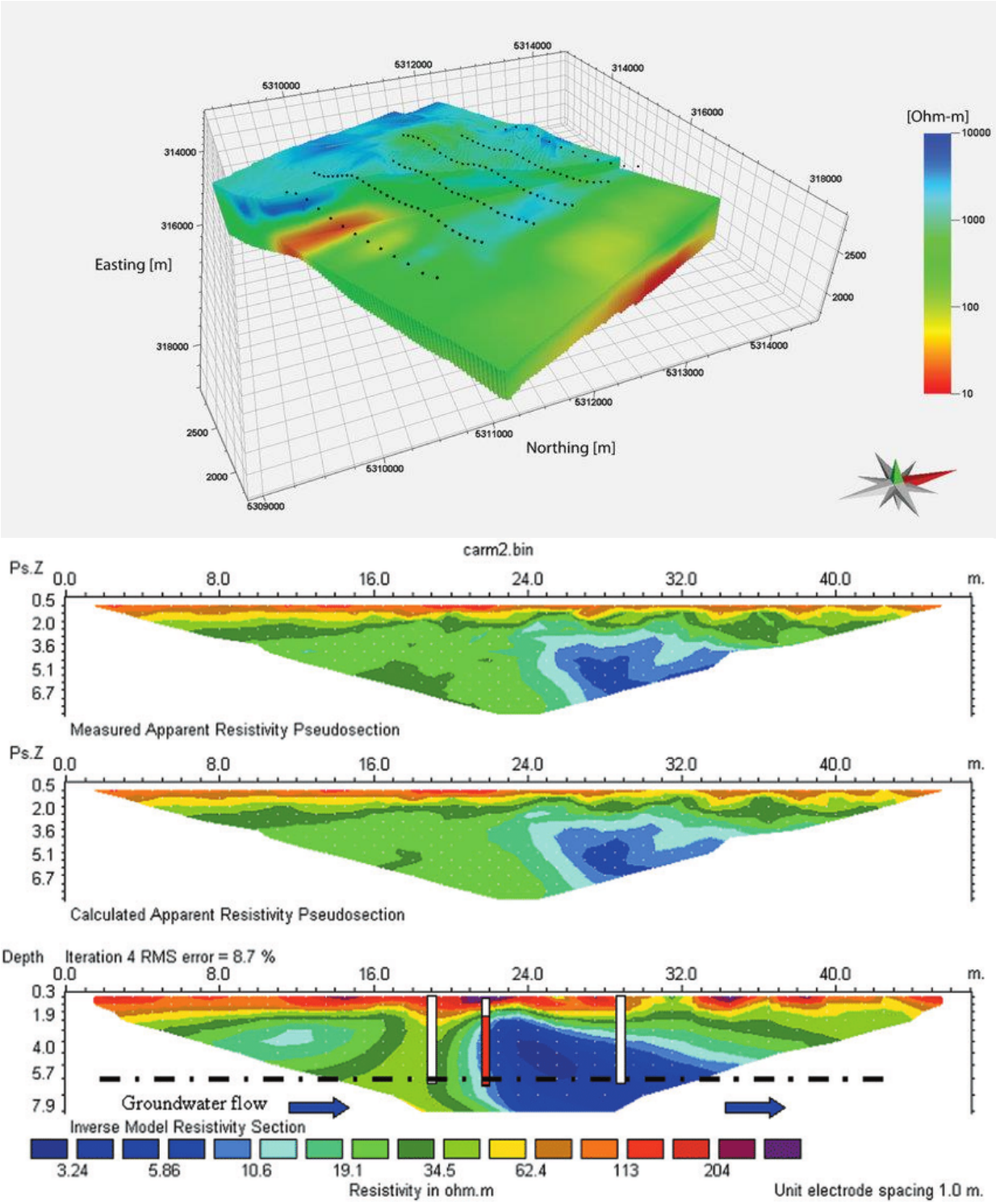
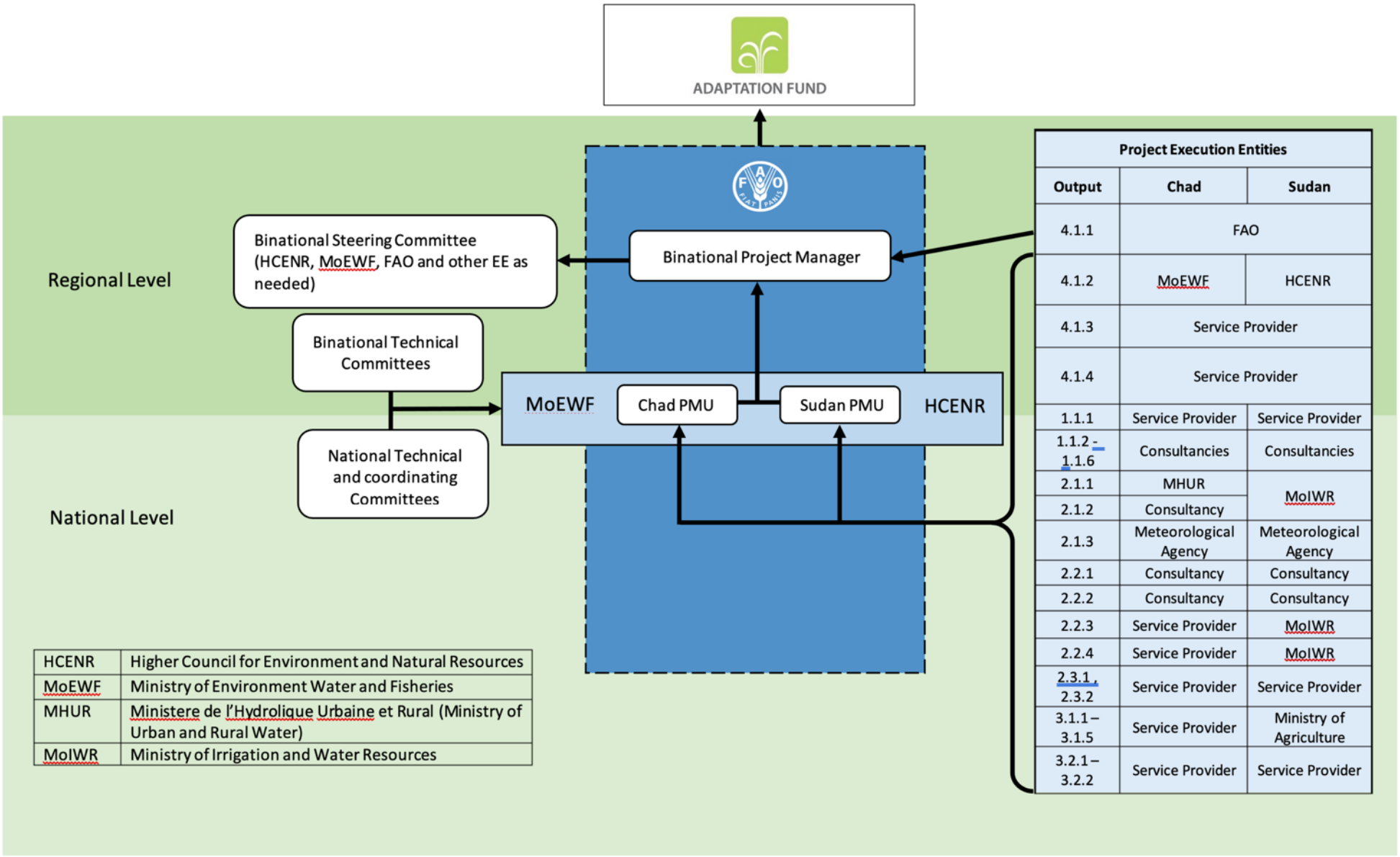
Annex 3: Example of 3-dimensional underground water modelling4



Annex 4: Project Organigram



Project Execution Entities		
Output	**Chad**	**Sudan**
4.1.1	FAO	
4.1.2	MoEWF	HCENR
4.1.3	Service Provider	
4.1.4	Service Provider	
1.1.1	Service Provider	Service Provider
1.1.2 - 1.1.6	Consultancies	Consultancies
2.1.1	MHUR	MoIWR
2.1.2	Consultancy	
2.1.3	Meteorological Agency	Meteorological Agency
2.2.1	Consultancy	Consultancy
2.2.2	Consultancy	Consultancy
2.2.3	Service Provider	MoIWR
2.2.4	Service Provider	MoIWR
2.3.1 , 2.3.2	Service Provider	Service Provider
3.1.1 – 3.1.5	Service Provider	Ministry of Agriculture
3.2.1 – 3.2.2	Service Provider	Service Provider

HCENR	Higher Council for Environment and Natural Resources
MoEWF	Ministry of Environment Water and Fisheries
MHUR	Ministere de l'Hydrolique Urbaine et Rural (Ministry of Urban and Rural Water)
MoIWR	Ministry of Irrigation and Water Resources

Annex 5: ESP screening and Environmental and Social Management Plan

Contents

I. Screening and Categorisation

270. SCCIWM is an environmentally positive project with no potentially adverse impacts and it is aligned with the Adaptation Fund's Environmental and Social Policy and Principles. Following the environmental and social risk assessment detailed in section, the project corresponds to a 'category B' due to some minor risks relating to the construction of water infrastructure and use of fertilisers for which mitigation measures have been taken, the national safeguard procedures will be followed, additionally Environmental Impact Assessments conducted and FAO standard operating procedures for the integration of fertiliser management will be included in the training.

271. The main risks relate to the small-scale tertiary irrigation infrastructure under outcome 2.2 that the IESS-Adapt will co-finance with the IESS, as well as the risks posed by water extraction activities under outcome 2.2, for the use of new water sources for on-farm irrigation. The following table provides a brief overview of the potential risks the project poses in relation to the 15 Environmental and Social Principles, this is followed by a detailed environmental and social risk assessment. The following table provides a brief summary of the outcome of the risk assessment in relation to the 15 AF Environmental and Social Principles, this is followed by a detailed environmental and social risk assessment.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
ESP 1 Compliance with the Law	X	No risk
ESP 2 Access and Equity	X	No risk
ESP 3 Marginalized and Vulnerable Groups	X	No risk
ESP 4 Human Rights	X	No risk
ESP 5 Gender Equity and Women's Empowerment	X	No risk
ESP 6 Core Labour Rights	X	No risk
ESP 7 Indigenous Peoples	X	No risk
ESP 8 Involuntary Resettlement	X	No risk
ESP 9 Protection of Natural Habitats	X	No risk
ESP 10 Conservation of Biological Diversity	X	No risk
ESP 11 Climate Change	X	No risk
ESP 12 Pollution Prevention and Resource Efficiency	X	No risk
ESP 13 Public Health	X	No risk
ESP 14 Physical and Cultural Heritage	X	No risk
ESP 15 Lands and Soil Conservation	X	No risk

II. Environmental and Social Impact Assessment.

Principle 1: Compliance with the Law

272. No further assessment of potential impacts and risks is required for compliance with the law, since the project complies with all relevant national legislation and policies on agriculture, water management, climate change adaptation, among others as detailed in section 'II-F'. The project is in compliance with said laws and has measures in place to minimise the risk of conflict resulting from project activities, the key points of which are summarised below.

- The project will help promote communal dialogue and conflict resolution between sedentary farmers and herders in particular, should this be required. The design consultations have had in-depth discussions with experienced professionals at ministerial level and with experienced international agencies as detailed in the consultative process. Consultations have also been conducted with NGOs, civil society and at community level. The resulting project's conflict mitigation and resolution mechanism is based on established best practices and is detailed in output 1.1.1 and in output 1.2.6. These include the mapping of the drivers of conflict and conflict resolution 'connectors' that will provide context-specific knowledge that the project will be able to apply should a conflict event / episode arise; the identification and training of conflict resolution mediators, the training of community leaders and the creation and training of Conflict Resolution Committees (CRCs) in both countries.
- The project will furthermore be compliant with national laws and regulations where they exist. For example differing criteria exist for screening and assessing of potential environmental impacts of the projects in both countries and details of compliance have been provided in section II – F of the proposal.
- In both countries the project will furthermore works closely, as per procedure, with the respective WASH clusters that is in both cases chaired by UNICEF and attended by all the main development agencies including FAO and the Ministry of Physical Infrastructure and Planning (MoPIP) in Sudan. The WASH cluster in Sudan applies the government-approved guidance manual on applicable standards during the review and coordination of project activities by the WASH cluster. For both Sudan and Chad the WASH cluster adds an additional level of safeguards and scrutiny that will help avoid duplication and help ensure compliance with the respective national legal frameworks, processes and procedures. Ultimately the project will be overseen by the Binational Steering Committee that will have overall responsibility for ensuring compliance with the respective national laws and processes.
- The project will additionally comply with both constitutions in granting women equal rights to both genders by giving men and women equal opportunities. This will be ensured by the setting of the target of women participation at 60 percent to reflect the level of female participation in the rural agricultural labour force in the project area in both countries.

Concern	Legislation	Responsible Agencies	Description of Responsibility
Conflict mitigation / resolution	Rule of law	HCENR (Sudan) / MoEWF (Chad) / Conflict Resolution Councils	Ensuring community conflict resolution frameworks are operational and fully functional and that any disputes are addressed and resolutions found.
Compliance with Environmental Impact Assessments.	Decree no. 630/PR/PM/MEERH/2010 (Chad)	MoEWF	The MoEWF is the ministry responsible for the reviewing and assessing of the 'notice d'impact sur l'environnment' for category 'B' projects
	Environment Protection Act 2001 (Sudan)	HCENR	The HCENR is the authority responsible for assessing the technical feasibility report that will be conducted as part of output 1.2.5

Principle 2 Access and Equity

273. No further assessment of potential impacts and risks is required for compliance with access and equity since the project will not reduce or prevent communities in the targeted areas from accessing basic services. The project will take a number of transparent steps that will help ensure that the benefits of the project are being distributed fairly with no discrimination nor favouritism. Primarily, project targeting has been agreed with the government and comprises targeting criteria based on gender and age quotas. The project will advertise broadly and implement an outreach/mobilisation strategy as detailed in output 1.1.1. Beneficiaries will be explained as they have been throughout the participatory and gender-balanced consultations during the design, that this is a project with a strong focus on women and youth, but that also adult men will also be eligible. The project will promote an extensive outreach programme that aims to be inclusive of the most vulnerable that will be executed

in a participatory consultative and gender-sensitive manner and the grievances procedure promoted to ensure everyone being included is entitled.

Principle 3: Marginalised and Vulnerable Groups.

274. There is no risk that the project will impose adverse impacts on marginalised and vulnerable groups as the entire focus on the project is based around the inclusion and climate-proofing the livelihoods of the most vulnerable sedentary, agro-pastoralist communities as well as refugees, IDPs and returnees. As detailed in the targeting section of the proposal and to ensure the inclusion of vulnerable categories, the project has set specific quotas of 60 percent women, 25 percent youth and 30 percent IDPs, refugees and returnees. The project has also designed project activities aimed specifically to enhance the climate-resilience of these vulnerable groups. The project's extensive process of outreach and inclusion of marginalised and vulnerable groups is detailed in output 1.1.1 of the project proposal. The SCCIWM approach is for the non-discrimination of vulnerable people and this applies to all vulnerable categories, FAO will at all times in all consultations ensure that no vulnerable people will be discriminated in any way. Should any of the beneficiaries fall into this category, efforts will be made to facilitate access to the project's services, events, and any other activities related to the project.

Principle 4: Human Rights.

275. No further assessment of potential impacts and risks is required for compliance with human rights since the project is designed to respect and adhere to the requirements of all relevant conventions on human rights in compliance with the ESP. FAOs Environmental and Social Management Guidelines are deeply rooted in the Human Rights Based Approach, and will at all times support the realisation of United Nations principles expressed in the Universal Declaration of Human Rights and the mainstreaming employment and decent work.

276. **Sudan.** The most recent Office of the High Commissioner on Human rights (OHCHR) Special Procedures Report for Darfur (2018) highlights a number of human rights concerns namely:

- Sexual and gender-based violence and conflict-related sexual violence. To address this risk the project has integrated gender-based violence (GbV) awareness into all project training activities.
- The situation of internally displaced persons lacking adequate food, safe drinking water and adequate health care. The project addresses this concern by directly targeting vulnerable IDP camps with quotas of 30% participation for project activities that will help alleviate the absence of access to food, water and sanitation.

277. **Chad.** The OHCHR most recent Special Procedures Report for Chad highlighted a number of issues that the project will try to address, namely:

- Violence Against Women and concerns relating to the prevalence of violence against women and girls as a problem deeply rooted in the country's patriarchal and traditionalist society. Particularly women refugees are found to be vulnerable to GbV. To address this the project has held consultations with the UNFPA and UNWOMEN and has mainstreamed training on GbV into all project training activities.
- Women are victims of multiple forms of discrimination. The report recommends that the development of long-term strategies for the empowerment of rural women needs to be a priority. The project will promote gender equality and include women quotas of 60% and set a quota of 50% for women participation in rural decision-making bodies such as WUAs and WASH committees.

278. **Human rights violations.** The project will at all times coordinate with the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) which is the UN agency responsible for coordination in both Chad and Sudan, as FAO already does in both countries. Should a broader conflict arise beyond the control of the project's conflict resolution mechanisms and external to the project, the ongoing coordination with OCHA will help ensure rapid and appropriate response mechanisms. The project will additionally at all times monitor human rights and report any human rights violations to the WASH cluster and to OCHA who is also a member of the WASH cluster in both countries.

Principle 5 Gender Equality and Women's Empowerment.

279. Gender Equality and Women's empowerment have been thoroughly assessed and included in the project design, no further assessment on this principle is needed. The project has conducted an Initial Gender Assessment as required by the AF Gender Policy in annex 7 of the project proposal. The IGA analysed gender in terms of food and nutrition security; gender-based violence; access to land; poverty; culture context of gender roles; gender legal and national strategies; Gender-based Violence; gender and access to labour; differentiated climate change impacts on gender; and the gender-related issues raised from community consultations. The

assessment assisted the project in taking proactive measures to integrate gender-focused development strategies that will ensure it will not pose a risk to the principle of gender equality and women's empowerment.

280. **Constraints.** Women face multiple constraints in Sudan and Chad and continue to face significant cultural, social and economic barriers that limit their economic prospects, access to decent pay and basic human needs that have the impact of reducing women integration into the labour market and formal economy. These include: the need for basic literacy in financial and business matters, basic means of production and adding value to farm products such as mill grinders, food packaging, but also basic farm tools and means to transport to the market. Women face multiple hardships particularly in getting access to water and sources of energy such as firewood and charcoal. Women also face frequent harassment as a result of having to travel long distances to procure the essential basics, but also as a result of a lack of latrines for non-camp inhabitants and therefore having to relieve themselves in the open bush.

281. **Design.** FAOs poverty targeting and gender sensitive design and implementation guidelines were applied for the design of the project and conducted a poverty, targeting and gender assessment in the targeted area. The design team conducted gender-separated consultation groups that enabled women and men to discuss their primary concerns free of social pressure from the other group. This resulted in vulnerable and marginalised women and youth being given a central role in the project. In order to overcome any potential risks related to this principle, the project has developed a very proactive strategy for the participation of women in project activities. Specific gender objectives, activities, disaggregated targets and budget allocations have been defined, and the selection criteria for the service provider includes women staff to ensure outreach to women and integrate gender aspects.

282. **Inclusion.** The project gender targeting of 60% reflects the findings that women form the majority of on-farm labour. The project will also include the Gender Action Learning for Sustainability (GALS) methodology[112] which promotes a change in philosophy based on underlying principles of social and gender justice, inclusion and mutual respect. In particular it promotes women's human rights based on the United Nations Convention on Elimination of All Forms of Discrimination Against Women (CEDAW): freedom from violence; equality of property ownership; equality of decision making; equality of work and leisure; and freedom of thought and association. Women will receive support in enhancing their decision-making power at the household and community levels through literacy, life skills and leadership training. It is expected that women in representative position (committees) will be 50%. Gender-awareness trainings (including Gender-based Violence – GbV) will be mainstreamed into all training to men and women will be carried out at both household and community levels, including village leaders.

