ADAPTATION FUND

DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
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# PROJECT/PROGRAMME PROPOSAL

## PART I: PROJECT/PROGRAMME INFORMATION

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| PROJECT/PROGRAMME CATEGORY: | **REGULAR PROJECT** |
| COUNTRY/IES: | **DJIBOUTI** |
| TITLE OF PROJECT/PROGRAMME: | **DEVELOPING AGRO-PASTORAL SHADE GARDENS AS AN ADAPTATION STRATEGY FOR POOR RURAL COMMUNITIES** |
| TYPE OF IMPLEMENTING ENTITY: | **MULTILATERAL IMPLEMENTING ENTITY (MIE)** |
| IMPLEMENTING ENTITY: | **UNDP** |
| EXECUTING ENTITY/IES: | **MINISTRY OF ENVIRONMENT/MIN. OF AGRICULTURE/CERD** |
| AMOUNT OF FINANCING REQUESTED: | **4,658,556** (IN U.S DOLLARS EQUIVALENT) |

## PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

**General context**

1. Djibouti lies in Northeast Africa on the Gulf of Aden at the southern entrance to the Red Sea. It has 314 km of coastline and shares a border with Eritrea, Ethiopia and Somalia. The country is mainly a stony semi-desert, with scattered plateaus and highlands. Djibouti has a land area of about 23,000 $km^2$, and a population of 818,200 people (RGPH 2009) growing at 2.8% per annum, 6.1% considering refugees arrivals. More than 80% of the population lives in urban areas, with 58.1% in the capital city. A Least Developed, low income and food-deficit country, Djibouti has some of the lowest health, education and other social indicators in the world and was ranked 147th out of 169 countries in the 2010 UN Human Development Index.

2. Djibouti's economy is characterised by an extreme dualism: the commercial urban sector, modern and oriented towards exports, and the rural sector, characterized by subsistence economy based on pastoralism, with very limited access to infrastructure, services and markets. The service sector contributes to more than 75% of Djibouti's GDP. Agriculture contributes to a meagre 3%, while the industrial and manufacturing sector accounts for 22% of GDP. Although economic growth has been strong during the last 10 years, it has very little impact on rural population, who even face tougher living conditions with repeated droughts. In fact, Djibouti's economy has shown over the past two decades very mixed performance, marked by the succession of political crises and economic shocks (drought in particular) that have resulted into a continued deterioration of the country's competitiveness. The per capita income has fallen by over 25% compared to its 1984 level, while the deficit of state budget reached 10.1% of GDP in 1995. Unemployment affects around 60% of the active population and the composite index of human poverty in Djibouti is estimated at 42.5%, close to that of the extreme poverty (45%). Recent analysis of the poverty situation shows that it has become a structural problem. Given its scale and its depth, poverty is not just a social issue but has now become a real development challenge for the country.The situation is particularly alarming when it comes to rural communities who bear the brunt of both climatic and economic shocks. While the rural population only accounts for 15% of the total population (DSRP, 2004), the vast majority of rural households, 96.5%, live

below the poverty line, while over 80% of them live in a state of indigence, and are not even able to meet their basic needs.

**Djibouti's agriculture sector**

3. Djibouti's agriculture sector remains very modest and is characterized by its low level of productivity and small contribution to the domestic food supply. The National Strategy for Food and Nutrition Security (2008) estimates that less than 10% of the calories consumed nationally come from domestic production, the remaining 90% being imported from neighbouring countries or from the international market. In both rural and urban areas, households, especially the poorest ones, are overly dependent on the market to access food and cover their basic nutritional needs. This heavy reliance on regional or international food import makes the country highly vulnerable to external market risks that are often beyond its control (e.g. products availability, abrupt surge in food prices, etc.).The under-development and poor economic performance of the agriculture sector is a direct consequence of the country's inherent aridity and its fragile water and soil resource base that constrain local production. It also results for a large part from the low level of investments made so far in modern farming practices, especially in the area of water resource mobilization and management (rainwater harvesting, construction of boreholes, recharge of aquifer, etc.) that are necessary to increase sectoral outputs and productivity in a sustainable and effective manner. Given the predominance of the urban population, the Government of Djibouti has favoured until now the development of the service sector, with the objective of positioning Djibouti as a strategic transit hub that can offer commercial access to the sea to the neighbouring landlocked countries. As a result, few investments were made in agriculture and rural development and productivity levels were stagnant or even on decline, especially during recent dry years. However, because of high poverty rates and limited cash income opportunities in rural areas, agricultural activities do continue to play a critical role in the food supply and daily subsistence of the rural communities involved in production. Though generally insufficient to cater for the food needs of rural dwellers, local agriculture still provides a key contribution and primary means of livelihoods for a vast majority of households, especially those with limited assets and sources of revenue. Moreover, the sector shows important room for improvement, with a productive potential that remains largely untapped due to the absence of effective and sustainable farming policies and practices.