283. Women will also be 60% beneficiaries of training package under outcomes 2.2 and 3.1 including in climate resilient irrigation technologies, improved soil and water conservation practices, water management. 100% of women will be targeted for IGAs and moringa plantations that will help reduce their burden in wood collection but also provide additional income, improve the environment (contributing towards the Great Green Wall Initiative - GGWI). The project will also ensure that training modules for project staff and extension services include specific sections related to gender sensitive topics, including GbV. The project will produce/adapt and oversee the training modules and curricula that will be delivered to targeted communities/ households and the work of community facilitators and all project staff.

Principle 6: Core Labour Rights

284. The project will not negatively affect the Core Labour rights in the project area and Sudan and Chad have been members of ILO since 1956 and 1960 respectively. **Sudan** has ratified 7 fundamental conventions on forced labour; the right to organise and collective bargaining; equal renumeration; abolition of forced labour; discrimination; minimum age; and child labour. The 2020 Report of the Committee of Experts to the 180th International Labour Conference, on the Application of Convention and Recommendations (CEACR) reports concerns vis-à-vis Sudan on forced labour. In response to this risk, the project will at all times ensure workers rights are respected at all times and upheld to international standards. **Chad** has ratified 8 fundamental conventions on forced labour; the right to organise and collective bargaining; equal renumeration; abolition of forced labour; freedom of association; discrimination; minimum age; and child labour. One of the main concerns of the CEACR for Chad was that of forced child labour.

285. The project will ensure that at all times international labour standards will be applied, it will not engage child labour in any of its activities and will apply the FAO framework on ending child labour in agriculture[113]. The prohibition of child labour will be part of the agreement with the beneficiaries and will be a non-negotiable provision of the agreement. FAO has a longstanding collaboration with the International Labour Organisation

[112] FAO, IFAD, WFP https://www.fao.org/3/cb1331en/cb1331en-01.pdf
[113] https://www.fao.org/documents/card/en/c/ca9502en/

(ILO) dating back to 1947. Furthermore, FAO is a founding member of the Rural Youth Action Plan 2019-2021 (RYAP) and of the International Partnership for Cooperation on Child Labour in Agriculture (IPCCLA). FAO is also an equal opportunities employer and as such it works to ensure that all its projects are free of discrimination in respect of employment and occupation. The project design ensures quotas for women and youth participation and transparent processes for recruitment as well as raising awareness raising about women and youth participation in decision making processes.

Principle 7: Indigenous Peoples

286. For the design of the project, significant and extensive consultations at community level took place over a year including with community organizations, Ministries officers, and different stakeholders. During the community consultations the project design team did not identify Indigenous Peoples in the project area. The project will however endeavour, should Indigenous Peoples be identified during the implementation, to apply the Free, Prior and Informed Consent (FPIC) as per the FAO Manual and to ensure alignment with UNDRIP and the FAO Policy on Indigenous Peoples and to include Indigenous Peoples in project activities under the do-no-harm and inclusivity principles.

Principle 8: Involuntary Resettlement

287. Although no involuntary resettlement is foreseen during project implementation, all consultations will be based on FPIC principle. Should a situation of resettlement or economic displacement arise during the implementation of the project that was not anticipated during design, the implementers and FAO will ensure that a consultation and negotiation process is undertaken with the potentially affected people, according to the FPIC and do-no-harm principles. In case no agreement is reached, the project implementers will modify the specific interventions associated with the affected people, or halt them if changes are not possible. In the case where project implementers fail to undertake a consultation and negotiation process with the affected people, according to the FPIC and do-no-harm principles, the conditions and terms of the grant agreement could be considered to be breached and could be suspended.

Principle 9: Protection of Natural Habitats

288. The project area does not contain critical natural habitats including those that are (a) legally protected; (b) officially proposed for protection; (c) recognised by authoritative sources for their high conservation value, including as critical habitat; or (d) recognised as protected by traditional or indigenous local communities. No further assessment will consequently be necessary during project implementation.

Principle 10: Conservation of Biological Diversity.

289. No further assessment of potential impacts and risks is required for compliance as the project area has not been found to contain UNESCO biosphere reserves or RAMSAR sites applicable to this ESP. The project will also not be introducing invasive species, the only species will be indigenous to the project area and the project area also does not contain any species red listed by the International Union for Conservation of Nature (IUCN).

Principle 11: Climate Change

290. No further assessment of potential impacts and risks is required for compliance with the climate change ESP, since this is inherently an adaptation project with activities that are based on the adaptive priorities set out in the INDC, NAP, NAPAs of both countries and their respective national adaptation strategies as detailed in table 8 in section II-E of the proposal. The project will not have any negative impact on climate change as it does not promote any drivers of climate change (energy, transport, heavy industry, building materials, large-scale agriculture, large-scale forest products, and waste management), it will therefore not contribute to climate change as it is based on the premise of assisting vulnerable communities to adapt in a climate neutral fashion.

Principle 12: Pollution Prevention and Resource Efficiency

291. It is not expected that the project will pose any significant risks to resource efficiency (water) or pollution risks (fertilisers) and no further assessments will be required beyond the procedures already integrated into the project. The two main components 2 and 3 will largely focus around improved access to water and the latter on promoting water and soil conservation techniques in agriculture among other no-regret measures in soil management and adaptive techniques to help reduce crop stress related to drought or torrential rain. The project on the whole is estimated to have a break-even or water-positive balance in as much as it aims to consume / extract less water than is being replenished through natural infiltration of the water harvesting infrastructure in component 2; in total the project is expected to increase the water harvesting capacity by 8.3 million m^3. All Sub-Surface Dams (SSD), Hafirs and water yard constructed will be subject to Environmental Impact

Assessments and feasibility studies, as well as the project being in compliance with the EIA criteria and processes of both countries as detailed in section II-F of this proposal. The project will also promote the utilisation of organic fertilisers which is the sustainable utilisation of the existing natural resource without the need for additional fertilisers and pollution risks. The use of all fertilisers in the FFS training will be governed by FAO standard procedures for fertiliser management in addition to the training that will be provided for the safe handling of organic fertilisers.

292. The project will also map surface and underground water availability with the aim to create hydrological modelling and develop management plans. The SCCIWM will develop a natural resource monitoring network and a regional Natural Resource Management Plan that will aim to help increase resource efficiency.

Principle 13: Public Health

293. The project will not have negative impacts on public health. The WHO explains[114] that many factors combine together to affect the health of individuals and communities. Whether people are healthy or not, is determined by their circumstances and environment. To a large extent, factors such as where people live, the state of their environment, genetics, income and education levels, and relationships with friends and family all have considerable impacts on health, whereas the more commonly considered factors such as access and use of health care services often have less of an impact. The main overarching determinants of health are:

- The social and economic environment,
- The physical environment, and
- The person's individual characteristics and behaviours.

294. The project will improve all the determinants of health presented in the screening table below and as listed by the WHO. The project through supporting environmental sustainability / climate change, livelihood promotion, social empowerment and water harvesting, moringa planting, will make significant contributions towards improving health. The project is expected to have an overall beneficial impact on the public health with improved access to water, climate-proofed yields and increase quality of produce that will also provide improved food security and nutritional benefits.

Determinants of Health	Health Risks	Mitigation	Impact on Health
Income and social status	Lower income and social status are linked to worse health.	The project will target the most vulnerable and marginalised to provide them sustainable avenues for livelihood development.	Positive
Education	Low education levels are linked with poor health, more stress and lower self-confidence.	The project will have a broad training and capacity building programme where the most marginal and vulnerable communities will be given skills that will allow them to produce more and better agricultural produce but also for women groups to . This will improve their ability to interact with the community and broader society.	Positive
Physical Environment	Limited access to trees for firewood reduces ability to cook food and maintain nutrition levels	The project will target women groups to cultivate fast growing indigenous Moringa trees that are nutritious, environmentally beneficial as nitrogen fixing and act as water coagulants which is beneficial for the physical environment. The fast-growing trees also enable ratooning twice a year for firewood and charcoal that is climate-neutral, will help combat deforestation and desertification.	Positive
Social Networks	Greater support from families, friends and communities is linked to better health	Through the promotion of women groups and communal farms, the project will be engaging in community- based participatory approaches that will build community development and people will learn that they can benefit from depending on each other.	Positive

[114] https://www.who.int/news-room/questions-and-answers/item/determinants-of-health

Determinants of Health	Health Risks	Mitigation	Impact on Health
Land use	Changes in land use, soil quality, choice of crop have impact on health	The project will promote improvements in land use, soil quality and choice of crops. Through component 3 the project will implement programme aimed at increasing the climate resilience of farmers through the introduction of techniques that will improve soil quality but also improve crop yields. It will also demonstrate new type of crops that are more climate resistant and will also improve yields and in turn health.	Positive
Unsustainable farming	Unsustainable farming including chemical and energy use, biodiversity, organic production methods, and diversity of foods produced	The project will support sustainable farming on 11,000 ha of agricultural land that will result in improved biodiversity of soils and diversity of food produced that in turn will improve health.	Positive
Water	Irrigation use and its impact on river/water-table levels and production outputs can have negative impacts on health.	The project will promote increased access to 8.3 million m^3 of harvested rainwater. This will have a direct impact on reducing water table extraction rates and combined with the FFS training, improve productivity and human health.	Positive

Principle 14: Physical and Cultural Heritage

295. There is no risk that the project will impose adverse impacts on the physical and cultural heritage. Sudan ratified the Convention Concerning the Protection of World Cultural and Natural Heritage in 1974 and Chad in 1999 and extensive consultations have shown there to be no national cultural heritage sites in the project area, the project area also does not contain UNESCO World Heritage Sites.

Principle 15: Land and Soil Conservation

296. The project will not have negative impacts on lands and soil conservation. The project has been designed in a fashion that reduces any risk posed by it to the environment, it is also not expected to pose any risks to lands as well as promote land, soil and water conservation. The project area is characterised by insufficient access to water which is aggravated by desertification, deforestation, climate change and maladaptive land management practices. The marginalised and vulnerable rural poor are also almost entirely dependent on the natural environment for their livelihoods and are therefore disproportionately vulnerable to climate change. The project will directly aim to reduce the climate vulnerability of these marginal communities in multiple ways, one of which is through land and soil conservation. The project aims to ensure that 11,000ha of agricultural land will be under sustainable agricultural practices that will inter alia increase the yield of crops by between 50 and around 170% with the addition of organic manure but also reduce runoff by 12% and soil loss by erosion of 46%. The project will result in the enhancing of the physical properties of soils and increase in soil moisture also through conservation agriculture.

III. Environment and Social Management Plan (ESMP)

297. The project has been designed in full compliance with Sudan and Chad laws and relevant safeguard procedures that have been fully mainstreamed into the project. A consolidated ESMP for the whole project is presented in the table below, however specific measures have been taken to ensure the compliance with national laws and approval processes. Independently from the national requirements under output 2.2.1 all infrastructure construction (sub-surface dams, wells and hafirs) will be subject to topographical surveys and the hydrogeological investigations needed to assess the water availability and sustainability of water harvesting and groundwater extraction activities as well as Environmental Impact Assessments (EIA) for each construction. In addition to these safeguard mechanisms, the project will also comply with national environmental impact assessment requirements. Compliance herewith have been detailed in section II – F of the proposal. The project will furthermore map the underground aquifer and the surface water infrastructure to create a hydrological modelling of underground resources with the aim to develop a Natural Resource Monitoring System (NRMS).

This will be instrumental to the sustainable use of water supplies for existing water infrastructure as well as enable the national authorities to plan for future sustainable use and development planning.

298. A key output of the regional project is the development of an innovative Regional Natural Resource Management Plan (RNRMP) which will be one of the key outputs resulting from the development of the new regional platform developed by the SCCIWM. The RNRMP will involve a comprehensive mapping and analysis of the natural resources landscape in the project area with a view to develop a regional sustainable management plan of what are limited natural resources. The regional natural resource monitoring information system will inter alia help identify the main challenges for the sustainable management of the available water supply and will analyse the implications of the results of the aquifer mapping and groundwater monitoring stations on the development of sustainable livelihood management strategies by integrating the climate change research that will be conducted in output 1.2.7.

299. The project will furthermore also map all the project activity areas and as part of the PPR tracker also report on all the indicators (including gender and youth), identifying those indicators that are not meeting their targets and proposing the corrective measures being taken by the PMUs. Below is a consolidated EMSP table synthesizing project safeguards for each priority of the Adaptation Fund's ESP and GP and reporting plan.

Consultation

300. The design for the SCCIWM have been ongoing for over a year initially for the concept note approved in April 2021 and subsequently until the end of the same year during which a wide range of stakeholders have been consulted.[115] The proposed project has throughout the design process worked and consulted closely with the Higher Council for Environment and Natural Resources (HCENR) in Sudan and the Ministry of Environment Water and Fisheries (MoEWF) in Chad and has been developed through a gender and youth sensitive participatory approach. The field survey focus groups were instrumental in informing the development of project interventions and the activities were subsequently designed based on local community concerns and needs. The stakeholder consultations have been gender and youth focused with meetings being arranged with smallholders, refugees and IDPs that were timed to be sensitive to their respective needs as well farmer's needs more generally. Representatives of women groups, women-focused NGOs and international agencies focused on gender concerns have all been consulted. Women were also interviewed separately from men, this produced the desired effect as women felt freer to open up about their issues, which otherwise would not have been possible.

301. Access to water was one of the main challenges facing the daily lives of local communities all reported access to sufficient clean water as being a critical problem. Villagers depend mainly on traditional hand dug wells located along the beds of the wadis. During the rainy season water is available in the wadis as well as ponds although these disappear during the dry season, a situation that becomes critical around April - June when many of the wells dry up or the water becomes very deep. Access to water yards helps to some extent as do hand pumps and dams although insufficient to meet the needs of everyone as most of these sources are either poorly functioning or not functioning at all. Women traditionally travel long distances to collect water and even longer distances to collect firewood and charcoal at times reporting 30km distances over 24 hours with heightened risks to their personal safety. Consultations with NGOs and women group representatives highlighted the importance of access to basic tools for agricultural production and transport to the market as well as training in small income-generating activities (IGA) that World Food Programme (WFP) surveys have demonstrated are key in reducing extreme poverty and reducing malnutrition.

302. The project has been designed to have minimal to no social and environmental impacts with mitigation measures and safeguards taken for all applicable Environmental and Social Principles. Additionally project consultations will at all times be gender-sensitive and inclusive of vulnerable and marginalised groups, particularly during the extensive consultations that have been planned under output 1.1.1. Beneficiaries will be consulted in a sequence of one exploratory visit and 4 additional phases including fixing times and dates for subsequent meetings, the identification of lead community persons for the selection of farmers for Farmer Field Schools (FFS), Water User Associations (WUAs), women groups, the Community-Based Total Sanitation (CLTS) programme and conflict resolution mediators. The third phase will agree on the terms of partnership, and to agree on the plans and in the case of the CLTS the identification of the open defecation-free zones. Finally in phase four a lessons learned assessment to receive feedback from the beneficiaries.

Grievance Mechanism

303. The project will also comply with FAO Grievance and Redress Mechanism[116] at all times that will help ensure that any issues arising from project implementation will be addressed appropriately. Any person, group,

[115] See Annex XXX for list of stakeholders met.
[116] https://www.fao.org/3/i4439e/i4439e.pdf

or representative of a person or group, who is potentially directly affected by a FAO programme, is permitted to file a complaint. Complaints are received in person, and by mail, email, telephone and facsimile. FAO is committed to ensuring that its programmes are implemented in accordance with the Organization's environmental and social standards. In order to better achieve these goals, and to ensure that beneficiaries of FAO programmes have access to an effective and timely mechanism to address their concerns about non-compliance with these obligations, the Organization, in order to supplement measures for receiving, reviewing and acting as appropriate on these concerns at the programme management level, has entrusted the Office of the Inspector-General with the mandate to independently review the complaints that cannot be resolved at that level. The FAO grievance and redress procedures are as follows.

304. FAO will facilitate the resolution of concerns of beneficiaries of FAO programmes regarding alleged or potential violations of FAO's social and environmental commitments. For this purpose, concerns may be communicated in accordance with the eligibility criteria of the Guidelines for Compliance Reviews Following Complaints Related to the Organization's Environmental and Social Standards, which applies to all FAO programmes and projects.

305. Concerns must be addressed at the closest appropriate level, i.e. at the programme management / technical level, and if necessary at the Regional Office level. If a concern or grievance cannot be resolved through consultations and measures at the project management level, a complaint requesting a Compliance Review may be filed with the Office of the Inspector-General (OIG) in accordance with the Guidelines for Compliance Reviews.

(i) Programme management/technical level

306. All projects, programmes and country offices will be required to publicize the mechanism for the receipt and handling of grievances at the local level. A focal point to receive and process complaints will be established at the country office level.

307. Programme and project managers will have the responsibility to address concerns brought to the attention of the focal point regarding environmental and social standards laid down in FAO ESS. Each country office will be responsible for establishing mechanisms by which beneficiaries may communicate their concerns on ESS with the relevant focal point. This may include, but is not limited to, an email address, telephone number(s), contact person or physical address. The focal point will be responsible for keeping a log of all grievances filed regarding their programme or project.

(ii) Regional office level

308. Should the complainant not receive an acknowledgement of receipt within seven working days, they should forward their matter to the following addresses dependent on their region: Africa FAO-RAF@fao.org ; Near East and North Africa FAO-RNE@fao.org. The Environmental and Social Risk Management Unit will be responsible for providing technical assistance to the programme, country and regional offices to the concerns and complaints raised by beneficiaries regarding compliance with the ESS.

(iii) Office of the Inspector-General (OIG)

309. In those cases where a concern is not resolved through consultation with the programme / project management, country office or regional office as set out above, beneficiaries may file a complaint with the FAO Office of the Inspector-General (OIG), which will conduct an independent review. Contacts and details for filing complaints can be found in http://www.fao.org/aud/. Email: Investigations-hotline@fao.org

IV. Monitoring and reporting

310. As described in section III – D of the proposal, the project will have a comprehensive monitoring and reporting programme that will include quarterly reports, technical reports, annual project reports, the AF PPR tracking, annual FAO supervision mission reports, a Mid-Term Review (MTR) and a final evaluation and impact assessments. The monitoring and reporting of the ESMP will be commensurate with the limited ESMP required for the SCCIWM. The project will through the annual Project Performance Report (PPR) to the AF and supervision missions report on financial data; procurement; risk assessment; Environmental and Social Policy compliance; Gender Policy compliance; rating; project indicators, lessons learned; and results tracker.

Implementation Schedule

311. The implementation will be as follows:

Activities	Timeline			
	PY1	PY2	PY3	PY4
Development of Project Implementation Manual (PIM) and Technical Feasibility Report;				
The mapping of context-specific drivers of social conflict and development of conflict resolution strategies through identifying historical connectors and resolved conflict;				
Mapping the role of customary institutions				
The conducting of a regional climate research				
Monitoring and reporting (PPR)				
Development of Regional Natural Resource Management Plan (RNRMP)				

Associated ESMP costs

Activities	Source of funding
Development of Project Implementation Manual (PIM) and Technical Feasibility Studies	Output 1.2.5
The mapping of context-specific drivers of social conflict and development of conflict resolution strategies through identifying historical connectors and resolved conflict	Output 1.2.6
Mapping the role of customary institutions	Output 1.1.1
The conducting of a regional climate research	Output 1.2.7
Monitoring and reporting (PPR)	Built in the Project Execution Cost
Development of Regional Natural Resource Management Plan (RNRMP)	Output 4.1.4

	Consolidated ESMP							
	Outcome 1.1	**Outcome 1.2**	**Outcome 2.1**	**Outcome 2.2**	**Outcome 2.3**	**Outcome 3.1**	**Outcome 3.2**	**Outcome 4.1**
ESP 1 Compliance with the law	The project complies with all national relevant laws, regulations and technical standards. In the absence of national standards, the project will apply internationally recognized standards. The project will also develop a conflict mitigation and resolution framework that will reduce the risk of communal disagreements, particularly between sedentary and nomadic peoples.							
ESP 2 Access and Equity	• The project design supports equal access to training, equipment, infrastructure and services, taking especially into account marginalized and vulnerable groups, namely women, youth, refugee, IDP and returnee communities. • The planning and designing of rehabilitation works is done through consultation and agreements with the vulnerable groups that may benefit from irrigation water. • The project will take a number of transparent steps that will help ensure that the benefits of the project are being distributed fairly with no discrimination nor favouritism. • Project targeting criteria is based on gender and age quotas • The project will advertise broadly and conduct extensive outreach and consultative activities aimed at targeting the most vulnerable in output 1.1.1 • SCCIWM will publicly advertise and tender all contracts including the staff / technical experts of the PMUs as well as the Service Providers and the contractors that will be involved in the designing and constructing of infrastructure. • The project will consult all local water users, and involve beneficiaries in all stages of infrastructure development, from design, through operation and management, to rehabilitation and reconstruction; ensure equitable, reliable and sustained access to, and use and control of, water; and address the gender dimensions in all stages.							
ESP 3 Marginalized and Vulnerable Groups	The project will specifically target the marginalised and vulnerable through the outreach programme in output 1.1.1 and the targeting of women groups, refugees, IDPs and returnees.							
ESP 4 Human Rights	The project is designed to respect and adhere to the requirements of all relevant conventions on human rights. FAO is committed to good international practices by supporting the realization of United Nations principles expressed in the Universal Declaration of Human Rights and for mainstreaming employment and decent work. The screening as identified the main recommendations from the last Report of the OHCHR Assessment Missions to Sudan and Chad. The project will address OHCHR concerns through: • **Sudan:** Addressing Gender-based Violence and conflict-related violence by integrating gender-based violence (GbV) awareness into all project training activities; Addressing the situation of IDPs lacking adequate food, safe drinking water and adequate health care by directly targeting vulnerable IDP camps and returnees with quotas of 30% participation for project activities that will help alleviate the absence of access to food, water and sanitation. • **Chad:** Addressing concerns related to Violence Against Women and to the prevalence of violence against women and girls women refugees that are vulnerable to GbV by having held consultations with the UNFPA and UNWOMEN and mainstreaming training on GbV into all project training activities.							

	Consolidated ESMP							
	Outcome 1.1	**Outcome 1.2**	**Outcome 2.1**	**Outcome 2.2**	**Outcome 2.3**	**Outcome 3.1**	**Outcome 3.2**	**Outcome 4.1**
ESP 5 Gender Equity and Women's Empowerment	The project has specific gender targets and budget allocations, service providers with women staff to ensure outreach to women and integrate gender aspects in all reports. The project will have an approach to encourage the inclusion of women and specific targets have been identified for them. The identification of assets, skills training and enterprise development have been designed to address opportunities of relevance for women. The project has taken proactive measures to integrate gender focused development strategies that will ensure it will not pose a risk to the principle of gender equality and women's empowerment. • The project will target 60 percent of women, promote women economic empowerment. • Enable women and men to have equal voice and influence in community-based organisations; • Challenge social norms that perpetuate inequalities between men and women. • Women's economic empowerment will be promoted through access and control of productive assets and the home. • Strengthen and ensure the representation and participation of women in local decision-making bodies; the contribution of women to decision-making within the household or the community alongside that of men will be promoted. • Awareness will be raised through training for women, men, communities and leaders on gender-based violence. • Literacy classes promoted by the project will help to counteract discriminatory factors against women and unequal power relations.							
ESP 6 Core Labour Rights	Relevant national labour laws guided by the ILO labour standards will be followed throughout project implementation. The project employment creation will enable marginalized and vulnerable groups including refugees and IDPs youth and women to raise their income.							
ESP 7 Indigenous Peoples	Extensive consultations at community level took place over a year including with community organizations, Ministries officers, and different stakeholders and Indigenous Peoples were not identified in the project area. The project will however endeavour, should Indigenous Peoples be identified during the implementation, to apply the Free, Prior and Informed Consent (FPIC) as per the FAO Manual and to ensure alignment with UNDRIP and the FAO Policy on Indigenous Peoples and to include Indigenous Peoples in project activities under the do-no-harm and inclusivity principles.							
ESP 8 Involuntary Resettlement	• Although no involuntary resettlement is foreseen during project implementation, all consultations will be based on FPIC principle. • Should a situation of resettlement or economic displacement arise during the implementation of the project that was not anticipated during design, the implementers and FAO will ensure that a consultation and negotiation process is undertaken with the potentially affected people, according to the FPIC and do-no-harm principles. • In case no agreement is reached, the project implementers will modify the specific interventions associated with the affected people, or halt them if changes are not possible. In the case where project implementers fail to undertake a consultation and negotiation process with the affected people, according to the FPIC and do-no-harm principles, the conditions and terms of the grant agreement could be considered to be breached and could be suspended.							
ESP 9 Protection of Natural Habitats	The project area does not contain critical natural habitats including those that are (a) legally protected; (b) officially proposed for protection; (c) recognised by authoritative sources for their high conservation value, including as critical habitat; or (d) recognised as protected by traditional or indigenous local communities. No further assessment will consequently be necessary during project implementation.							

	Consolidated ESMP							
	Outcome 1.1	**Outcome 1.2**	**Outcome 2.1**	**Outcome 2.2**	**Outcome 2.3**	**Outcome 3.1**	**Outcome 3.2**	**Outcome 4.1**
ESP 10 Conservation of Biological Diversity	The project area has not been found to contain UNESCO biosphere reserves or RAMSAR sites applicable to this ESP. The project will also not be introducing invasive species, the only species will be indigenous to the project area and the project area also does not contain any species red listed by the International Union for Conservation of Nature (IUCN).							
ESP 11 Climate Change	Project activities are based on the adaptive priorities set out in the INDC, NAP, NAPAs of both countries and their respective national adaptation strategies as detailed in table 8 in section II-E of the proposal. The project will not have any negative impact on climate change as it does not promote any drivers of climate change (energy, transport, heavy industry, building materials, large-scale agriculture, large-scale forest products, and waste management).							
ESP 12 Pollution Prevention and Resource Efficiency			The project will not pose any significant risks to resource efficiency or pollution for water, land or fertiliser use. The project will also map surface and underground water availability with the aim to create hydrological modelling and develop management plans. The SCCIWM will develop a natural resource monitoring network and a regional Natural Resource Management Plan that will aim to help increase resource efficiency.					
ESP 13 Public Health	The project will not have negative impacts on public health and has screen health-positive on a number of WHO indicators for: Income and social status, Education; Physical environment; Social networks; Land use; Unsustainable farming; and Water.							
ESP 14 Physical and Cultural Heritage			There is no risk that the project will impose adverse impacts on the physical and cultural heritage. Sudan ratified the Convention Concerning the Protection of World Cultural and Natural Heritage in 1974 and Chad in 1999 and extensive consultations have shown there to be no national cultural heritage sites in the project area, the project area also does not contain UNESCO World Heritage Sites.					
ESP 15 Lands and Soil Conservation						The project will not have negative impacts on lands and soil conservation. The project has been designed in a fashion that reduces any risk posed by it to the environment, it is also not expected to pose any risks to lands as well as promote land, soil and water conservation.		

Annex 6: List of Stakeholders Consulted and Meeting Summary.

Date and Location	Name	Position / organisation	Meeting Summary
Chad			
21/12/2020 Teleconference	Kouesse Ramadane	Directrice général technique Adjointe de l'environnement et du Développement durable. Point focal national Genre auprès de la CNUCC - Ministère de l'Environnement et de la Pêche	The initial meeting validated the preparatory work that had been conducted by FAO in the preparation of the initial pre-concept. Some of the concerns that were raised and have been addressed in the development of the proposal included the strengthening of the link with COVID-19, the need to identify and promote synergies with other projects in the area and to avoid duplication. The participants were keen to highlight the important impact that the project will have in helping vulnerable communities adapt to increasing temperatures and the stress this will cause on water availability and variability, making food production more challenging.
	Fatimé Ousmane Daba	Directrice Adjoint de lutte contre le Changement climatique et éducation environnemental, Point focal national du fonds d'adaptation au changement climatique Ministère de l'Environnement et de la Pêche	
	Oumar Abdelrahmane Abdoulaye	Directeur de l'Hydraulique Agricole - Ministère de l'Agriculture	
	Adyl bechir	Directeur de l'Organisation des professionnels de l'Elevage et de la Sécurisation des Systèmes Pastoraux - Ministère de l'Elevage et des Productions Animales	
	Ahmat Adoum Ngardjana	Coordinator NGO BADIA	
	Mohamadou Mansour Ndiaye	Représentant FAO	
	Mahamat Sorto	Chargé de programme FAO	
	Maladonan Issa Bolmbang	Assistant technique au programme FAO	
	Djarma Ali	Consultant national FAO	
09/06/2021 Teleconference	Mr Porgo Hounly	Adaptation Fund National Designated Authority (NDA)	An introductory meeting was had with the National Designated Authority of Chad to the Adaptation Fund. During the meeting the project concept was presented and logistical arrangements were agreed in support of the project design.
10/06/2021 Teleconference	Mr Porgo Hounly	Point focal Fonds D'Adaptation - Ministre de l'Environnement, de la Pêche et du Développement durable (MEPDD)	An initial meeting was held with key ministries. The meeting presented the regional project and received inputs and feedback. The meeting was key in understanding the extent to which key data is

Date and Location	Name	Position / organisation	Meeting Summary
	Mr Nassour Saleh Terda	Directeur des Ressources en Eau/ Point focal ODD 6 - Ministre de l'Hydraulique urbaine et rurale	available for the project area, for example: ground water data; who is responsible for ground water data collection; availability of data on water and sanitation; whether there is an existing sewage system in the project area. The meeting also discussed agricultural priorities of the communities in the project area and the alignment with the Great Green Wall Initiative (GGWI). The GGWI focal point confirmed that the project was aligned with the initiative. In particular he suggested the inclusion of 'Garden Forestry' activities that will help the propagation of tree growth and land restoration.
	Alexis Ramadji N.	Grande Muraille Verte (MEPDD)	
	Mr Djondang Koye	Consultant-FAO	
	Mr Djoume Achim	Ministre du Développement agricole	
	Maladonan Issa Bolmbang	Assistant Technique au Programme - FAO	
11/06/2021 Teleconference	Mr HilaireNare, Mallah	FAO Early Warning Early Action focal point.	A meeting was held with the EWEA focal point for Chad. The purpose of the meeting was to better understand how the EWEA network operated in Chad, and whether it was viable to consider EWEA as an activity for the regional project as it was initially explored in SCCIWM concept note.
14/06/2021 Teleconference	Amadou SIDIBE	Country Program Director - AIRD	A meeting was arranged with the gender machinery in Chad and more specifically in the project area. The FAO country office facilitated the contacting of the participants and the arranging of the meeting which was held with a number of NGOs experienced in implementing gender-focused projects in Chad and Assongha. The meeting also was an opportunity to understand whether there were any Indigenous Peoples in the project area. Their absence was confirmed by the Association of Women and Indigenous Peoples (AFPAT). The meeting explored all areas relevant to women including information on women cooperatives and how women typically work together in the project area. The main challenges facing women in the project area were discussed and it was confirmed that women do form cooperatives. The NGO project activities have focused around basic financial literacy and business management from mill grinder revenue, and the income they generate enables them to send their children to school. The NGOs explained how they typically go about forming committees with 5 day trainings aimed at organising women to work together including on training in Natural Resource Management, setting up women committees and educating them about their human rights.
	Halidou Zakaria	SubDelegation Manager - AIRD	
	Emmanuel Shar	Admin & Finance Manager - AIRD	
	Khadidja Koubra Wardougou	Communication & Reporting- AIRD	
	Mastog Ngarmadji	Senior manager Livelihoods - IRC	
	Salim Assani	Directeur Général Adjoint - Maison de la Femme	
	Aissatou Oumar Ibrahim	Coordinatrice Adjointe-Trésorière - Association des Femmes Peules et Peuples Autochtones du Tchad	
	Mastog Ngarmadji	Senior manager Livelihoods - IRC	
16/06/2021 Teleconference	Mr Bagamla Lamtouin	Ingénieur Hydrogéologue et Système Information Géographique - Direction de la Connaissance et de la Règlementation sur l'Eau du MHUR	A technical meeting was held with the experts in water monitoring with the objective to understand the water monitoring capacity in the project area. It was confirmed that there are currently around 100 piezometers in Chad and none that monitor underground water levels

Date and Location	Name	Position / organisation	Meeting Summary
	Mr WALBADET AÏNA Appolos	Directeur Adjoint de la Connaissance et de la Règlementation sur l'Eau, et Point Focal de la Commission du Bassin du Lac Tchad - - Direction de la Connaissance et de la Règlementation sur l'Eau du MHUR	in the project area. They confirmed that the ministry has no means to conduct the drilling of the piezometers for the project and that the project will need to contract private contractors. The estimated costs of installing piezometers were discussed from their experience in implementing similar activities for a project by the International Fund for Agricultural Development (IFAD) in central Chad. It was also confirmed that in Chad they don't construct hafirs, they didn't know what hafirs were and expressed great interest in including them in the Chad project area. They advocated for a transnational platform between Chad and Sudan for cooperation and sharing of knowledge.
	Mr SINGAMBAYE Djekounda	Chef de Service Prévision Météo - Agence Nationale de la Météorologie	
	Mr Waqas Ahmed	Water and Irrigation Engineer - FAO	
25/06/2021 Teleconference	Ms Clémence Eberschweiler	Programme Director - Concern Worldwide	The technical meeting with the NGO Concern Worldwide Chad was held to explore technical capacity of NGOs in the area and part of an initial idea to have one NGO execute transitionally as one project area on both sides of the border. The NGO proved to have significant capacity in execution however ultimately it was decided to tender captively for SCCIWM contracts. Concern Worldwide Chad was experienced mainly in Sila bordering the south of the project area. They have experience in working with refugees for social protection; cash for work; agricultural techniques; Income Generating Activities (IGA): small commerce, bread-making, groundnut and garlic cultivation etc. They confirmed that the water harvesting capacity in the project area is non-existing and that there is limited telephone coverage. They confirmed the social and local governance structures in the project area as described in annex 8. Furthermore, the meeting also covered the operational and reporting requirements that are expected by the Government of Chad vis-à-vis NGOs that operate in the country, and traditional conflict mitigation and resolution strategies need to go through the local chief and the need to set up conflict resolution committees together with the traditional authorities.
	Ms Bella Hodgkinson	DIZA Consortium Coordinator - Concern Worldwide	
	Mr Francesco Tropea	Desk Officer - Concern Worldwide	
28/06/2021 Teleconference	Mr Abdoulaye DIALLO	UNICEF WASH Cluster Coordinator	A coordination meeting was held with the acting UNICEF WASH cluster coordinator where the project proposal was presented and feedback and inputs received. The project idea was broadly welcomed and encouraged as the area is largely neglected by development agencies and is in great need of assistance. The WASH coordinator was also instrumental in utilising his contacts for the arranging of meetings with UNHCR and UNICEF on getting access to the refugee camps for community consultations. The meeting discussed the other WASH-related activities and validated the project idea, discussions were also had on the environmental safeguards that are applicable to development projects in the project area and

Date and Location	Name	Position / organisation	Meeting Summary
			need to coordinate activities with the WASH cluster of which FAO is already a member.
29/06/2021 Teleconference	Mr Edgar Wbyona	Head of VAM - WFP	A technical meeting was held with WFP in a similar effort as in Sudan to get access to valuable targeting and profiling data. WFP have been very helpful and cooperative and have shared the questionnaires they use for the collection of the vulnerability data that they collect monthly. Based on the cooperation established with WFP Sudan, this meeting also resulted in the sharing of the Comprehensive Food Security Assessment HH and the Food Security Monitoring System HH Questionnaires. From here the design team was able to select key questions that would help in developing the targeting strategy of the project. Questions included: household (HH) composition by gender; distribution of HH educational level; Distribution of households by type of main source of drinking water; Percentage of HH by type of toilet facility; Average household size; Main income sources for households; Percentage of farmers; Land ownership status; Average production and post-harvest losses; Percentage of women engaged in different harvesting and post-harvest processes; Percentage of HH rearing livestock; Percentage of HH engaged in non-agricultural livelihood. Other information shared by WFP included the Integrated Food Security Phase Classification (IPC) data.
	Mr Alemu Mekonnen Gebre	Programme policy officer resilience (FFA and Livelihood) - WFP	
	Mr Alladari Traore	Monitoring and Evaluation Officer - WFP	
12/07/2021 Teleconference	Mr BI Tizié TRE	WASH (Water, Sanitation and Hygiene) Officer - UNHCR	A technical meeting with UNHCR and UNICEF was arranged by the UNICEF WASH coordinator. The meeting focused on the status and immediate needs of the refugees in Assongha. The meeting also facilitated the design team's access to the refugee camps through logistical coordination and support by UNHCR.
	Mr Sido IDO	Associate WASH (Water, Sanitation and Hygiene) Officer - UNHCR	
14/07/2021 Teleconference	Vincent Gruber	Hydrogeologist Supervisor - UNHCR / Swiss Development Cooperation	The UNICEF WASH Coordinator also arranged a meeting with a hydrologist expert that spent many years working with the Swiss Development Cooperation in Chad developing the digital geological and hydrological website, and is now working with UNHCR in assessing the active wells in the refugee camps. The technical meeting went into detail about the typical water infrastructure interventions that are constructed in the project area and also in Sila which is the department immediately to the south of Assongha. The main interventions include: hand-dug wells, borehole water wells, foot pumps, surface dams and the associated challenges. Time was spent on discussing the Swiss website on mapping surface water infrastructure, surface hydrological features and geology in all of Chad. He gave his availability to integrate and share the Swiss

Date and Location	Name	Position / organisation	Meeting Summary
			experience and knowledge with the Natural Resource Monitoring System being developed by the SCCIWM. He also welcomed the initiative to map and model the Disa aquifer which has not been done yet and will likely provide valuable information for future planning and development.
19/07/2021 Teleconference	Mr Markinzaye Saturnin Kouma Kossi	Coordonnateur Projet PNA - UNDP	As mentioned in the concept note the SCCIWM held consultations with UNDP on the GEF National Adaptation Plan (NAP) project. UNDP welcomed the initiative to coordinate activities as they were planning on the installation of piezometers in Assongha as part of the National Adaptation Plan. The meeting presented the project activities and as a result of the consultation the two projects will not overlap, instead UNDP/GEF will adjust their plans for Assongha and let FAO/Adaptation Fund construct the piezometers. UNDP/GEF was also interested in exploring the sharing of ground water data and the monitoring network that will be developed as part of the SCCIWM project. As a result of this meeting, in effect the SCCIWM project will be contributing to the NAP of Chad and further cooperation / consultations will be had with UNDP/GEF during project execution.
	Mr Bianpambé Patallet	Expert Hydrométéorologie - UNDP	
	Mr Chaibou Issa Ramadan	Expert Suivi-évaluation - UNDP	
	Mr Docteur KOUSSOUMBI	Expert Renforcement des Capacités - UNDP	
25/10/2021 N'Djamena	Mr Adoum Ramadane Kaboul	Directeur General Technique de L'Hydraulique et de L'assainissment - Ministere De L'Hydraulique Urbaine et Rural	As a result of the global vaccine rollout and the relaxing of international travel restrictions, the design team was able to conduct in-country mission and meet with key stakeholders to validate the project proposal and conduct technical meetings, one of these was with the Ministry of Urban and Rural Water. The meetings confirmed that there is technical capacity on the ground Assongha and Abécé the largest town to the north that can be trained to conduct the Disa aquifer mapping. They also welcomed the innovation of bringing hafirs into Assongha and look forward to learning from their Sudanese counterparts through the regional platform that will be developed as part of the SCCIWM. The Community-Led Total Sanitation (CLTS) activities of the project were also fully endorsed by the ministry and they were already familiar with the approach to bring community-made latrines to the rural poor.
	Ms Ache Tahar Sougoudi	Directrice De L'hydraulique Pastoral - Ministere de L'Environment, de l'Eau et de la Pêche	
	Mr Nang-Yana N'Dalna	Director de Direction de l'Approvisionnement Eau Potable - Ministere De L'Hydraulique Urbaine et Rural	
	Mr Ali Abakar Ali	Directeur Adjoint Director of Direction de l'Approvisionnement Eau Potable - Ministere De L'Hydraulique Urbaine et Rural	
26/10/2021 N'Djamena	Mr SINGAMBAYE Djekounda	Chef de Service Prévision Météo - Agence Nationale de la Météorologie	A validation meeting was held in person with a technical expert in the Meteorological Agency. He confirmed that the Agency currently has 64 meteorological stations in Chad that relay live data straight to the server in his office. He explained that in order to be able to better adapt to climate change it is important for Chad to have reliable meteorological data of which in Assongha there is none at the moment. The meeting went into detail as to the technical capacity required for the installation and operation, as well as the cost