4. In rural areas, two traditional production systems are present: pastoralism and small-scale farming. Pastoralism is an age-old and deeply entrenched tradition that dominates Djibouti's rural economy. Pastoralism is a land use system enabling rural people to cope with the low, unpredictable and fluctuating precipitation between and within years that characterizes Djibouti's climate. Some 90.5 per cent of the country's territory can be classified as pastoral lands that are used for herding. Pastoral activities consist primarily of extensive nomadic herding which often represents the sole source of subsistence for pastoral communities that are estimated approximately at 210,000 individuals. Transhumance is still practiced extensively along grazing routes determined by the presence of water and pasture. Mobility is a highly efficient way of managing the sparse vegetation and relatively low fertility of fragile soils of Djibouti. The country's total herd numbers amount over 1 million head, 89 per cent of these being sheep and goats.

5. Agriculture is a relatively recent activity compared to extensive pastoralism which remains the predominant feature of rural livelihoods in Djibouti. Despite some expansion during the past decades, development of small-scale farming remains very modest in the country, mostly due to the scarce water resources and limited access to reliable water supply in most rural areas. Arable land in Djibouti amounts to 10,000 ha, whose only 388 ha are irrigated (NAPA, 2006). The farmer community is estimated at around 30,000people who cultivate small agricultural plots generally located on wadis' banks, where availability of irrigation water and fertile land is the greatest. Most farmers are involved in fruit and vegetable production, sometimes combined with semi-sedentary livestock production (cheep, gods, camels). In these agropastoral systems, animals usually graze in the nearby rangelands during the rare rainy periods (especially the summer season and "Karan / Karma'' rain) and then receive supplement of forage from the sub-product of cereal cropping (corn or wheat bran). In the past years, the GoD started to diversify local agricultural production by

introducing agro-forestry practices through the plantation of drought and salt-tolerant varieties of date palm trees imported from Saudi Arabia.

6. However, both nomadic pastoral and farming systems, including agro-pastoralism, have reached today their production limit largely due to increasing water stress and land degradation. Over the past 20 to 30 years, pastoralism in Djibouti has undergone profound transformations resulting from environmental and political factors. Being mostly a volcanic arid landscape, Djibouti is highly susceptible to desertification and pastoral communities relying on natural rangelands have been increasingly affected by a mounting trend of aridity and desertification. More frequent and longer droughts of the past decades have inflicted important blows on quality, productivity and spatial distribution of natural pastures and water points which are mainly shaped by rainfall and are critical for livestock survival during the dry season. Declining pastoral resources, coupled with demographic growth have rendered access to natural forage more difficult leading to loss of livestock and significant rise in destitution among pastoral groups. At the same time, government policies constraining herd mobility and encouraging sedentarization have been introduced on the assumption that it is impossible, or anyway too expensive, to deliver satisfactory development services (e.g. health and education) to mobile pastoralists. In response to these drivers, many nomadic communities have settled in the last decades, if not migrated to urban areas, concentrating mainly around relatively reliable water sources and exerting enormous pressures over the neighbouring land and limited water resources. The resulting concentration of livestock further contributes to overgrazing and leads to a continuous impoverishment of vegetation and land degradation in pastures. In addition, recent analyses show that animal productivity and health are low, with a resulting impact on food security

7. . Similarly, farmers and agro-pastoralists are experiencing a severe drop in production and a deterioration of their income. Small scale agriculture is increasingly faced by repeated water shortages that result from longer and more severe drought periods. Reduction in water resources during dry seasons also leads to an increase in the salt content of groundwater used for irrigation of cultivated plots, thereby contributing to the salinization of already fragile fertile soil and severe decline in land productivity. New attempts to diversify agricultural production through plantation of drought and salt-tolerant date palm trees is hampered by the poor genetic potential of date palm varieties used so far (varieties of low productivity, excessive proportion of male trees). In addition to these constraints are the periodic flooding of wadis and subsequent bank erosion occuring during rainy seasons that cause important damage to local irrigation infrastructures and cropland.

**Climate change vulnerabilities and risks**

8. Djibouti is characterized by a very arid and semi-desert type of climate, which makes it extremely sensitive to climate change-induced drought and water scarcity risks. The country has a fluctuating, low and abrupt precipitation regime with annual mean rainfall of 150 mm, mean temperatures comprised between 17°C and 42°C and extremely high rate of evapotranspiration amounting to 2000 mm per year. The aridity of the climate is further reinforced by a particularly hot and dry West wind regime (‘Khamsin’) resulting from the warming and drying of the Eastern African Monsoon (Foehn effect) when blowing over Somalia and Ethiopia’s mountain ranges. Added to this are the effects of La Niña phenomenon, which in severe La Niña years brings drought to the country and sparks food-security concerns in areas that are already water stressed and heavily dependent on rain-fed agriculture and pastoralism. Under historical conditions, Djibouti climatic context is clearly one of high hydrological uncertainty, frequent dry spell and chronic water stress, features that are likely to be worsened by climate change with wide-ranging implications on national economy, food security and human development in general.

9. Past records and recent observations tend to indicate that early manifestations of climate change and associated shifts in rainfall and water regimes are starting to being felt across the country. Data analysis conducted under the Initial National Communication and NAPA already shows a marked trend towards temperature increase by up to 1,5°C since 1990 and rainfall decrease from 1960 (between 6 and 15% depending on the region).With increasingly low annual rainfall—between 50 and 300 mm per year– the

past decades have witnessed an increase in the frequency of drought events (from one in 10 years to one in 2 or 3 years) with longer time span and shorter recovery periods, resulting in severe impacts on vulnerable populations. Despite important efforts from the Government and the international community in fostering institutional and policy reforms to help Djibouti better prevent and manage climate-related droughts and water shortages, such events are clearly on increase, with a growing number of climate incidents and affected people being observed (Table 1)

Table 1: Top 10 Natural Disasters in Djibouti for the period 1900 to 2011[1]

| Type of Disasters | Date | Total number of people affected |
|---|---|---|
| Flood | Feb. 1978 | 106,000 |
| Drought | June 1980 | 145,000 |
| Flood | 18/03/1981 | 102,000 |
| Flood | 09/04/1989 | 150,300 |
| Flood | 19/11/1994 | 120,000 |
| Drought | Feb. 1996 | 100,000 |
| Drought | June 2001 | 100,000 |
| Flood | 12/04/2004 | 100,000 |
| Drought | April 2005 | 150,000 |
| Drought | July 2008 | 340,000 |