Date and Location	Name	Position / organisation	Meeting Summary
			implications and pros and cons of having simple rain gauges or automatic meteorology stations.
26/10/2021 N'Djamena	Alexis Ramadji N.	Grande Muraille Verte (MEPDD)	The design team had an extensive technical meeting with an experienced agro-forestry expert. The project was discussed in detail and the chosen approach to focus on moringa tree plantations fully endorsed. He agreed as to the need for such an activity to contribute to the GGWI. He also agreed as to the associated health and environmental benefits and he thought that the utilisation of women groups for their implementation was a 'great idea'.
29/10/2021 N'Djamena	Mr Oualbadet Magomna	Deputy Director General Ministry of Environment Water and Fisheries	The design team finally met with the AF National Designate Authority (NDA) to present the results of the final meetings and the final slight amendments that have been brough to the project as a result of the in-country mission. The NDA and the Ministry of Environment Water and Fisheries fully endorsed the project.
	Mr Porgo Hounly	Adaptation Fund Focal Point - Ministry of Environment Water and Fisheries	
Chad Community Consultations			
18/07/2021 Abéché	Bradine Abboh	Canton chiefs of Bardé and Mabrone	Community consultations were held with the canton chiefs of Bardé and Mabrone at the office of the NGO Djabal in Abéché ahead of the mission to Assongha. The topics that were discussed included techniques in avoiding conflict between farmers and herders. The Chiefs generally advise their people against the cultivation of crops such as watermelon and cucumber during the period of migration to avoid conflict.
	Abakar Abdelaziz	Canton Chiefs of Bardé	
	Dr Djondang Koye	FAO consultant	
	Ms Koultouma Ahamat	UNICEF Assistant	
	Ms Halime Mahadi	UNHCR Coordinator	
20/07/2021 Ambelia Nil (village)	Mr Katir yaya	Farmer	Access to water and that climate change is affecting the fragility of the soils and in combination with the conflict with herders, villagers are having to find other coping mechanisms. Specific requests were made for basic agricultural production tools to work farms including carts to transport produce to market.
	Mr Abakar Bakhit	Agriculture	
	Mr Djouma Adam Gamar	Worker (tractor driver)	
	Mr Katir tiguil	Farmer	
	Mr Moustapha Idriss	Farmer	
	Mr Adam mahamat	Farmer	
	Ms Haoua Abdoulaye	Farmer	
	Ms Halimé Moustapha	Farmer, trade	

Date and Location	Name	Position / organisation	Meeting Summary
	Ms Fadaye Abakar Bakhat	Farmer	
	Ms Mariam Moussa Abdallah	Farmer	
20/07/2021 Guilane (village)	Mr Amdan Din	Farmer	Village trade is based on manufactured products from Sudan, but also agricultural products bought and stored by traders in order to resell at a time of scarcity when prices rise, while fresh or dried market garden products are bought and resold by women. Income from livestock mainly relates to small ruminants (sheep and goats). According to the statements made by the participants in the focus group, the breeding of large cattle such as cattle is compromised by thieves, who steal during the day or who come to remove them in the enclosures at night.
	Mr Hassane Abdoulaye	Farmer	
	Mr Abakar Abdoulaye	Farmer	
	Mr Abdallah Abdoulaye	Farmer	
	Mr Abdoulaye Oumar	Farmer	
	Ms Kaltouma Yacoub	Farmer	
	Ms Achta Adoum	Farmer	
	Ms Madina Mahamat	Civil servant, Commerce, agriculture	
	Ms Maïmouna Hassan	Trader, Farmer	
	Ms Sadié Mahamat	Trader, Farmer	
21/07/2021 Farchana (village)	Ms Zara Oumar	Trader, Farmer	**Access to water.** A traditional open-air well 8 km away water is used for agricultural production. Some at Farchana don't have potable water for their consumption, the government has built some water points for populations but those water points don't provide full coverage. Some villagers get water from the wadi to meet their needs **Conflict.** Cohabitation was very difficult with refugees at the beginning but since 2010, NGO's supported through the setting up of Joined Committees that helped address the concerns of the two communities. **Women** have confirmed their right to participate to the family decisions. They also have a right to possess land and are entitled to inherit 50% less of the land inherited by their brothers according to the Islamic law. Early marriage is less frequent as it is punished by the law.
	Ms Achta Adam Mahadi	Farmer, trader	
	Ms Zoubaïda Yacoub Abakar	Agriculture	
	Ms Mastoura Yacoub Isaac	Trade, Brick making, agriculture	
	Ms Katré Mahamat Ahamat	Agriculture	
	Ms Fatimé Mahamat	Agriculture	
	Ms Kadidja Abdoulaye	Trade	
	Mr Bradine Sabour	Agriculture, trade	
	Mr Tahiti Brahim Youssouf	Agriculture	

Date and Location	Name	Position / organisation	Meeting Summary
	Mr Adoum Abdelaziz Mahamat	Trade, agriculture	**Climate change:** The effects of climate change are impacting people negatively and animals through drought, animal diseases etc, but the people feel powerless and unable to adapt.
	Mr Arbab Ibrahim	Agriculture, trade.	
	Mr Mahamat Ahamat Adam	Agriculture, caretaker	
	Mr Mahamat Abakar Mahamat	Agriculture,	
21/07/2021 Clair District (village)	Ms Nouracham Yacoub	Agriculture	Water is a very limiting factor for both agriculture and herders. In Clair there is a strong practice of fodder cultivation in market gardening. Alfalfa fodder is sold in small bundles at the value of five hundred (500) CFA francs.
	Ms Koultouma Abdelkrim	Agriculture	
	Ms Rihanna Abdelaziz	Trade	
	Ms Halime Abdoulaye	Trade	
	Ms Haoua Abdoulaye	Agriculture (Market gardening), trade	
	Mr Fadoul Djarma	Trade	
	Mr Abakar Mahamat Abderrahman	Agriculture	
	Mr Yacoub Idriss Abdelkrim	Agriculture	
	Mr Moura Abakar	Agriculture	
	Mr Algari Abboh	Agriculture	
24/09/2021 Treguine refugee camp in Hadjer Hadid	Ms Noura Ahmat Hassan	Refugee	• **Humanitarian assistance:** all the women interviewed acknowledge that they have benefited and continue to benefit from the assistance of NGOs working in the area. This assistance is expressed in terms of health coverage, school for their children, food for poor households, water for sanitation and consumption and cash for some of them. • **Access to water:** In the **Treguine camp** there are three sources of water that women use: water from water pumps; tanks and wadi. Water from the well pump is available but women complain about the smell and they prefer to take water from the wadi. For irrigation, women use the water from the wadi, it dries up in the
	Ms Rakia Bachir Abdoulaye	Refugee	
	Ms Achta Matar Djibrine	Refugee	
	Ms Fatimé Adoum Haroun	Refugee	
	Ms Kaltouma Younouss Bara	Refugee	
	Ms Laila Arbab Adam	Refugee	

Date and Location	Name	Position / organisation	Meeting Summary
	Ms Halimé Yaya Adam	Refugee	hot season. For cattle, women alternately use water from pumps or wadi. The source of water for sanitation is limited during the hot season but water is available. **Bredjing camp:** Water for consumption and sanitation is available at any time in the camp through water wells. Only water for people practicing irrigation is limited during the dry season. • **Sanitation:** All the interviewed women knew the importance of hand washing and practice it regularly to avoid sanitation-related illnesses; • **Effects of Covid-19:** The pandemic has affected all interviewed women. It restricted movements during the lock down period. Markets, schools and mosques were closed and this disrupted the life of these women; • **Effects of climate change:** Women say they are feeling the effects of climate change without knowing how it is happening. They notice that the rainy seasons are getting shorter than before and that the quantity of water available is reducing. • **Access to land:** No refugee is allowed to own land in the camp. Men go through the rental or sharecropping system to access the land and cultivate it during the rainy season. The average surface they rent is 1 ha per refugee; • **Source of energy used in households:** Firewood is the single source of energy used by interviewed men and women. Women travel 28 km spending around 25 hours per week looking for wood and are exposed to sexual assaults by herders and other individuals.
	Ms Halom Adam Abakar	Refugee	
	Ms Arafat Issaka Idriss	Refugee	
	Ms Zamzam Abdallah Hassan	Refugee	
	Mr Ahmat Ibrahim Oumar	Refugee	
	Mr Kadre Oumar Abdoulaye	Refugee	
	Mr Djouma Abakar Yacoub	Refugee	
	Mr Mahamadine Malick Abdramane	Refugee	
	Mr Abdel Azim Chérif	Refugee	
	Mr Faissal Djouma Mahamat	Refugee	
	Mr Mahamat Adam Souleymane	Refugee	
	Mr Ossama Abdallah Ali	Refugee	
	Mr Khamis Hassan Hamid	Refugee	
	Mr Dahié Djouma Abderamane	Refugee	
Bredjing refugee camp in Hadjer Hadid	Mr Hassan Djouman Adam	Refugee	
	Mr Abdelkerim Matar Issaka	Refugee	
	Mr Mahamat Ahmat Adam	Refugee	
	Mr Djouma Yaya Younouss	Refugee	

Date and Location	Name	Position / organisation	Meeting Summary
	Mr Hamdane Abdel Hamid Yaya	Refugee	
	Mr Abdine Oumar Abdallah	Refugee	
	Mr Abakar Yaya Ibrahim	Refugee	
	Mr Mahamat Bara Abdallah	Refugee	
	Mr Yaya Ahmat Abdallah	Refugee	
	Mr Sidick Ismaine Moumine	Refugee	
	Ms Mariam Yaya Khamis	Refugee	
	Ms Hadjé Ramadane Mahamat	Refugee	
	Ms Zamzam Mahamat Yaya	Refugee	
	Ms Maka Adam Mahamat	Refugee	
	Ms Mariam Annour Mahamat	Refugee	
	Ms Aché Djouma Adoum	Refugee	
	Ms Djimet Ramadane Youssouf	Refugee	
	Ms Kadidja Adam Ali	Refugee	
	Ms Darassalam Mahamat Ibrahim	Refugee	
	Ms Rakié Adam Abdallah	Refugee	
25/09/2021 Farchana Refugee Camp	Ms Fatimé Mahamat Abdallah	Refugee	• **Water management:** UNHCR provides water for refugees in the camp through solar powered well pumps. Some refugees go to the wadi during well down-time to get water or buy it from water sellers at a cost of one full barrel (200 litres) at 1000 CFA. Some
	Ms Halimé Abakar Yacoub	Refugee	

Date and Location	Name	Position / organisation	Meeting Summary
	Ms Mariam Adam Souleymane	Refugee	refugees are using water from infrastructures set by NGO's outside of Farchana for irrigation farming. • **Types of conflicts occurring at the camp:** The number of conflicts between locals and refugees are decreasing since 2010 after the creation of the mixed committee. Some aggression cases happened between the authorities and refugee women due to the reduction of food distribution since 2020, consequently women have had to double their efforts to get more food. • **Energy.** As above, women travel typically around 30 km in the bush looking for fire wood for their own use and also for market. By doing that activity, they put themselves at the risk. Sometimes they experience violence or sexual aggressions from breeders or non-identified individuals;
	Ms Zena Defalla Oumar	Refugee	
	Ms Kaltouma Arbate Abdallah	Refugee	
	Ms Achta Ali Ismael	Refugee	
	Ms Toma Souleymane Ismael	Refugee	
	Ms Kaltouma Yacoub Abdallah	Refugee	
	Ms Kadidja Mahamat Ahmat	Refugee	
	Ms Achta Mahamat Cheikh	Refugee	
	Mr Moustapha Khamis Hassan	Refugee	
	Mr Fadoul Bidi Mahamat	Refugee	
	Mr Hissein Defalla Arbab	Refugee	
	Mr Ibrahim Mr Souleymane Idriss	Refugee	
	Mr Adam Abakar Moumine	Refugee	
	Mr Arbab Mahamat Idriss	Refugee	
	Mr Abdou Zakaria Haroun	Refugee	
	Mr Abakar Ahmat Hassan	Refugee	
	Mr Djouma Adam Hissein	Refugee	
	Mr Ibrahim Arbab Idriss	Refugee	
Sudan			

Date and Location	Name	Position / organisation	Meeting Summary
21/12/2020 Teleconference	Mr. Rashid Mekki Hassan	Secretary General - Higher Council for Environment and Natural Resources and AF National Designate Authority.	The 2 meetings validated the preparatory work that had been conducted by FAO in the preparation of the initial pre-concept. Some of the concerns that were raised and have been addressed in the development of the proposal included the strengthening of the link with COVID-19, the need to identify and promote synergies with other projects in the area and to avoid duplication such as with the GCF project in Darfur Participants were keen to highlight the important impact that the project will have in helping vulnerable communities adapt to increasing temperatures and the stress this will cause on water availability and variability, making food production more challenging. It was also reminded to focus on adaptation measures on reducing the sensitivity on rainfall levels; improving resilience to climate variability and improving heat tolerance; the importance of water efficiency in agricultural production and water harvesting, for which site selection is important.
	Mr. Nagmeldin Goutbi	Senior Researcher - Environment and Natural Resources Specialist, Higher Council for Environment and Natural Resources	
	Ms. Rania Elsadig	Environment Inspector Assistant - Higher Council for Environment and Natural Resources	
	Mr. Younis Abdalla	Senior Researcher - Hydraulic Research Centre, Federal Ministry of Irrigation and Water Resources	
	Ms. Nahid Abdulrasoul	Geological Engineer - Groundwater and Wadis Directorate, Federal Ministry of Irrigation and Water Resources	
	Mr. Khalid Elnoor	Irrigation Engineer Federal Ministry of Irrigation and Water Resources	
	Mr. Elwaleed Mohamed Elamin	Director - Water Harvesting Research Institute, Agricultural Research Corporation	
	Mr. Abaelmagied M. Eltayeb	Director General - Agriculture Production Administration, Federal Ministry of Agriculture and Natural Resources	
	Mr. Ahmed Omer Ahmed	Executive Director - Undersecretary Office, Federal Ministry of Agriculture and Natural Resources	
	Mr. Adam Ali Ahmed	Director General - Ministry of Infrastructure and Urban Development – West Darfur State	
	Mr. Osman Hussein	Director General - Ministry of Production and Economic Resources – West Darfur State	
	Mr. Khaleel Zayed Ibrahim	State Coordinator - Food Security Technical Secretariat – Ministry of Production and Economic Resources	
	Mr. Moawia Omer Mustafa	Director General - Ministry of Infrastructure and Urban Development	
	Mr. Ali Mohamed Salah	Chair - Higher Council for Management of Water Resources – Red Sea State, and Director General – Ministry of Infrastructure and Urban Development	
	Mr. Elwathig Mukhtar	Assistant FAO Representative for Programme	

Date and Location	Name	Position / organisation	Meeting Summary
	Ms. Aisha Oshiek (f)	FAO Senior Natural Resources Officer	
	Mr. Mohammed Nour Maninai	FAO National Technical Advisor	
	Mr. Ibrahim Ahmed Mustafa	FAO Social Mobilizer	
	Mr. Siddig Abufudda	FAO Technical Field Officer	
31/12/2020 Teleconference	Ghada Batran	JASMAR (National NGO)	
	Elmutalib Ibrahim	Sudanese Red Crescent	
	Mahmoud Elhaj	WHH (German Agro Action)	
	Abdulgadir Ohaj	Abu Hadia Society for women and community development (National NGO)	
	Abdalla Yahia	Vétérinaires sans Frontìeres Germany (VSFG)	
	Mustafa Ali	Sudanese Organisation for Research and Development (SORD)	
	Omer Ibrahim	Practical Action	
	Elwathig Mukhtar	FAO Sudan	
	Aisha Oshiek	FAO Sudan	
	Hassan Mohamed	FAO Sudan	
	Mohammed Nour Maninai	FAO Sudan	
	Ibrahim Ahmed Mustafa	FAO Sudan	
	Siddig Abufudda	FAO Sudan	
02/06/2021 Teleconference	Mr. Rashid Mekki Hassan	Secretary General - Higher Council for Environment and Natural Resources	The first meeting of the full proposal design was held with the Sudan AF NDA. The NDA provided initial endorsement of the ideas put forward for the full proposal subject to the outcome of the consultations. It was stressed that the baseline information needed to be collected and that field visits to West Darfur needed to be conducted, the results of which are presented below. Logistics were discussed and the availability of a HCENR focal point was provided to assist with the coordination of the design in Sudan.
	Mr. Nagmeldin Goutbi	Senior Researcher - Environment and Natural Resources Specialist, Higher Council for Environment and Natural Resources	

Date and Location	Name	Position / organisation	Meeting Summary
			It was explained that the project area did not have a sewage network system that would be needed to implement some of the proposed activities of the concept note, namely the constructed wetland system. The full project consequently made adjustments accordingly to the project structure. The NDA and the Senior Researcher pointed out the pressure and scarcity of resources, and that improving access to water is paramount for peacebuilding. It was requested to place a focus on renewable energy as fuel was expensive for the vulnerable communities.
06/06/2021 Teleconference	Ms Balighe Takana	FAO Early Warning Early Action (EWEA) and Monitoring and Evaluation Officer	Initial discussions were held with FAOs focal point on its EWEA programme in Sudan. Including that it was piloted in 2017 to upscale a similar programme FAO had in Kenya. It was operational in 2018 and is working well in the States of Kassala, North Darfur and the Red Sea. It holds sector coordinator meetings with the Meteorological Authority, the Humanitarian Aid Commission (HAC) WFP and others. In 2019 the pilot was scaled up into a multi-sectoral EWEA system. The EWEA holds monthly technical working group meetings with FAO, the Food Security Technical Secretariat, WFP, OCHA, HAC, IFAD, NGOs and Ministry of Irrigation and Water Resources. The EWEA mainly monitors floods in eastern Sudan and drought indicators that are validated through community consultations authorities on the ground. Ultimately however as a result of the consultations the development of the EWEA was not deemed to be feasible for the scope of the project. This activity was replaced with the aquifer mapping and modelling and surface water mapping in components and 4.
06/06/2021 Teleconference	Mr Adam Ali Ahmed	Director General of Ministry Infrastructure and Physical Planning West Darfur	The meeting discussed in detail a number of technical issues relating to water, irrigation, sanitation. It was explained that there is no sewage system in the project area. In the big cities there are at best cisterns. The meeting discussed the Sudanese practice of constructing hafirs, or large surface reservoirs, including the operation and maintenance. The best water is collected through borehole wells as opposed to hand-dug wells and only 40% of the water need in the project area is currently being met. It was also confirmed that fuel is very expensive in the project area and that the focus should be on developing solar capacity. Irrigation was discussed in terms of efficiency and typical practices of simply flooding fields. Irrigation is hampered however by irregular water availability.
	Mr Osman Hussain	Director General of Ministry of Production and Economic Resources - West Darfur	
	Mr Ezzadin Mohamed	Head of Directorate of developmental planning at Ministry of Finance - West Darfur	
	Mr Ali Ahmed Dawoud	FAO West Darfur Field Coordinator and Team Leader	
	Mr Hashim Elsabki	FAO Field Officer	