10. Since 2007, the whole Horn of Africa region and Djibouti in particular have been facing a prolonged drought event that has heavily impacted agricultural production and rural livelihoods, especially animal husbandry, the backbone of pastoralist way of life. Over the past years, the rainfalls, although traditionally very limited, have been 5 to 50% below average in Djibouti. The Rapid Drought Impact Assessment[2] conducted by the GoD showed that the 2010 drought– the fourth consecutive year of failed rainfall in terms of its quantity and regularity – has had a devastating impact on the water security and livelihoods of the 240,000 people living in rural areas, especially small-scale farmers and herders, with 120,000 (15% of the country's population) being now directly considered food insecure. The recent waves of drought have destroyed the crops of small-scale farmers for two consecutive years and led to further deterioration of water resources and pasture lands. Many traditional surface and sub-surface water sources have dried up whilst the water table level of aquifers in many deep boreholes has drastically decreased. In the south-west region (agricultural region of Gobaab and the plain of Hanlé) gathering more than a third of all agricultural plots, the number of rain-fed and irrigated cultivated plots dropped from 500 to 120 in four years. In many locations, this has also resulted in the deterioration of water quality though increased salinization, posing problems to both human health (the physico-chemical quality of water is clearly not up to recommended WHO standards in many places) and crop productivity (soil salinization). Similarly, due to the lack of pastures, fodder and water, pastoralist households suffered a loss of 70 to 100% of their livestock and are left now with very few options to survive. Livestock-raising activities currently generate 20-40% of the revenues of pastoralist households. Under normal conditions, these activities would represent 60-80% of household revenues. All the segments of the pastoralist society are being affected by the on-going drought which

[1] Source: EM-DAT, The OFDA/CRED International Disaster Database, Université Catholique de Louvain, Brussels – Belgium, www.em-dat.net

[2] Evaluation rapide de l'impact de la sécheresse en milieu rural (Ministry of Interior and Decentralization, March 2010)

literally leads to the blurring of social boundaries between wealthy and poor breeders. Some pastoralists do not hesitate to describe this prolonged drought as "Isa Sima", which means in Somali language 'the one which equalizes the level of wealth'. On top of that loss, food prices have increased by 50% between 2006 and 2009. The drop in income combined with the food price crisis has forced vulnerable households to allocate a larger share of their revenues to purchase food at the expense of the satisfaction of other basic needs such as health or education. Despite this extra effort, food security of most rural families is far from being secured. A nutrition survey in mid 2009 showed alarming acute malnutrition rates that in some regions (particularly north-west) reached 25%, with children under five being primarily endangered. As a response to these hardships, households are seeking alternative sources of revenue but these are often insufficient, and include increasing dependence on already declining remittances, uncertain food aid and debt accumulation.

11. While drought is no new challenge, the scale and seriousness of the current drought spell in Djibouti and its consequences on local sources of food and income, have clearly overcome the coping mechanisms and internal support capacity of the affected rural households. Consequently, these detrimental conditions have already prompted and are likely to further force an increasing number of pastoralists and agro-pastoralists to give up their traditional activities and migrate to urban and semi-urban areas, principally in the capital Djibouti Ville, as already observed in the year 2008. Most of the time, these drought-displaced people end up settling into crowded peri-urban slums or makeshift camps where they live in extremely precarious conditions with little job and income opportunities. In a context of widespread turmoil and social protests across the Arab region, these internal migrations could further exacerbate social tensions in Djibouti and undermine the prospect for peaceful democratic reforms.

12. As reported by the World Food Programme, Djibouti comes across as a 'forgotten country' in terms of international attention and relief brought to handle worsening drought and food insecurity issues. The country is indeed located in a geographical region where millions of rural poors are affected by drought and water shortage, so with 120,000 drought affected people in 2010, the country does not make the headlines. But in terms of the percentage of the population, it is much higher than anywhere else in East Africa and requires as such, priority and immediate action.

13. It is now well established that the on-going climatic changes and related disasters cannot be attributable to historical climate variability alone. There is growing scientific evidence that observed trends of aridification and increased drought events in Djibouti are linked to climate change and are early signs of bigger and persistent climatic disruptions. As such, a recent study from the from the U.S. Geological Survey and the University of California[3], determined that the decline in average rainfall amounts and greater frequency of dry spells seen in the Horn of Africa over the past 30 years are linked to an unprecedented warming of the Indian Ocean that is directly caused by global warming. With global temperatures continuing to rise, this trend of increased drought frequency and water scarcity will likely persist and amplify in the future.