Date and Location	Name	Position / organisation	Meeting Summary
			Sub-surface dams (SSD) are the best interventions as they can last the longest with water into the summer time. It is important to set up community Water User Associations (WUAs) to help construct and operate and maintain the hafir and water yard infrastructure. Typically it is the community leader, or Sheikh that is entry point for the development of project activities, including women committees, agricultural activities. The procedures for environmental safeguards were discussed and the national procedures that the project will need to comply with for the construction of the water infrastructure in particular.
09/06/2021 Teleconference	Mr Ali Ahmed Dawoud	Field coordinator/Team Leader - FAO	An extensive meeting was held with key actors in West Darfur. Each of the ministries and organizations talked in detail about their area of expertise and experience to given the formulation team a good understanding of the situation on the ground. The meeting was arranged and coordinated by the FAO country office and discussed about water, the underground aquifer and how UNICEF is developing a manual record of water well readings. The need for meteorological stations was also stressed and the need for additional research on climate change. In summary: The distance that people have to travel to collect firewood and get access to water was also stressed as a major concern and that by addressing these critical issues the project will be working towards addressing some of the key drivers of communal conflict. It was confirmed that the Ministry of Irrigation and Water Resources is the entity responsible for the construction of the water monitoring stations. And the construction of the boreholes. It is common for communities to set up a local water tariff system for the management of water infrastructure. There was the need to develop policies for improved environmental management of the project area and a focus on solar energy instead of fuel. Women groups and associations exist and need to be supported through capacity building and agronomic technical packages. Access to seeds was a major topic and the main challenges associated with their procurement. Emphasis was placed on the need to train women, organize agricultural and livestock associations, dialogue with nomadic women and sedentary women to prevent conflict, and that women were a good
	Mr Zaid Ahmed Alamin	WASH Officer - UNICEF	
	Mr Zakeria Ahmed	Program Manger - Syaj Charity Organization	
	Mr Hashim Elsabki	Livestock Specialist - FAO	
	Ms Fathia Mohamed	Program Manger - Nomadic women Association	
	Mr Hamza Ahmed Ishag	Extensions Officer - Ministry of Production and Economic Resources	
	Mr Adam Hassan	Agriculture Officer - Ministry of Production and Economic Resources	
	Mr Mahmoud Abdallah Bashir	Director General - water sanitation and Hygiene	
	Mr Ismeal Abaker	FSL coordinator - World Relief	
	Mr Hussin Manzool	Manager . Ground Water Department- West Darfur	
	Ms Zainab Abdulrahaman	Member of women farmer group	
	Mr Zakaria Mohamed	FSL project Manger - War Child Canadian	
	Mr Amer Mohamed Ahmed	Program Manger - War Child Canadian	

Date and Location	Name	Position / organisation	Meeting Summary
			entry point to conflict resolution. Women are in need of basic agricultural tools: ploughs, horses, donkey ploughs.
10/06/2021 Teleconference	Ms Agnes Mushimiyimana	Programme Policy Officer Food Assistance For Assets (FFA)	In order to get a good understanding of project targeting, a number of meetings were held with the WFP Vulnerability Analysis and Mapping (VAM) units in both countries. In this meeting the formulation team presented the project concept and solicited feedback and lessons learned from WFP. The main topics being discussed were also WFP targeting and outreach, the utilization of VAM data and WFP operations in the project area, the geographic reach of VAM, the profiling of beneficiaries, community-based targeting, access to water, access to data (maps were not available). IDPs were discussed and the ways that WFP assists them and manages issues of communal conflict between IDPs and sedentary people. WFP experience in constructing hafirs was mentioned as well as the operational and maintenance requirements. It was also mentioned that WFP operates in accordance with the guidance manual as do all the members of the WASH cluster that meets every month and is also attended by the Ministry of physical infrastructure and production. A follow-up meeting was arranged to discuss VAM data more in detail.
	Ms Andreia Fausto	Head of Programme	
	Mr Jonathan Garcia	Vulnerability Assessment & Mapping (VAM) Officer – Profiling Coordinator	
15/06/2021 Teleconference	Ms Mastura Hamid	Gender Based Violence Program Officer- UNFPA West Darfur state	A meeting was held with the UNFPA and UNWOMEN on Gender-based Violence (GBV) in Darfur. The meeting introduced the project idea and comments and feedback were sought for the mainstreaming of gender into the project design. The main points raised by the UNFPA was to: • Include GBV into all training • Risks to women engaging in WASH activities after dark, • The need to ensure women participation in decision making roles within the WASH committees. • To consult women in the designing of the project. • To design project activities that reduce the burden on women for sanitation, collecting of water and firewood collection.
	Mr Awet woldegiorgis	Gender Based Violence Programme Specialist - UNFPA Sudan	
	Ms Hanadi Abdelhalim	National Gender Coordinator - UNWomen	
	Ms Fatma Abdelkarim Mohamed	Program specialist gender justice and human rights - UNWomen	
22/06/2021 Teleconference	Mr AKM Musha	Country Director	A meeting was had with Concern Worldwide in an initial effort to explore capacities for the execution of the project activities. The detailed meeting provided insights into the operations of NGOs in West Darfur, their interaction and reporting requirements to the national authorities and particular to the Humanitarian Aid Commission (HAC) that need to approve NGO activities.
	Ms Eva Stacho	Programme Director	
	Mr Ayoub Suleiman	Acting Area Co-ordinator – West Darfur	
	Mr Lukasz Jakielski	Incoming Area Co-ordinator – West Darfur	

Date and Location	Name	Position / organisation	Meeting Summary
	Mr Waqar Ahmad	Emergency Team WASH Programme Manager	Concern Worldwide explained in detail that they have abroad experience in execution of activities being proposed by the project, sanitation, latrine construction, water well construction, drilling of boreholes, construction of hafirs, etc.
	Mr Mark Harper	Desk Officer	
23/06/2021 Teleconference	Dr.Sawsan Khair Elsied Abdel Rahim Mustafa	Sudan Focal point of Great Green Wall Initiative - DG Natural Resources General Directorate Ministry of Agriculture and Forests	A meeting was arranged with the national focal point for the Great Green Wall Initiative (GGWI). The meeting discussed the main desertification challenges facing the project area. Also the challenge that is being posed by the constant need for firewood and how this had detrimental effects on efforts to develop the GGWI. Ideas for project activities were discussed and they included the development of 'garden nurseries' run by women to grow all sorts of trees and bushes that can be sold by women groups to generate an income and address the deforestation concerns.
	Ali Hamid Osman	M&E Specialist - Sudan Sustainable Natural Resources Management Project (SSNRMP)	
27/06/2021 Teleconference	Zaid Ahmed Alamin	UNICEF- WASH Officer	A follow-up meeting was held with the WASH actors from the 9th of June meeting to discuss WASH-related issues in more detail vis-à-vis West Darfur. The points of discussion were: • The Humanitarian Aid Commission and its functions • More information on the WASH database that UNICEF was compiling. • Enquiring about contacts for the precipitation data in the project area. • Discussions about the environmental and social compliance technical guidelines for the construction of water infrastructure. • More information on the availability of groundwater monitoring data for W. Darfur, • The need for additional meteorological stations was mentioned again.
	Mahmoud Abdallah Bashir	State Water Corporation - DG. water sanitation and Hygiene	
	Hussein Manzool	Ground Water Department- West Darfur - Manager	
28/06/2021 Teleconference	Seokjin Han	Head of Vulnerability Assessment & Mapping (VAM)	A meeting was held with the VAM unit in WFP Sudan with the aim to follow-up on the meeting of 10th of June. WFP offered to share its vulnerability data that it collects on a regular basis and resulting from this meeting shared the Comprehensive Food Security Assessment HH and the Food Security Monitoring System HH Questionnaires. From here the design team was able to select key questions that would help in developing the targeting strategy of the project. Questions included: household (HH) composition by gender; distribution of HH educational level, Distribution of households by type of main source of drinking water; Percentage of HH by type of toilet facility; Average household size; Main income sources for households; Percentage of
	Karim Abdelmoneim	• Head of Vulnerability Assessment & Mapping (VAM) • VAM Officers	
	Mutaz Mohammed	• VAM Officers	

Date and Location	Name	Position / organisation	Meeting Summary
			farmers; Land ownership status; Average production and post-harvest losses; Percentage of women engaged in different harvesting and post-harvest processes; Percentage of HH rearing livestock; Percentage of HH engaged in non-agricultural livelihood. Other information shared by WFP included the Integrated Food Security Phase Classification (IPC) data.
15/7/2021 Teleconference	Mr Ali Hamid Youssef	HCENR / GCF Consultant – Water Engineer	As the executing entity for the Green Climate Fund 'Building resilience in the face of climate change within traditional rain fed agricultural and pastoral systems in Sudan' Project, the HCENR arranged a meeting with one of their technical water engineer consultants actively involved with the project execution. The project which has limited overlap in West Darfur, is also involved in a number of similar project activities. The discussion went into detail on hafir construction and maintenance, sand storage dams (different to Sub-surface dams proposed by the SCCIWM) and water yards. The discussion also included estimated costs of construction site selection, technical committees, the development of technical construction guidelines.
15/7/2021 Teleconference	Eng . Mr. Mustafa Abdel Rahim	Ground Water Consultant - Ministry of Irrigation and Water Resources (MoIWR)	A technical meeting was held with the groundwater division in the MoIWR. The aim of the discussion was the attempt to collect groundwater data which is scant. The meeting also discussed the underlying Disa Sandstone aquifer: • That there is only scattered data available about the aquifer. It was discovered in the 80s and studies have estimated that it has a depth of around 70 – 145 meters which has been measured by boreholes. • They expressed keen interest to develop technical working groups with the Chad counterparts to further study the aquifer and share data. They explained they have extensive experience from the mapping of the GEF / IAEA / UNDP Nubian Aquifer project between Chad, Sudan, Libya, and Egypt.
	Eng. Ms. Sawsan Bushara	Director General Ground Water General Directorate - Ministry of Irrigation and Water Resources	
	Ms Azzah Ahmed	HCENR Focal Point for SCCIWM Project	
	Eng. Mr. Musa Abdelazim Osman Mohamed	Hydrogeologist - Ground Water and Wadis General Directorate (MoIWR)	
20/10/2021 Khartoum	Mustafa Abdalraheem	Consultant - Ministry of Ground Water	Due to the global vaccination programme having been unfolded and travel restrictions lifted, it was possible for the design team to travel to Chad and Sudan in October 2021. The design mission met with the ground water and wadi directorate of the Ministry of Irrigation and Water Resources and discussed the Nubian Aquifer (GEF / IAEA / UNDP) project in more detail. Specifically the structure of the project
	Igbal Saeed Mohammed	Ground Water And Wadis General Director	
	Hisham Alameer Yousif	Drinking Water And Sanitation Unit Director	

Date and Location	Name	Position / organisation	Meeting Summary
	Abdalmohsen Hajo	Surface Water Engineer National Co-Director	and the implementation / governance modalities, the role of the Steering Committee; the level and extent of cross-border cooperation and that there already is extensive technical-level cooperation between Chad and Sudan; the sharing of hydrological data and the technical setup for the sharing of aquifer data. The Steering Committee sits every 6 months, and discusses technical and legal issues, oversees the construction of the international database that all parties need to contribute towards. The experts requested that technical offices be set up in El Geneina and on the Chad side to execute the project and to promote transnational technical working groups / committees for the SCCIWM project.
	Salah Alsideeg	Hydrologist	
	Nahid Abdulrasool	Consultant - Ministry of Ground Water	
20/10/2021 Khartoum	Mr. Rashid Mekki Hassan	Secretary General - Higher Council for Environment and Natural Resources and AF National Designate Authority.	During this mission the project design team met with the AF National Designate Authority and presented the draft project proposal. The HCENR NDA and technical Specialist gave broad approval to the project and acknowledged the effort undertaken in its design. The NDA also agreed to FAO's execution of the development of the regional platform as long as there is an exit strategy for FAO and that there will be national ownership by the end of the project. The need for the development of a Regional Natural Resource Management Plan was also specifically requested. Both requests have been fully integrated into the project proposal.
	Mr. Nagmeldin Goutbi	Environment and Natural Resources Specialist, Senior Researcher - Higher Council for Environment and Natural Resources	
Sudan Community Consultations			
29/07/2021 Adekong Village	Ms Sumia Hassan Sadallah	IDP - Agriculture	**Summary of consultations.** **Access to sufficient clean water** is a critical problem and was reported by all communities as one of the top priority issues to be addressed. People in the villages and camps used to depend almost primarily on traditional hand dug wells located along the beds of the wadis, of which Wadi Kadja is the most important. During the rainy season the wadi water and the scattered ponds provide important water sources. The problem of water is particularly critical during the months of April-June when many of the wells dry up or the water becomes very deep. However, other sources of water in the are do exist including water yards, hand pumps and dams. Most of these sources are either poorly functioning or not functioning at all. Nearly 45% of the hand pumps in the locality are described as non-functional. Existing dams along wadis provide other sources and are usually dried
	Ms Maryam Gumaa Adam	IDP - Agriculture	
	Ms Noora Agami Abdallah Salah	IDP - Agriculture	
	Ms Ekram Mukhtar Mohamed	IDP - Agriculture	
	Ms Naima Ahmed Idris	IDP - Agriculture	
	Ibrahim Mohamed	IDP - Agriculture	

Date and Location	Name	Position / organisation	Meeting Summary
	Mohamed Adam Abdo	IDP - Agriculture	up by Jan-Dec. Seven dams exist in all of West Darfur State. In some villages and during periods of acute water shortage community leaders used to arrange water to be delivered by truck at a cost of 1,200 SDG per water barrel. **Women.** All the women in the separate consultations expressed similar views about domestic violence, violence during their journey to water sources and firewood collection. The women complained about the fact that the aid support and funds received from NGOs typically get taken by men and that there are also no women groups or associations regarding agriculture and trade. It is reported that there is a low school attendance among girls, and the percentage of illiteracy among women is 95%. Unlike in the Chad consultations, in West Darfur early marriage issue is a major problem in the community. Charcoal trade is the secondary source of income after agriculture. The main vulnerabilities associated with Covid-19 as described by women include economic losses associated with closure of markets and curtailing of movement, reduced access to services and human losses. Major needs are the following: • Establishing new school for women. • Water scarcity in the area lead women to travel far distance for water. • Cultivation season need to be secure in order to allow women cultivate their land. • Midwifes are needed. 4 midwifes for more than 8000 women in the community. • Lack of awareness for covid-19 among women. **Land degradation.** Severe land degradation was described by communities as a serious issue that negatively impacts their livelihoods. The main indicators of land degradation according to them are: • Decline in soil fertility • Declining yields from land, from an estimated 6-7 sacks of millet in the past to 2-3 sacks at present • Degradation of forest resources associated with conflict and commercial trade in wood and charcoal
	Barkat Hussin	IDP - Agriculture	
	Mogdam Abdallah	IDP - Agriculture	
	Yousif Mohamed Burma	IDP - Agriculture	
	Ismail Yagoub		
	Abdalla Omer Adam	IDP - Agriculture	
30/08/2021 Gilo village and surrounding villages	Fatima Mohamed Dawood	IDP - Agriculture	
	Mariam Mohamed Yahya	IDP - Agriculture	
	Rashida Salih Osman	IDP - Agriculture	
	Muna Adam Mohamed	IDP - Agriculture	
	Aisha Musa Abdallah	IDP - Agriculture	
	Fatima Osman Ibrahim	IDP - Agriculture	
	Hamed Kharish Ahmed	IDP - Agriculture	
	Mohamed Jamaleldeein	IDP - Agriculture	
	Sharif Mohamed	IDP - Agriculture	
	Yahyia Abdallah Mohamed	IDP - Agriculture	
	Wardi Abubakar Haroon	IDP - Agriculture	
	Ishag Abelelah Suliman	IDP - Agriculture	

Date and Location	Name	Position / organisation	Meeting Summary
2/08/2021 Hashaba Gugar village	Mr Abulalmola Yajob Ali	Agriculture	• Erosion and gullying along the banks of the main wadis • Degradation of range resources, especially the palatable species preferred by animals • Frequent windstorms **Perception and knowledge of Climate Change.** Communities in the villages know about the climate change. They stressed that they know it from the changes they observe in their daily lives. The main indicators they mentioned are: • Rainfall irregularity • Changes in the onset and end of the rainy season • Long dry spells during the rainy season
	Mr Abdo Mohamed Hassan	Agriculture	
	Mr Yusif Abakar Jumaa	Agriculture	
	Ms Magda Hamed Osaman	Agriculture	
	Ms Fatima Ghurashi Adam	Agriculture	
	Ms Makka Ahmed Dolla	Agriculture	
	Ms Mimuona Adam Mohmed	Agriculture	
	Ms Rasha Ibrahim Ishag	Agriculture	
4/08/2021 Molli Village	Mr Mohamed Adam Abdellah	Agriculture	
	Mr Arbab Abdallah Mohamed	Agriculture	
	Mr Suliman Abdelrahman Jumaa	Agriculture	
	Awatif Bilal Adam	Agriculture	
	Hawia Hassan Nadeef	Agriculture	
	Rugia Mohamed Ali Osman	Agriculture	
	Halima Ghureein Adam	Agriculture	

Annex 7: Gender Assessment

312. The Adaptation Fund conceptualises the initial gender assessment as a tool for identifying the differences and providing empirical evidence in the form of qualitative and quantitative data for gender roles, activities, needs, and available opportunities and challenges or risks for men and women within a particular context or sector. It is required under the GP (para.12) as part of the project proposal development to ensure the integration of gender-responsive implementation and monitoring arrangements, including gender- responsive indicators.

313. The information and data generated by the initial gender assessment are the basis for possible subsequent gender mainstreaming actions throughout the project cycle. It informs the project planning and design and helps identify the gender-responsive activities needed in the implementation stage, in budgeting and in monitoring and evaluation.

314. The gender analysis is necessary in order to establish a data baseline at the project start against which implementation progress and results can be measured later. In general, the AF requires that gathering and collecting data should be gender-responsive and reflect the realities of women and men by breaking down the data not only by gender, but ideally also by age and other diversity factors such as ethnic origin and in response to questions that consider existing gender concerns and differentials.

Sudan

Demography, health and education

315. Gender inequality is high as the Gender Inequality Index places Sudan 130th in the rank of nations with an index of 0.545.[117] Women in Sudan comprise 50% of the general population, they form 23.8% of the female-headed households.[118] Women form around 43% of the labour force[119] of which 49% are employed in the agriculture sector, 22% in the service sector 2% in industry and 26% in other activities. Women engaged in agriculture are mainly involved in the traditional subsistence sector (78% - 90%), with only 10% being involved in the modern sector.[120]

316. **Health.** In 2018 the country had a fertility rate of 4.4 which has seen a steady decline over the decades from a high of around 7 in the 1970s. Women have a life expectancy of 66.7 as of 2018 while men 63.3 years.[121] Sudan spends just over 5% of its GDP on health, with private spending as the largest source for health spending. Out-of-pocket payments represented 75.5% of total health expenditure in 2014 Sudan has recently taken steps to expand its National Health Insurance (NHI) program from civil servants and formal sector employees only, to include all poor and vulnerable populations. Enrolment is now offered to all citizens under the same scheme, and coverage of vulnerable groups (pensioners, indigents) is subsidized by public funds. As a result, insurance coverage is reported to have increased rapidly in the past two years. The government has also recently implemented a free maternal and child health medicines program for all. Coverage with free medicines for children under 5 has increased; however, the availability of free pregnancy-related medicines remains low.[122]

317. **Education.** Sudan has one of the largest number of out-of-school children in the Middle East and North Africa region. It's estimated that over three million children here, aged 5-13 years, are not in the classroom. Seventy-six percent of primary age children attend school; in secondary that figure dips to 28 percent. Conflict, a lack of awareness about the importance of education and chronic under-development all contribute to the poor schooling of boys and girls in Sudan. The inability to pay fees—even though school is free per government policy—prevents many poor families from sending children to school. Finally, cultural pressures and the traditional views of the role of women mean fewer girls attend, and remain in, school. [123]

[117] UNDP 2020 Human Development Report
[118] FAO http://www.fao.org/3/x0176e/x0176e.htm
[119] World Bank / ILO (2020) Ratio of female to male labour force participation rate (%) https://data.worldbank.org/indicator/SL.TLF.CACT.FM.ZS?locations=SD
[120] Karshenas, Massoud (2001). "Agriculture and Economic Development in sub-Saharan Africa and Asia". Cambridge Journal of Economics. 25 (3): 315–342. doi:10.1093/cje/25.3.315.
[121] World Bank https://data.worldbank.org/indicator/SP.POP.TOTL.FE.ZS?locations=SD
[122] World Bank (2017) Moving Toward Universal Healthcare. Sudan National Initiatives, Key Challenges, and the Role of collaborative initiatives. http://documents1.worldbank.org/curated/en/929661513159699256/pdf/BRI-Moving-Toward-UHC-series-PUBLIC-WorldBank-UHC-Sudan-FINAL-Nov30.pdf
[123] UNICEF https://www.unicef.org/sudan/education (accessed Feb 2021)

Gender-based Power Structures

318. **Agriculture.** In the pastoral and traditional rainfed sector, women provide a considerable contribution to the household's wellbeing and food security. Women's specific responsibilities include: (i) in settled farming communities women practice farming, both on the household (HH) fields together with their husbands and on the jubraka land, generally 2 feddans (0.84 ha), where they mainly grow green vegetables, tomatoes, cowpeas, okra, millet and maize for both HH consumption and sale; (ii) all HH work, which includes preparing food, collecting fire wood and fetching water; (iii) childcare; (iv) rearing small animals; and (v) petty trade. The varied tasks mean that women generally work longer hours than men. In spite of their responsibilities, women have access to smaller plots of land and generally can control cash income coming from petty trade and poultry rearing, but are rarely involved in decisions concerning key productive assets, such as land and livestock sale. Women also have limited decision-making power in the household or within the community. Their empowerment is hindered by a high rate of illiteracy, persisting gender inequalities perpetuated by the customary law, and early marriage. Compared to men, women earn lower incomes, but tend to allocate more of their earnings to buy food items for their HH. Women headed HH are particularly vulnerable. They can be categorized in four main groups: (i) polygamous HH, which represent the largest segment; (ii) widows, in which the wife and the children remain attached to the late husband's relatives; (iii) women whose husbands have left; and (iv) households whose male head left temporarily to take up non-farm employment opportunities or enrolled in the army. In the absence of the husband, the HH are still under the nominal supervision of a male head, although it is up to the women to earn a livelihood and look after the children.[124]

319. **In Sudanese society**, strong patriarchal norms prevail, with men expected to be the decision- makers and protectors, and women, the homemakers and child carers. The patriarchal system in Sudan has been shaped by the interaction and (re)construction of culture, religion, tribal affiliation, geography and politics. This has resulted in a male dominated hierarchy at the household, tribal and public levels, and socially excluded and subordinated women, especially in rural areas. Gender relations may be labelled as 'complex', with differences across age groups, social class and rural-urban locales. The imbalance in development, the unequal share of wealth and power, the neglect of social services, especially education and health, the imposition of discriminative laws and regulations, and the prevalence of insecurity and gender-based violence have all reinforced male domination. As a result women have little access to resources, and limited decision-making power, with minimal participation in political forums. The rendering of women to be powerless has been used to justify women's weakness and inequality, and to reinforce the status quo, with trickle down effects on future generations, and perpetuating, and if not increasing levels of injustices.[125] The long–term and on-going conflicts have significantly increased Sudanese women's vulnerability to violence. This is reflected in high levels of sexual violence perpetrated by warring parties during conflicts. Displaced women and girls in particular are at a high risk of sexual abuse and rape. Such serious forms of violence against women are not adequately reported due to a lack of protection and justice mechanisms, social stigma and cultural impunity for the perpetrators.[126]

320. There have however been tangible efforts in policy and strategy making in gender equality and development in Sudan over the past 10-15 years, yet repressive legislation and a lack of 'institutional will' have held back grassroots change and equitable development. In rural areas, the combination of deteriorating economic conditions (and the demographic changes due to displacement in certain regions), the lack of rural development initiatives and the concentration of services in the capital, and high levels of migration have resulted in both shifting gender roles and responsibilities, and the increasing vulnerability of women.[127] It is clear that major barriers to achieving gender equality and inclusion remain in Sudan, embedded in both formal and cultural institutions.

Gender-Based Violence

321. Violence against Women and Girls (VAWG) is regarded as a prevalent and critical hindering factor for human development and peace-building in Sudan. The country has a weak normative framework regarding VAWG, as it is not a state party to the Convention on the Elimination of All forms of Discrimination Against Women (CEDAW). Women are disproportionately affected by the various conflicts and security situations across the country; yet their involvement in leadership and participation in peace talks, conflict resolutions, and peace building continue to reflect

[124] IFAD (2017) Integrated Agricultural and Marketing Development Project (IAMDP) Final Project Design Report. https://webapps.ifad.org/members/eb/122/docs/EB-2017-122-R-24-Project-Design-Report.pdf

[125] Elkarib, A. (2016a) *Gender Needs Assessment and Vulnerability Study in Humanitarian Action in Sudan*, Khartoum: UN Women.

[126] African Development Bank (2020) Country Gender Equality Profile: Sudan – Prospects of change in a new era?

[127] Elkarib, A. (2016b) 'Threatened Masculinities in Sudan' in Networks of Knowledge Production in Sudan: Identities, Mobilities and Technologies. US: Lexington books

only token treatment.[128] Gender-based violence against women in Darfur is widespread, particularly among IDP populations but also for women residing outside displacement camps. Although prevalence statistics are not readily available, sexual and physical assault of women and girls throughout the crisis in Darfur has constituted a systematic pattern of attack perpetrated by armed forces, as well as by armed militia and opposition groups. Rape has been used as a mechanism to destabilize, destroy and displace populations, to build fear and to humiliate and disempower local communities, as men are unable to protect their wives and relatives.[129] Rape carries extreme social stigma, as well as potential legal implications. Women and girls are therefore often reluctant to report cases of rape or to seek medical attention or psychosocial support. A culture of impunity prevails as there is little legal recourse for victims of violence, as well as little political will to investigate or prosecute allegations of rape, particularly against government forces, which are often immune to legal action under the 1991 Criminal Law. Sudan's laws governing against rape moreover often expose women to further abuse and stigmatization.[130]

Access to Land

322. In Sudan there is no unified legal framework of land tenure and women have significantly less access to land and other natural resources than men, despite their significant role in agricultural production. Even when land is granted to them, they rarely own land and must rent it or borrow from others additionally, their decision-making power regarding the use of the land is restricted by social norms. For instance, in some localities, social norms dictate that women may not plant perennial crops or fruit trees. Also, women are rarely able to use the land as security for loans because of the lack of land titles although this last point also applies to men in many cases. In the event of divorce or the death of a spouse women also face challenges in gaining access to land or maintaining their land rights. In the event of divorce, in most regions, women lose their right to all the family property, including the land. In the case of the death of the husband, the husband's family "inherits" the widow and she retains user's rights to the land, at the discretion of the family.[131]

Labour

323. Since the loss of the majority of the country's oil fields, agriculture has once again become Sudan's most important economic sector, contributing approximately one-third of the country's GDP, employing nearly half the labour force and providing livelihoods to approximately two-thirds of the population.[132] Agricultural employment is particularly significant from a gender perspective as it comprises the majority of female employment. Nationwide, 54.3 percent of women are employed in agriculture, compared to 34.8 percent of men.[133] These rates vary noticeably between states, as there are some states (such as Darfur) in which agricultural work is dominated by women, while in other states (such as Gedaref, Red Sea and Kassala), women are banned from agricultural work in all its forms.[134]

324. While labour-related legal frameworks guarantee gender equality, employment statistics, together with data gathered through FAO surveys, indicate significant gender disparities in the labour market in Sudan, in terms of respective shares of men and women in the workforce, employment opportunities and types and conditions of work. Other than agriculture, the only sectors in which women's participation is higher than that of men are health, education and social work. With the exception of these sectors, women's opportunities to access the labour market are extremely limited. The percentage of women in the remaining sectors (such as industry, trade, administration, transport and information) are, in the best cases, half that of men, whereas in certain sectors, such as financial services and scientific and technical professions, women are not present at all. Employment vulnerability data further shows the unsecured status of the work of rural women compared to both urban women and to urban and rural men. Overall, the vulnerable employment rate (VER) for rural areas is 61.5 percent, double that of urban areas (31.2 percent). Rural women are further disadvantaged by gender inequality, with a VER of 79.7 percent, considerably higher than that of rural men (55.5 percent).[135]

[128] UNWOMEN https://africa.unwomen.org/en/where-we-are/eastern-and-southern-africa/sudan
[129] Medecins Sans Frontieres. 2005. "The Crushing Burden of Rape: Sexual Violence in Darfur." Medecins Sans Frontieres, Geneva
[130] Human Rights Watch. 2006. "Lack of Conviction: The Special Criminal Court on the Events in Darfur." Human Rights Watch, New York.
[131] FAO 2021 Country Gender Assessment of Agriculture and the Rural Sector in Sudan
[132] FAO. 2020. *Special Report: 2019 FAO crop and food supply assessment mission to the Sudan.* https://doi.org/10.4060/ca7787en
[133] World Bank. 2020. Sudan. In: Gender Data Portal [online]. http://datatopics.worldbank.org/gender/country/sudan
[134] Ministry of Human Resources, Development and Labour. 2013. *Sudan Labour Force Survey 2011.* Khartoum.
[135] Ibid

Chad

Demography, health and education

325. Chad fares poorly in terms of gender equality as the Gender Inequality index palaces it 160th out of 189 countries with an index value of 0.7. As of 2019, women make up 50% of the general population and according to ILO estimates women form 64% of the labour force between 15-65 years of age. Average life expectance in Chad is low as women in Chad live on average 55.4 years while men 52.6 years. Child mortality has come down significantly in chad from 129 per 1000 in 1972 to 69 per 1000 in 2019.

326. **Health.** In terms of health, main causes of consultations are malaria, acute respiratory infections, diarrheal diseases, trauma, skin infections and chronic malnutrition (women and children). Maternal mortality rates remain among the highest (856 per 100,000 in 2015). Malaria still remains a major public health problem for which 77% of households have impregnated mosquito nets. The prevalence rate of HIV is 1.6% in the general population and 2.9 in pregnant women and the rate of transmission of HIV from mother to child after breastfeeding is 32%. Tuberculosis cases have increased from 6,200 cases detected in 2007 to 12,305 cases in 2014, and TB / HIV co-infection accounts for 46.6% of tuberculosis cases. Malnutrition affects 44.2% of the population and acute malnutrition reaches the critical threshold of 15% in most regions: nearly 40% of children suffer from chronic malnutrition.[136]

327. **Education.** In terms of education Chad ranked second last of the 10 sub-Saharan countries participating in the French 2014 Educational Systems Analysis Program of CONFEMEN (PASEC). At the end of primary schooling (CM2) 84.3% of students are below the minimum threshold for reading skills and 80.9% in mathematics. The majority of pupils reaching the end of primary school are not equipped to succeed in average and this proportion is all the more important for girls[137]. The evaluation also revealed the low level of equipment in classrooms in Chad, where less than 5% of primary students have their own textbook in reading and mathematics. Compounding the educational problems is the fact that around 75% of students are supervised by teachers whose highest diploma does not exceed secondary level.[138]

Gender-based Power Structures

328. Although there have been improvements in the situation of women in Chad in recent years, traditional customs and practices continue to hinder development as traditionally women are not considered and their views are frequently neglected. In Chad modern and customary laws coexist creating problems for women that are reflected in the difficulties they experience. Socio-economic factors such as overwork and access to dowry limit women's access to education and many parents believe that girls should only aspire to domestic activities, while others believe that their education increases the risk of prostitution. In the socioreligious field, the role of women is conditioned by the perpetuation of traditional practices including domestic violence, polygamy and early and forced marriages.

329. Statistics on gender participation in agriculture in Chad is limited however, gender inequalities extend to the productive sectors such as agriculture, livestock, fisheries, natural resources and crafts that are marked by strong inequalities and gender disparities. In general, women who make considerable productive contributions have little access to the means of production, to human capital and to financial and extension services. In particular, land tenure insecurity as well as poor access to equipment, agricultural inputs, technologies, credit observed among women and to a lesser extent among men, constitute a major constraint on productivity, especially that of women.[139]

Gender-Based Violence

330. Gender-based violence (GBV) is a fundamental and pervasive problem in Chadian communities, and which is exacerbated in times of crisis. Data produced by the Demographic and Health Survey and Multiple Indicators in Chad over the period 2014-2015 show that in Chad, 23% of girls are married before the age of 15 and 65% before 18 years old; 38% of women aged 15 - 49 have undergone female genital mutilation. Also, one in three women report being a victim of physical violence and 12% of women experience sexual violence each year.[140] In Chad at

[136] WHO 2017 – 2020 Chad Development Strategy https://apps.who.int/iris/bitstream/handle/10665/137147/ccsbrief_tcd_fr.pdf;jsessionid=CF03FA2ADBA1922051941E62CDD66C96?sequence=1

[137] PASEC2014 – Performances du système éducatif tchadien : Compétences et facteurs de réussite au primaire – PASEC, CONFEMEN, 2016. http://www.pasec.confemen.org/wp- content/uploads/2016/10/PASEC2014_Tchad.pdf

[138] UNHCR (2020) Strategie Education 2030 https://data2.unhcr.org/en/documents/download/83328

[139] African Development Bank (2018) Environnemental and Social Impact Assessment Programme d'approvisionnement en eau potable et d'assainissement en milieux semi urbain et rural de onze regions, (PAEPA SU MR phase 1)

[140] OCHA (2020) Gender-based violence in Chad in the face of COVID-19

least a third of women and adolescent girls in Chad face severe violations of their rights and violence on a daily basis. Experiences of child, early and forced marriage, denial of access and control over resources, eviction of one's home and sexual violence within their household, are all examples of violence against women and girls that impact negatively on the ability of survivors to secure their livelihoods, their health and their rights.[141]

Access to Land

331. In Chad access to land is governed by laws 23, 24 and 25 of July 22, 1967, which guarantee the right to free possession. Which laws were supplemented by Law No 7 of 5 June 2012 which strengthens the capacities of rural communities in the management of natural resources and Decree No 215 of April 24, 2002 which establishes a national land observatory. This little popularized legal arsenal is generally unknown. At the rural level, customary regimes are perpetuated through the prerogatives recognized to traditional chiefs. In Chad three land tenure regimes coexist: i) the customary regime whereby land belongs to the community; ii) the Islamic regime based on belief which considers that the land belongs to God, that governs social and human relations through the role of traditional and religious authorities iii) the modern regime which is neutral and based on gender equality enshrined in regulatory / legislative texts in Chad. In Chad women's access to land depends on modalities dictated by socio-cultural membership, the availability of cultivable spaces according to agro-ecological zones, marital status and economic power to rent or buy plots. The main modality of their access in most communities remains the use of the family domain. Indeed, only 20% of rural women own an agricultural plot.[142]

Labour

332. The labour force in Chad is 60%[143], mostly employed in the informal agricultural sector as in 2011, nearly three quarters of the labour force were employed in this sector[144] and there is a significant participation (approximately 97%) of women in informal sector (agricultural and non-agricultural). Despite this, when compared to the overall population, women are still significantly less represented (65.4%) than men (90.2%). Gender disparity becomes clearer, however, when the remuneration variable is considered, since men predominate with 56.7% compared to 43% for women, in terms of time devoted to paid work. Women are also underrepresented in the formal secondary and tertiary sectors, where they account for 3% of business owners compared to 97% for men. They are also under-represented in the State apparatus, where they hold few decision-making positions. African Development Bank consultations highlighted the lack of skills required for the labour market, the limited access to factors of production (e.g., land, capital, etc.), and weak entrepreneurial capacity as the major challenges responsible for women's massive presence in the informal sector.[145]

Gender Legal and National Strategies Context

333. **Chad** has made considerable progress in enacting laws to protect human dignity and gender equality. This progress is evident in the signature or ratification of various international and national legal instruments. Challenges remain however as although the Chadian legal framework is conducive to the promotion of gender equality, the current National Gender Policy emphasizes that ignorance of these international and national texts by men and women, their poor application and the coexistence of customary and religious law undermine the effective implementation of the legal and institutional instruments at all levels of society. Hence, there are several major obstacles to women's empowerment including inequalities in family law, marriage and inheritance, ownership rights and the persistence of gender-based violence (female genital mutilation, early marriage).[146]

334. **Sudan.** As articulated in the Interim Constitution (2005), the (draft) Interim Constitutional Document of Sudan (2019) guarantees that women and men are equal before the law and have the right to legal protection without discrimination (Article 48). There are however major barriers to justice include a lack of awareness of legal rights at both community and institutional levels and there is often little knowledge of legislation and policies related to children, marriage and sex either within local communities, or at local institutions such as the police and traditional courts. Notably became with first African nation to develop Female Genital Mutilation / Cutting (FGM/C) legislation

[141] United Nations Environment Programme, UN Women, UNDP and UNDPPA/PBSO (2020) Gender Climate & Security: Sustaining inclusive Peace on the Front lines of climate change
[142] FAO (2018) Profil National Genre des Secteurs de l'Agriculture et du Développement Rural Tchad
[143] *Third Survey on Consumption and the Informal Sector in Chad ECOSIT 4 – 2018.*
[144] ECOSIT 3, 2011
[145] African Development Bank (2020) Gender profile of the Republic of Chad – From the Economic Empowerment of Women and Girls to the Dividend
[146] Ibid

prohibiting Type 3 FGM/C or the pharaonic form of FGM/C.[147] Attempts to enforce the law however were 'extremely rare' and there was limited social support. Sharia law was subsequnetly introduced in 1983 and the article was removed from the Criminal Act. In 2005, the Interim Constitution included an abolition of 'harmful customs and traditions which undermine the dignity and status of women' but no explicit reference to FGM/C.

335. The current justice system in Sudan remains unclear and 'ineffective', in particular in regions affected by conflict and instability, as access is inhibited by geographical distance and security concerns. The Sudanese Human Rights Initiative[148] highlighted that a lack of access to justice and the right to a fair trial has effectively 'denied' the basic human rights of various vulnerable and marginalised groups, including women, IDPs, and those belonging to ethnic and religious minority groups.[149]

Document	Gender Analysis
Sudan - Laws[150]	
Draft Constitutional Charter for the 2019 Transitional Period	The draft constitution guarantees and promotes women's rights in Sudan in all social, political, and economic fields, and combats all forms of discrimination against women through: • The establishment of a Women and Gender Equality Commission • Protecting women's rights as set forth in international and regional agreements ratified by Sudan. • Guaranteeing to both men and women the equal right to enjoy all civil, political, social, cultural, and economic rights, including the right to equal pay for equal work, and other professional benefits. • Guaranteeing women's rights in all fields through positive discrimination. • Combating harmful customs and traditions that reduce the dignity and status of women. • Providing free healthcare for motherhood, childhood and pregnant women.
Criminal Procedure Act (1991 / 2015)	• The Criminal Procedure Act of 1991 provides some protections for women during court proceedings. It protects victims from being subjected to questions that include offensive phrases and comments, and prevents flagrant and emotionally harmful questions, unless focusing on essential facts related to a case. • The Criminal Act was amended in 2009 to include a provision on special protection for women during armed conflicts. The Armed Forces Act of 2007 also includes an article on special protection of women during armed conflicts • The Criminal Act was amended in 2015 to criminalize sexual harassment. • Many women who experience sexual violence are reluctant to initiate criminal cases. Rape and sexual crimes are associated with shame and disgrace, many women avoid therefore reporting such crimes, particularly if the police and prosecution officer responsible for pursuing the case is a man.
National Civil Service Act (2007)	The act and relevant regulations stipulate equal pay for equal work, the right to selection and promotion based on qualifications and achievements, right to maternity leave, waiting period (Iddah), decreased working hours for nursing mothers, and avoiding the use of women for dangerous work. The act also emphasizes open competition in selection of employees for civil service jobs.
Labour Act (1997)	• The Labour Act provides that women have rights regarding maternity leave and working mothers' have the right to nursing periods.