14. Although uncertainty in climate projections is important in Djibouti due the coarse spatial resolution of the global models used and unavailability of downscaled estimates, long term climate change scenarios for Djibouti, indicate a likely increase in mean temperatures between 1.7 to 2.10C, and an overall rainfall decrease of 4 to 11% by 2050, combined with increased variability in precipitation pattern, reduced rain season and higher evaporation rates. Rains during agricultural growing periods and during critical livestock production periods are also predicted to decrease throughout the country, except in Djibouti Ville, which could encounter an increase in precipitation by +3.9%. As demonstrated by the recent USGS

[3] Williams, Park A. and Chris Funk. "A westward extension of the warm pool leads to a westward extension of the Walker circulation, drying eastern Africa." *Climate Dynamics*. 4 Jan. 2011.

research, sea-surface temperatures are likely to continue to increase in the Indian Ocean and an average decrease in precipitation is expected in the Greater Horn of Africa region, especially in the March to June season, when substantial rainfall usually occurs. Indeed, the study predicts that resulting warmer air and increased humidity over the Indian Ocean will produce more frequent rainfall in that region. The air then will rise, lose its moisture during rainfall, and then will flow westward and descend over East Africa, causing further aridity conditions in countries such as Djibouti.

15. The combined effect of higher temperature and reduced precipitation (especially at critical stages of plants' growing cycles), will increase the occurrence of more severe and prolonged droughts and further strengthen desertification and water shortage. Water availability is a key limiting factor for the country's well being and development. Reduced precipitation and run-off are projected to lead to lower rates of recharge of underground aquifers, upon which the country depends for most of its water needs. Water supplies will record a deficit at least equal to the decline in rainfall, causing a reduction in the quantity of water soaking into the water reserves and the lowering of piezometric levels. Already with an annual water deficit of 5 to 7 million $m^3$, climate change induced droughts and changes in the precipitation regime are likely to further threaten the livelihoods of many by reducing the potential for agriculture and impacting water availability and supplies.;

16. Djibouti's Initial National Communication also indicates that climate change could increase the frequency and intensity of flash floods, which combined with more frequent dry spells, could exacerbate the damages caused on people, infrastructures, livestock and crops. Several important flood events have already been experienced between 1991 and 2004 (see Table 1), causing heavy human casualties and economic losses amounting to billions of Djiboutian Francs.

17. Similarly, Accelerated Sea Level Rise resulting from climate change is predicted to vary between 8 et 39 cm, with a average 20 cm compared to 1999 baseline. This will be accompanied by stronger and more frequent storm surges, acceleration of coastal erosion, extension of temporary or permanent submersions of the low coastal areas, especially in Djibouti ville, increased salt water intrusion in coastal aquifers.

18. Unless adequate and rapid action is taken to reduce Djibouti's vulnerability to climate change, the country will be exposed to large biophysical and socio-economic impacts as illustrated in Table 2.

Table 2: Summary of impacts expected from climate change on key vulnerable sectors (NAPA, 2006)

| **Key Sectors** | **Climate change impacts** |
|---|---|
| **Water ressources** | **Surface water :**<br>– Increase in flood frequency (up to 4-5 major flod per year)<br>– Increase in the magnitude of major flooding events<br>– Shift in run-off water regime<br>**Groundwater:**<br>– Reduction in aquifer natural recharge<br>– Reduction in groundwater resources (from 11 650 000 m3 to 9 880 000 m3/year in 2050) and increase in salinity of Djibouti's main aquifer |
| **Agriculture and forestry** | **Drought:**<br>*Agriculture***:**<br>– Depletion of ground water used for irrigation<br>– Increase in salt content of soil and irrigation |