[147] Badawi, Z. A and Folcio, A. (2016) *Gender Analysis for Sudan 2016*
[148] SHRI (2019) *A Report on Freedom and Belief in Sudan,* Sudan Human Rights Initiative.
[149] African Development Bank and UN Women (2020) Country Gender Equality Profile: Sudan – Prospects for a new era?
[150] UNDP, UNFPA, UN Women, ESCWA (2018), Sudan – Gender Justice & The Law

Document	Gender Analysis
	• A female worker shall, after six months of service and for each further year of service, be entitled to maternity leave with full pay. If a woman is absent from work because of a disease resulting from her pregnancy or confinement that prevents her from resuming her work, as certified by a doctor, she shall be considered to be on sick leave • The principle of equal pay for equal work shall be given due regard in specifying wages on the basis of the nature of the work, the difficulty of its duties and responsibilities, and the conditions under which it is performed • Article 19 of the Labour Act prohibits women from working in occupations that are hazardous, arduous or harmful to their health, such as carrying weights or assigning women to perform jobs under ground or under water or jobs which may expose them to poisonous material or to temperatures exceeding the normal limits borne by women.
Sudan - Policies and strategies	
The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)	Sudan has currently not signed CEDAW although debates are ongoing for signing and ratifying the convention.
Protocol on the African Charter on Human and People's Rights on the Rights of Women in Africa	Sudan signed the protocol in 2008 however discussions are still ongoing as to its ratification. The Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa, better known as the Maputo Protocol, is an international human rights instrument established by the African Union that went into effect in 2005. It guarantees comprehensive rights to women including the right to take part in the political process, to social and political equality with men, improved autonomy in their reproductive health decisions, and an end to female genital mutilation. It was adopted by the African Union in Maputo, Mozambique, in 2003 in the form of a protocol to the African Charter on Human and Peoples' Rights
Framework of Cooperation of the Republic of Sudan and the United Nations on the Prevention and Response to Sexual Violence in Conflict. (2020)	The Framework of Cooperation (FoC), aims to strengthen bilateral relations, through preparation of joint programmes to maintain protection from sexual violence in conflict (prevention and response) and strengthening and supporting established national mechanisms according to their needs, as well as enhancing capacity building programmes to service providers, prosecutors and law enforcement personnel, in addition to raising awareness of local communities regarding the reporting on sexual violent crimes and countering stigmatization of survivors. The FoC also reaffirms the cooperation in the field of rule of law and accountability according to relevant regional and international agreed norms.
National Policy for Eradication of FGM/C in One Generation (2008–2018)	• The main government policy on Female Genital Mutilation / Cutting (FGM/C) is the National Policy for the Eradication of FGM/C in One Generation (2008–2018) • According to Sudan Central Bureau of Statistics 2014 data, 86.6 per cent of women aged 15 - 49 years have been subjected to FGM/C. • The Government opposes FGM/C but the practice has not yet been criminalised.
National plan to combat violence against women (2012–2016)	A five-year national plan to combat violence against women (2012–2016) was adopted. A draft national policy to combat violence against women and children has been drawn up for the period 2016–2031.
National Plan for Combating Gender-based Violence (2005)	A national unit responsible for combating violence against women was established in the Ministry of Justice as a mechanism for coordination among ministries, states, NGOs, and UN bodies (Combating Violence Against Women Unit). Among its tasks are: designing policies and strategies for combating violence against women and children, establishing similar units at the state level, conducting research and studies, preparing reports, reviewing laws, and providing recommendations for amendments.

Document	Gender Analysis
Chad - Laws[151]	
Constitution	The constitution recognizes the promotion of gender and the youth as crucial to achieving gender equality and the imperative need to mainstream these issues in order to ensure sustainable human development
Labour Code (Law No. 38/PR/98)	The Labour Code ensures both sexes equal opportunity in employment.
Law on the promotion of productive health (No. 06/ PR/2002 of 15 April 2002)	The Law promotes reproductive health and prohibits female genital mutilation, early marriage as well as domestic and sexual violence.
Law No. 16/PR/2006 on structuring of the education system	The taw seeks to, inter alia, ensure that all Chadian children have equitable access to quality education, and to promote the enrolment of girls in school by eliminating stereotypes and other socio-economic and cultural obstacles to the full development of girls and women during the learning process.
Law No. 006/PR/2015 on the prohibition of child marriage.	The law prohibits child marriage in Chad sets the minimum age for marriage at 18 years, and establishes a prison sentence of 5 to 10 years and a fine of 500,000 to 5,000,000 francs for any person who compels by any means whatsoever a minor to marriage.
Chad – Policies and Strategies	
The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)	Chad ratified CEDAW in 1995 and is an international legal instrument that requires countries to eliminate discrimination against women and girls in all areas and promotes women's and girls' equal rights. It has often been described as the international bill of rights for women and sets out a comprehensive set of rights for women in civil, political, economic, social and cultural fields.
Five-year Action Plan for the implementation of the National Gender Policy 2019 – 2023	The objective of the Action Plan is to promote equality between men and women for sustainable development and to work towards ensuring that by 2030 Chad will be a country free from all forms of inequalities and gender inequities, from all forms of violence where men and women have the same opportunity, access and control of resources and participate in an equitable manner at the level of decision-making bodies with a view to sustainable development
The Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (2003)	Similar to Sudan, Chad has also only signed the Protocol without ratification as yet.
Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, supplementing the United Nations Convention against Transnational Organized Crime (Palermo Protocol)	Chad ratified the protocol on 27/07/2009 that stipulates that states parties must adopt or strengthen legislative or other measures to discourage the demand that fosters all forms of exploitation of persons, especially women and children that leads to trafficking.
National Gender Policy (2017)	Promote equality between men and women with a view to sustainable development and aims for Chad by 2063 to be free from all forms of inequalities and gender inequities and all forms of violence where men and women have the same opportunity to access and control resources and participate equitably in decision-making bodies with a view to sustainable development.

[151] African Development Bank (2020) Gender profile of the Republic of Chad – From the Economic Empowerment of Women and Girls to the Dividend.

Document	Gender Analysis
	The NGP emphasizes that ignorance by men and women, the poor application of national and international laws and the coexistence of customary and religious law undermine the effective implementation of the legal and institutional instruments at all levels of society. There are therefore several major obstacles to women's empowerment including inequalities in family law, marriage and inheritance, ownership rights and the persistence of gender-based violence (female genital mutilation, early marriage).
National Health Development Plan (2018 – 2021)	The main objective of the National Plan is to ensure universal access to people-centred quality, comprehensive, integrated, continuous health care in order to effectively contribute to the socio-economic development of the country.
The Five-Year Plan for the Development of Agriculture in Chad 2013-2018	The plan supports the access of women and youth to productive resources.

Differentiated Climate Change Impacts on Gender (Sudan and Chad)

336. **Globally** there is increasing attention on the differentiated climate change impacts on men and women, and their differentiated capabilities to adapt to these. There is growing evidence demonstrating how the livelihoods of both men and women may be affected differently by climate change, due to culturally established roles such as the gendered division of labour (like caring for children) or land ownership. Currently, however, there are no in-depth studies regarding gender-differentiated impacts of climate change in Chad and Sudan.

337. **Climate change** severely affects the poorest and most vulnerable populations, particularly women and girls because of the increased time burden, reduced economic opportunities, and health implications associated with increasingly scarce resources and the disproportionate exposure to risk from climate-induced phenomena, such as floods and hurricanes, compared with men. The number of women farmers—and those performing traditionally male roles—has grown out of the impacts of climate change and environmental degradation. All regions in the Sahel have suffered from increasing temperatures, uneven distribution and variability of rainfall, and drought. In turn, this has affected the livelihoods of pastoralists and farmers, with men migrating to the capital of Khartoum or other cities in search of employment. In turn, women—whose traditional roles have been caring for children and performing household chores—have stepped into the role of providers. By renting fields for their livestock and crops, they have been able to sell goods at the market and earn a small income. The women are left on the frontlines of both climate change and climate change-related conflict. Climate change is leading to shifts in livelihood patterns that are resulting in men either migrating away from the communities to find alternative employment or changing the migration patterns in such a way that women, instead of travelling with the men, now stay within the community.[152]

338. Violence against women and girls creates a vicious cycle, undermining households' and communities' capacities to adapt to environmental changes which in turn reinforces gender-based violence and discriminatory practices. For example, the practice of denying women's access to and control over resources creates economic stress for the entire family. Economic insecurity is in turn exacerbated by climate change that results in families being less able to keep their children in school, making adolescent girls more vulnerable to early marriage and young men more vulnerable to being enlisted in armed groups, and driving male migration. The consequences are detrimental for climate-resilience capacities, reinforcing women's lack of safety and undermining social cohesion in communities of origin.[153]

Gender-related issues raised from community consultations.

339. The project will use multiple and pro-poor targeting strategies to address the majority of women that work in agriculture in both sides of the project area, it will also do this by applying a selection criteria focused primarily on poverty, isolation, difficulty of access to water and climate vulnerability. The project will additionally implement a comprehensive outreach strategy that will involve extensive community consultations and will ensure that women

[152] UNEP (2019) Empowering Women on the Front lines of Climate Change. https://www.unenvironment.org/news-and-stories/story/empowering-women-frontlines-climate-change

[153] United Nations Environment Programme, UN Women, UNDP and UNDPPA/PBSO (2020) Gender Climate & Security: Sustaining inclusive Peace on the Front lines of climate change

are fully consulted in accordance with the AF Gender Policy on gender inclusion and consultations. A gender-sensitive approach was used for the consultations that contributed to the developing of the AF proposal and which have fed into this Gender Assessment. To ensure inclusive coverage of the target population, gender-segregated community consultations took place in the project area and focused on the highly vulnerable, including consultations with refugees and IDP groups of women. As part of the remote consultations women groups and gender-focused agencies and NGOs have also been consulted and all reported similar concerns that have been integrated into the project design. These include the need for basic literacy in financial and business matters, basic means of production and adding value to farm products such as mill grinders, food packaging, but also basic farm tools and means to transport to the market. The main concerns also heavily touched on the hardships faced by women, particularly in getting access to water and sources of energy such as firewood and charcoal. Women also face frequent harassment as a result of having to travel long distances to procure the essential basics, but also as a result of a lack of latrines for non-camp inhabitants and therefore having to relieve themselves in the open bush.

Project responses to climate change gender inequalities.

340. In view of the differentiated vulnerability of all beneficiaries in the project area to the interlinked challenges of climate change, it is critical to address the developmental needs of increased drought, access to water, land degradation and gender discrimination. This will help develop and implement a more enabling and gender-transformative environment for addressing climate change. Women in the West Darfur / Assongha face specific barriers to their basic human needs and persistent patriarchal attitudes that limit their options. Given their increased vulnerability to climate change, the project will aim to (i) promote economic empowerment; (ii) enable women and men to have an equal voice and influence in rural community-based organisations; and (iii) achieve a more equitable balance between women and men in the distribution of work and economic and social benefits. The project will challenge social norms that perpetuate inequalities between men and women.

- Ensure that women and men have respectively 60% and 40% access to capacity building, training and productive assets. Furthermore, specific services and trainings will target women on a 100% basis i.e. for outcome 3.2. This includes 12,000 women and 5,000 youth under output 3.1.2 for the implementation of Rainfed Farmer Field Schools; 240 women and 100 youth for the high-efficiency irrigation pilot in output 3.1.3; 780 women and 325 youth to receive training in standard irrigation FFS; 168 women and 70 youth to receive support for the production of seeds; and 1,200 women and 300 youth.

- Increase women's voice in decision-making at the household and community level. As part of literacy and life skills, leadership training will also be included. Women will be trained to form groups and their leadership and negotiation skills will be strengthened to enable them to make informed decisions during the community planning process. It is expected that women in representative position (committees) will be 50%. Gender-awareness trainings (including Gender-based Violence – GbV) will be mainstreamed into all training to men and women will be carried out at both household and community levels, including village leaders.

- Women will be 100% beneficiaries for outcome 3.2 with trainings in literacy, life skills and nutrition (including young women). Furthermore, women will be 60% beneficiaries of FFS where they will be able to acquire practical knowledge for livelihood improvement through FFS and climate resilience. Women will be 60% beneficiaries of training package under outcomes 2.2 and 3.1 including in climate resilient irrigation technologies, improved soil and water conservation practices, water management. 100% of women will be targeted for IGAs and moringa plantations that will help reduce their burden in wood collection but also provide additional income, improve the environment (contributing towards the Great Green Wall Initiative - GGWI).

- The project will also aim to improve nutrition education at both household and groups level under outcome 3.2 and will aim to improve nutrition and dietary knowledge. Specific attention will be given to young women, including also women refugees, IDPs and returnees.

- The SCCIWM will ensure that training modules for project staff and extension services include specific sections related to gender sensitive topics, including GbV. The project will produce/adapt and oversee the training modules and curricula that will be delivered to targeted communities/ households and the work of community facilitators and all project staff.

Annex 8: Governance Structure of the Transboundary Project Area

Population Size and distribution

341. **Total population** in the project area is estimated at 706,358 persons in 2020 divided between 51.8% (365, 695 person) in Assooungha and 48.2% (340,663 persons) in El Geneina Locality with an average household size of 6 persons the total number of households is estimated to be 117,726 households. Data from the El Geneina locality show that the female/male composition of the population was 103.4% in 2020 indicating male outmigration and implying that more women becoming heads of households. Regarding the size of the household field data show that the majority of households (62%) are made up of 6 members; 34% of households have between 6 and 9 members, whilst only 4% have 10 or more members. The population structure by age group shows that the population in the project area are very young with the youth in the age group 19-34 years accounting for 25% of the population. A large proportion of the population in the target area are classified as IDPs (148,533 persons) in El Geneina Locality and refugees (57,749) in Assoungha in Chad. All the refugees in Chad are of Darfur origin, and mostly from Al Geneina Locality in West Darfur.

342. **Population: Tribal / Ethnic composition.** The population of the project area is highly diverse along socio-cultural aspects, including ethnic and tribal lines. The Masalit, constitute the majority of the population in both the Chadian and Sudanese sides of the project. Other tribal groups in Assongha include the Ouaddaïens (the second largest group), the Zagawa, Mimi, Tama, Gourane Charfada, Assangoui and Arab groups. In El Geneina locality, as in other parts of Darfur, communities are often classified by livelihood and ethnicity (i.e., “African” or “Arab”). The primarily cleavage is between communities whose members are identified either as “African farmers” or “Arab nomads”. However, the Locality reflects an apparent cultural diversity as it consists of approximately 36 ethnic/tribal groups. The Masaleit, who are considered to be an African farming community, constitute the largest group and their paramount chief occupy the highest rank position (Sultan) in the Native Administration hierarchy in all of West Darfur State which is considered as the historical homeland of Masalit. Other sizable groups that are present in the Locality are the Fur tribes, Zaghawa, Berno, Aringa, Tama, Dago, Arab, Hawsa, Falata, Barti, Noba, Kanio, Meima. Considerable groups of West African origin are also present, especially in the big towns and the local markets in the rural areas.

343. The Arabs are mainly pastoralists live in semi-permanent residents called “Damrah” or Farig (nomadic camp) which is usually small consisting of 7-8 households connected through kinship relations. The pastoralists are usually categorized as camel herders or cattle herders and they move seasonally (during dry season) across the borders into Chad, Central African Republic and the Republic of South Sudan. Because of that the project area is crossed by number of transhumance routes. However, a strong tendency towards taking of agriculture has been widely reported among the camel herders and which is usually connected with the issue of land disputes.

344. **Human settlements** in the project area comprise five major types, namely: (i) Permanent villages which are mainly inhabited by settled farmers; (ii) urban centres dominated by the administrative centres; (iii) Farigs which are typical nomadic pattern; (iv) IDPs camps; (v) return sites; and (vi) refugee camps. Villages remain the dominant settlement pattern with the average settlement size varying considerably to include any number between 5000 and 40 households. But generally, the return sites are usually small compared to permanent settlements. Data from four return sites show that the number of households in the site varies between 340 households and 750 households with an average size of 598 households per site. The IDPs camps are usually of large population size with total households in 10 IDPs camps inside El Geneina Town being around 17,400 HHs.

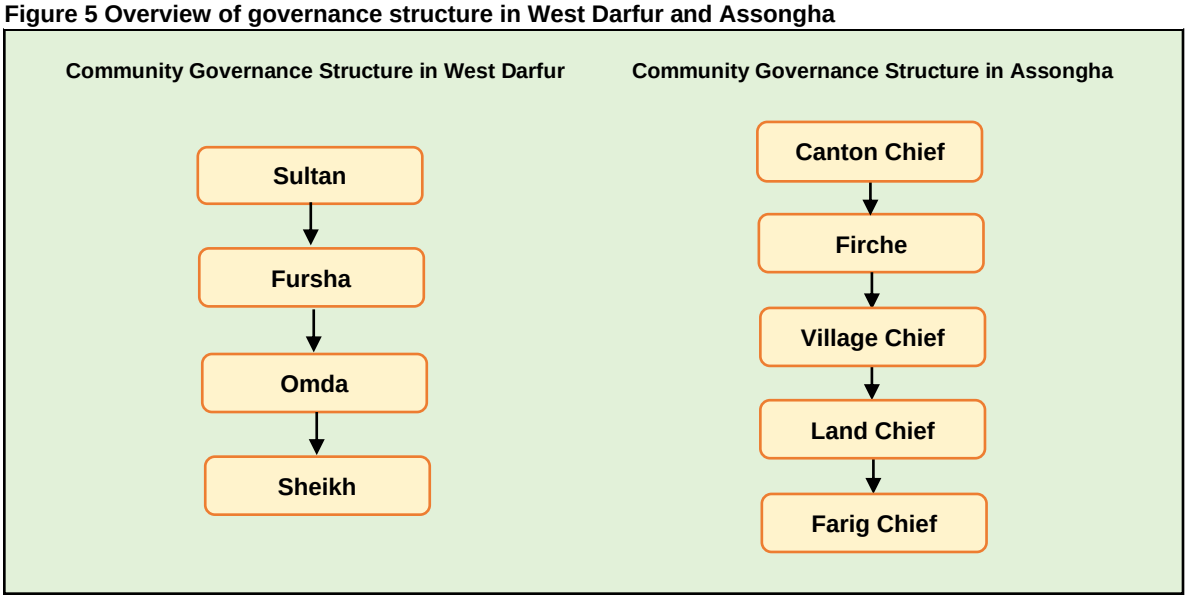
Community governance

345. **Community governance** in the two sides of the target area are not too dissimilar from each other as they are founded on the customary tribal institutions where the Canton Chief / Sultan is the highest level of the hierarchy at province / state level, followed by the Fursha as the second tier (at the locality level) and is assisted by Omda / village chief (sectoral level) and finally the sheiks at the lowest level of villages and Farig Chiefs (see figure below). However, the position of land chief in Assonga does not exist in El Geneina as the position is fully integrated as the role of the sheikh, the lowest level in the hierarchy.

346. The role of the customary institution relates directly to land and natural resource management besides providing for conflict resolution at the community level and in addition, the institution provides the entry point to the communities. It is important to note that project consultations have identified that the IDPs and refugees have established their own Omdas and Sheiks in the camps due to a lack of trust in the formerly recognized Sheikhs and

Omdas whom they accused of being politicized and manipulated by the Government and therefore unaccountable to the communities on the ground.

Figure 5 Overview of governance structure in West Darfur and Assongha



Annex 9: Overview of the CLTS programme

347. **Community-led Total Sanitation (CLTS)** is implemented in 5 phases: i) Introduction and rapport building; ii) Participatory analysis; iii) Ignition moment; iv) Action planning by community; and iv) follow-up. In the first stage which will be implemented as part of phase one of the outreach programme detailed in the table above in the villages that have been identified as practicing open defecation. This will involve an informal walk through the village (a transect walk) with the aim to motivate people to carryout out a more substantial analysis with the whole community. Phase two, **participatory analysis,** will involve engaged discussions about the faeces littered around and help them make the connection of any dog or other animals that they may own that would eat the faeces and then return to the village and play with the children. Once interest is generated the next stage is to facilitate a comprehensive analysis by the local community of sanitation in their own village, using participatory rural appraisal (PRA) tools and methods which are simple, visual and practical ways of involving people in discussing and analysing their situation, such as drawing maps or ranking different options. This will start with a transect walk with the objective to help the community members to realise for themselves how sanitary or unsanitary their behaviour is and decide whether they need to change. Change has to be generated organically from the beneficiaries, this process requires community ownership of the problem.

348. The process will also involve the mapping of defecation areas by creating simple maps of the community to locate households, resources and problems to stimulate discussion. The objective is to engage all community members (women and men) through a practical and visual analysis of the community sanitation situation. The community members will need to identify a large open area of ground where the map can be drawn. During the mapping exercise all community members are invited to locate themselves on the map, and indicate whether they have latrines or not. The areas of open defecation are marked and lines drawn to connect them to the households that visit them and the SP would need to draw attention to how far some people have to walk to defecate and at what times of day, any safety issues that women may be exposed to need to also be addressed. Participants will then need to be asked to draw lines of faecal flows from places of open defecation to ponds and other water bodies, resulting in their contamination. Additional analyses will involve the calculation of the quantity of faeces that the community produce on a daily basis and where this all ends up.

349. **Ignition moment.** The key point in of the process is the triggering moment that is reached when the community arrives at a collective realisation that due to open defecation everyone is ingesting each other's faeces and making them ill, and this will continue unless open defecation is stopped definitely. It is at this moment that the facilitators should thank the community for the analysis and conclude. The purpose of the process is to generate community discussions, not to instruct. Following the CLTS guidelines, and to be sensitive to age-old cultural practices the facilitators should conclude and thank the community members explaining that the project is not selling latrines or to give money. Reminding community members that if they continue their practices that they will continue to be exposed to everyone's faeces and continue to be ill and have to continue to pay for associated medical costs. They aim is to generate animated discussions on how to stop open defecation among themselves without facilitator intervention. Should the communities be interested in stopping open defecation through latrines but are offput by the cost, then it should be explained and demonstrated that there are very cheap options available that communities can construct themselves.

350. **Action Planning.** Once interest is generated then the facilitator should encourage and motivate the community and help them in the action planning. This will involve the forming a sanitation action group (drawing representatives from all the neighbourhoods of the village and including 50% women); Making a list or map of households and their present sanitation status; Developing individual family plans to stop open defecation. In the early days, related households often construct common toilets to share; Digging pits and using them as makeshift latrines for the short term; Getting commitments from better-off families to start constructing latrines immediately; Looking for suppliers of latrine construction materials.

351. **Community action follow-up.** Well-ignited CLTS sparks off urgent collective action that reduces open defecation practices very fast and might achieve 100 per cent open defecation-free status within a few weeks to a few months depending on the size of the village. It is usually either instant or never. Follow-up by the SP is important, in order to ensure that CLTS is sustained and improvements in latrines are made over the long term. For this it is important to identify community leaders and encourage them to take charge of ensuring that action plans are followed through and changes in behaviour are sustained. Once total sanitation is achieved, encourage the community members to put up a board or sign stating to this effect. This will increase their sense of pride and also serve to awaken interest among visitors to the village who may be interested in doing the same back home. To

ensure that people do not revert back to old behaviours once total sanitation has been achieved, the community might decide on a penalty for those who continue to practise open defecation.

352. The CLTS is sustainable as over time the gradual behaviour change of the community start using toilets and get used to the safety, convenience and comfort, and tend not to want to go back to open defecation again. Behavioural change, rather than the construction of quality latrines, is the key to the sustainability of the CLTS approach. However, the first locally made low-cost latrines might not last long: within a year or so they may have filled up or the shelter may have fallen. Often a household will spontaneously construct a better and more durable toilet when this happens. Follow-up may be needed, to encourage community members to follow through with the commitments they have made.

Annex 10: Refugee / IDP Camp Statistics.

353. The below statistics show a picture of the situation facing the refugee and IDP camps in Chad and Sudan respectively.

Chad:

Treguine camp

The camp opened on September 1, 2004, covers an area of 127 ha. and is mainly populated by the Massalit community. The camp has a population of 14,600 women and 12,500 men.

Health: The Treguine camp has one health center for the care of refugees and the host population, as well as a Joint Health Committee. All these centers are accessible to host populations as well as to refugees. Consultations are free.

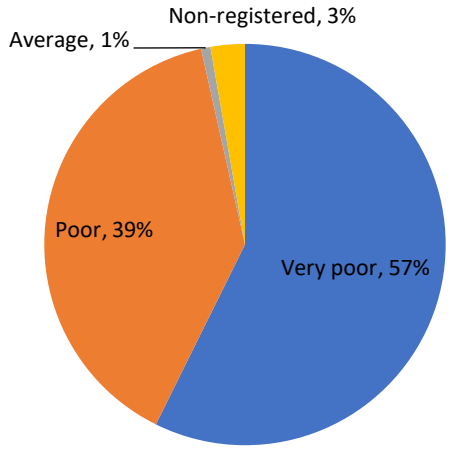
Hygiene and sanitation: The camp has 87 public latrines and 3,012 family latrines with an average ratio of 9 people per latrine. There are 13 garbage disposal points at the camp.

Community infrastructure Five community infrastructures are present in the Treguine camp, these are: 1 women's center; 1 youth center; 1 Psychosocial Office; 1 distribution site; 1 Community Service Office.

Support towards empowerment or self-care 1,521 people, (62% are women), received equipment/assistance for agricultural production and livestock activities from UNHCR; 3,803 animals belonging to 442 households were vaccinated: 3,803 belonging to 442 households; 447 households have access to agricultural land through advocacy by UNHCR and its partners; 01 irrigation farming site for the mixed group (Refugees and sedentary people); 114 women received loans to develop their small businesses; 42 people received technical and vocational training.

Water Average amount of water per person per day: 13.24 liters; Water wells: 27 human motor pumps of which 24 functional with a water production capacity: 1 to 5 m^3 of water per hour.

Figure 6 Poverty in Treguine refugee camp



The Bredjing Camp

The camp opened on May 19, 2004, covers an area of 193 ha and is mainly populated by the Massalit community. The camp's population comprises 27,673 women and 22,646 men.

Health: the camp has two health centers one for the camp inhabitants and one mixed for those in the camp and the host community.

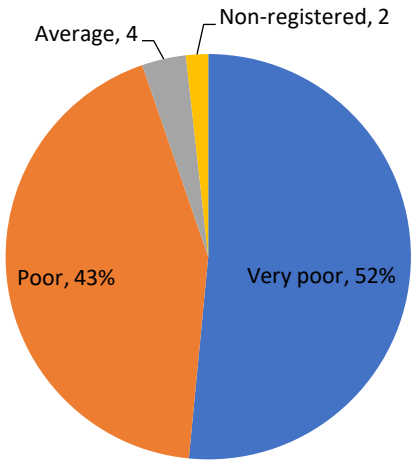
Hygiene and sanitation: There are 202 public latrines in the Bredjing camp and 4,986 family latrines for an average of 23 people per latrine and 9 waste disposal sites.

Community infrastructure: there are 6 community centers / infrastructure: 1 woman center; 1 youth center; 1 psychological support / social office; 2 distribution centers; and 1 meeting room.

Support towards empowerment or self-care: 1,804 people, (70% of women), received equipment / assistance for agricultural production, livestock and fishing activities; 6,151 animals vaccinated animals belonging to 715 households; 523 households with access to agricultural land through advocacy by UNHCR and its partners; 87 women received loans to develop their small businesses; 14 people received technical and vocational training.

Water quantity per person/day: 13.80 liters; 5 connected and functioning water wells with a production capacity of 647 m^3 /day.

Figure 7 Poverty in Bredjing refugee's camp



The Farchana Camp

The Farchana refugee camp opened on January 17, 2004. It covers an area of 172 ha, of which 77% is a residential area. The camp is subdivided into 26 districts called blocs and according to UNHCR data from March 2021, there are 6,765 households living in the camp with a population of 30,702 people of which 16,992 women and 13,710 men.

Health there are 2 health centers in the camp one for the camp residents and one for both the camp and the host community.

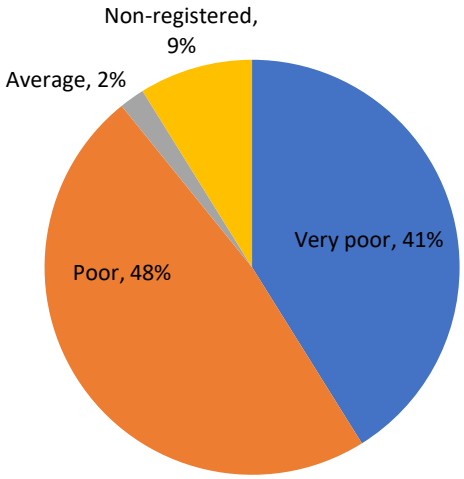
Hygiene and sanitation: There are 138 public latrines and 3,534 family latrines with an average of 8 persons per latrine. There are also 9 waste disposal sites.

Community infrastructure: There are 5 community center / infrastructures in the camp of which 1 women center, 1 youth center, 1 distribution center and 1 meeting room.

Support towards empowerment or self-care: 1,420 people, (60% of which were women), received equipment / assistance for agricultural production, livestock and fishing activities; There are 8,000 vaccinated animals belonging to 317 households; 560 households have access to agricultural land through advocacy by UNHCR and its partners; and 59 people received technical and vocational trainings.

Water quantity per person/day: 11.3 liters; there are 3 productive water wells that are connected and functioning with a capacity production of 341 m^3 /day.

Figure 8 Poverty at Farchana refugee camp



Sudan

West Darfur is home to 10 IDP camps in and around the state capital, El Geneina town as per the most recent information that was available during the project consultations. It is estimated that the IDP population (149,000) represents 44% of the local population, this is in addition to 19,102 classified as voluntary returnees. The overwhelming majority of the IDPs (82.4%) are children (59.7%0 and adult women (22.6%) while adult men represent 17.7% of the total IDPs.

Figure 9 IDPs in El Geneina, 2020 by camp name

No	Locality	IDPs Camp Name	Men	Women	Children	Total
1	El Genina	Ardamata	4,480	5,538	17,890	27,788
2		Kerndang 1	4,680	5,718	18,390	28,869
3		Kerndang 2	5,949	6,799	11,050	23,798
4		Riyadh	2,303	2,632	4,277	9,212
5		Abuzar	3,045	4,018	13,029	20,092
6		Hujaj	2,131	2,812	9,119	14,062
7		Dorti	586	775	2,513	3,874
8		Sultan House	1,364	2,868	4,771	9,003
9		Zalingi University	1,522	2,011	6,515	10,084
10		Jama	265	350	1136	1,751
Total			26,325	33,518	88,690	148,533
%			17.7	22.6	59.7	100.0

Source: Humanitarian Aid Commission HAC, West Darfur State, 2020

Vulnerability information about the camps is limited and the most recently survey was conducted by WFP in 2015[154] when there were 9 camps. The survey found that overall, 26% of households either benefitted from employment, access to land and ownership of a cart, or a combination of the three, where employment includes crop, livestock, agricultural labour, non-agricultural wage labour, non-salary work, salary work and small business or petty trade. Another 40% fell within the 'medium' vulnerability category where they only had one of the three and 33% were within the 'high' vulnerability category where they didn't have any indicators. The following table provides an

[154] https://reliefweb.int/sites/reliefweb.int/files/resources/idp_profiling_-_geneina_results_final_25june2015.pdf

oversight of the several key factors across the 9 camps, including employment, access to land, level of education and housing.

							Education				Housing			
Camp	HH profiled	High and Medium	Low and None	Assets	Employed	Land access	None	Primary/ Khalwa	Secondary	University	Mud/mud brick	Stone/concrete	Mats/Thatch	Plastic Sheeting
Dorti	2,512	48	52	13%	90%	74%	48%	37%	14%	1%	4%	1%	47%	48%
Kirinding 1	5,793	69	31	3%	58%	27%	63%	33%	4%	0%	3%	1%	15%	81%
Sultan Hous	1,531	70	30	9%	72%	30%	36%	52%	10%	3%	8%	5%	22%	65%
Abuzar	4,643	77	23	25%	66%	23%	37%	52%	10%	1%	8%	4%	20%	69%
Riyadh	5,764	77	23	13%	45%	21%	57%	38%	4%	1%	9%	7%	21%	63%
Ardamata	8,173	78	22	13%	71%	40%	47%	46%	6%	1%	NA	NA	NA	NA
Kirinding 2	2,795	78	22	4%	76%	20%	38%	54%	7%	1%	1%	1%	5%	93%
Hujaj	1,485	83	17	2%	88%	11%	42%	53%	5%	1%	11%	1%	14%	74%
Jama	568	99	1	1%	9%	1%	70%	27%	2%	1%	1%	1%	0%	98%
Weighted average		**74%**	**26%**	**11%**	**65%**	**31%**	**49%**	**44%**	**6%**	**1%**	**4%**	**3%**	**15%**	**54%**

The assessment by WFP will need to be updated during the outreach phase of output 1.1.1 to get a more recent indicator of the status of vulnerability. It however possible from this survey to determine that there are camps that better and also worse off compared to the others. Jama camp is for example according to the WFP survey by far the worse off of the camps having the highest proportion of households with no asset ownership, no employment, no land access, no education, and the highest number of households living in plastic sheeting. Dorti camp on the other hand is generally the best off having the highest percentage of households with a working member, land access, secondary school education and the lowest rate of populations living in plastic sheeting.

Annex 11: Gantt Chart

Output	Activity	Project Year															
		PY1				PY2				PY3				PY4			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Component 1																	
Output 1.1.1	Implementing partner (service Provider) costs for implementation of output 1.1.1																
	Community mobilization and sensitization workshops, transport supporting equipment																
	Stakeholder awareness workshop																
	Mapping the role of customary institutions																
	Training to strengthen the role of customary institutions in NRM and conflict resolution mediators (connected with output 1.2.6)																
	Technical support in the in the implementation of the outreach programme, and mapping																
Output 1.2.1	PMU Climate change awareness raising campaign (Radio programmes, posters, flyers, video clips etc)																
Output 1.2.2	Inception Workshops																
Output 1.2.3	Baseline assessment																
Output 1.2.4	Hiring of consultant for the development of guidelines based on climate-resilient agricultural practices and mainstreaming based on the lessons learned and best practices																
Output 1.2.5	A team of consultants to develop a Project Implementation Manual and Technical Feasibility Report to assist in project implementation																
Output 1.2.6	A team of national consultants to map context-specific drivers of social conflict and development of conflict resolution strategies through identifying historical connectors and resolved conflict. (linked to output 1.1.1)																
Output 1.2.7	Hiring of expert international consultancy for a comprehensive climate risk assessment																
Component 2																	

Output	Activity	Project Year															
		PY1				PY2				PY3				PY4			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 2.1.1	Specialised services in water monitoring software development																
	Designing training programme and training of national staff to conduct water use mapping and in using computer software and use of database (10 technicians)																
	Procuring of groundwater resistivity meters and computer equipment																
	Transport support for implementing partner in water mapping																
	Technical support for implementing partner to conduct mapping																
	Bi-national technical workshop support (transport, refreshments)																
	Technical support and M&E																
Output 2.1.2	Design, procurement and installation of ground water monitoring equipment																
	Design and implementation of training programme on water and climate related information acquisition.																
	Bi-national technical committee meeting support (transport, refreshments)																
	Technical support for the installation and operation of the motoring stations.																
Output 2.1.3	Procurement and installation of AWS																
	Technical support in the installation of the AWS																
Output 2.2.1	Topographic survey, hydrological and hydrogeological investigations																
	EIA of water harvesting and multiple water use infrastructure																
Output 2.2.2	Design and implementation of facilitator and WUA training programmes.																
	Technical support in the implementation of the technical training programme																
Output 2.2.3	Design and construction of subsurface dams, 50,000 m³ including feasibility studies.																
	Design and construction of concrete wells & solar pumps (output 3.1.4 + 3.2.2)																

Output	Activity	Project Year															
		PY1				PY2				PY3				PY4			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Design and construction of hafirs																
	Operation and maintenance water harvesting infrastructure																
	Technical review and support in the implementation of water harvesting infrastructure.																
Output 2.2.4	Design and construction of new water yards including tubewell and solar pumping system																
	Support equipment for WUAs																
	For technical review and support in the implementation of water yard infrastructure																
Output 2.3.1	Service provider to design and implement CLTS programme including workshops and transport																
Output 2.3.2	Provision and installation of WASH infrastructure																
	Technical support consultant																
Component 3																	
Output 3.1.1	Experts hired to design training programme and to train supervisors, coordinators and implementing partner facilitators																
	Technical support provided in quality assurance for technical level of training programme																
Output 3.1.2	Costs related to setting up and operating Farmer field schools: travel, workshops, on-farm inputs.																
	Implementing partner support in rainfed FFS																
	Technical support provided to introduce and maintain soil management measures																
Output 3.1.3	Experts for the design, approval and installation of on-farm irrigation systems																
	Costs related to setting up and operating Farmer field schools: travel, workshops, on-farm inputs.																
	Implementing partner support in on-farm irrigation																
	Operation and maintenance of on-farm irrigation systems																
	Technical support provided for the expertise in high-efficiency irrigation systems																
Output 3.1.4	Costs related to setting up and operating Farmer field schools: travel, workshops, on-farm inputs.																
	Implementing partner support in on-farm irrigation																

Output	Activity	Project Year															
		PY1				PY2				PY3				PY4			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Technical support provided for the implementation of the FFS																
	Costs related to setting up and operating Farmer field schools: travel, workshops, on-farm inputs.																
Output 3.1.5	Training and workshop costs for seed multiplication. Training of Service providers and farmers																
	Experts in smallholder seed multiplication																
	Purchase of foundation seed supplies																
	For the implementation and support seed multiplication farmers																
Output 3.2.1	NGO training workshop, travel and follow-up costs to deliver IGA training and support for women groups																
	IGA Tool support package to beneficiaries																
	For the implementation and support of IGAs																
Output 3.2.2	NGO to set up of the 50 ha of plantations per country, conducting of training, workshops and travel																
	Tools and materials to set up and operate moringa plantations																
	For the implementation and maintenance of the plantations																
Component 4																	
Output 4.1.1	Travel costs of Platform Participants																
	Operational costs of hosting events																
Output 4.1.2	Assessment of training needs and implementation of regional training and Design and implement of joint regional training of joint harmonized database																
	Exchange visits with key international groundwater centres of excellence and water management commissions / authorities																
	Study upscaling the SCCIWM project																
Output 4.1.3	Specialized services to create a web-based platform and provide technical support and maintenance																

Output	Activity	Project Year															
		PY1				PY2				PY3				PY4			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Binational report on the including new geological and hydrogeological maps																
Output 4.1.4	Development of regional NRM plan and design of a regional monitoring network																
Reporting																	
Quarterly progress reporting																	
PPR reporting																	
MTR																	
Terminal Evaluation																	