| | |
|---|---|
| | water<br>– Reduced yields<br>– Loss of agricultural land due to erosion or salinity<br>*Forest landscapes*<br>– Regression in forest cover<br>Gradual extinction of flagship endemic speciess<br>Overgrazing of shriking rangelands<br>– Intensified human pressures on forests for firewood and construction<br>Invasion of Prosopis sp. which is growing very rapidly under increasing aridity, encroaching on cultivated land by competing with other trees and local shrubs (esp. in coastal plain of Djibouti, Tadjourah, and Hanlé Gobaad)<br>**Flood**<br>– Destruction of farms located near the wadis<br>Silting of wells or destruction of crops and infrastructure<br>– Multiplication of pests and insects (caterpillars, mushrooms, crickets ...) |
| **Livestock production** | – Rangeland degradation<br>Concentration of livestock around water points<br>– Reduced livestock productivity<br>– Low resistance to diseases of livestock |
| **Coastal Zones** | – Destruction of economic infrastructure ($ 11.3 million during the 2004 flood)<br>– Destruction of natural habitats and biotopes<br>– Loss of human lives ( 80 dead or missing during the 2004floods) |
| **Marine ecosystems** | – Degradation of coral reefs<br>– Regression of mangrove areas<br>– Changes in fish stocks |

19. As mentioned in the NAPA, the most severe and devastating impacts from emerging and future climate change impacts will reside in the greater impoverishment of pastoral and farming communities, families sometimes losing their complete herd or crop because of drought and thus having no other choice but migrating to the cities. Key drivers of growing climate change vulnerability of pastoral and farming communities include the following:

- The rural populations of Djibouti are particularly at risk from aridification and water shortage as they reside mainly in deserts or marginal lands (only 3% of the country's land is suitable for farming), often with highly erodible soils and limited water supply.
- The country does not have permanent rivers and surface water is characterized by a temporary wadi regime, with occasional, sudden and rather violent floods. Djibouti population, and rural communities in particular, therefore rely almost totally on underground water, which is already being depleted by unsustainable extraction and water tables are lowered and suffer from increasing salinity and pollution. More than 49% of people in rural areas do not have access to a protected source of drinking water. Out of these, at least 30% resort to unprotected sources that

do not conform to minimum sanitary requirements. Women are more vulnerable to water scarcity since they would have to travel longer distances to fetch fresh potable water.

- Rangelands and grasslands are being subject to increasing degradation due to overgrazing with livestock numbers exceeding rangeland capacity by an estimated 63% (notwithstanding the fact that only a portion of potential rangelands are exploited due to lack of water in more remote areas, forcing pastoralists to reside longer in one same site). Many pastoral communities have settled in the past 3 decades, mostly concentrating around relatively reliable water sources exerting enormous pressures over the land and limited water resources. The semi-settlement of nomadic communities around water points and urban centres increases overgrazing problems and erosion, limiting rainwater penetration into soils and the regeneration potential of surrounding land. The consequences are (i) an increased malnutrition of rural populations, (ii) the multiplication of diseases (tuberculosis and anaemia in particular), (iii) rural exodus, (iv) a decrease in ground water levels; and (v) the degradation of pasture land, pushing herders to use more intensively the forest zones, which are subsequently degrading.
- Agricultural production is mainly located on wadi river banks and face increasing water shortages, salinization of land and groundwater and damage from flooding and erosion. Technical skills and farming practices are poorly developed and not compatible with the limitations posed by climate change on local production systems.

20. Combination of the above climate and baseline pressures put the pastoral and agro-pastoral systems at jeopardy. There is a need for an exit strategy for pastoralists and farmers the most vulnerable to climate change so as to provide them with alternative food production systems and livelihoods while giving them the opportunity to live on their lands. The obvious response to this immediate and long term adaptation need is to develop nascent agro-pastoral systems through establishment of irrigation based, multi-purpose oasis-type shade gardens that provides favorable micro-climatic conditions to support the integrated cultivation of drought and salt tolerant plants, such as improved variety of date palm trees, with local forage species, while offering opportunities to diversify livelihoods both on and off-farm, as a way to spread the risks associated with more frequent climate anomalies. Date-palm-based shade gardens have been traditional in many parts of the region (e.g. Tunisia – date palm shade gardens, Sudan – gum shade gardens, Yemen, Oman etc) and can considerably improve living conditions by allowing to grow forage, vegetables, cereals and some other local varieties resistant to more stringent conditions of aridity and increased soil salinity. Clearly, these multi-purpose agro-pastoral systems will offer the most viable and cost-effective solutions for many rural residents to survive the food insecurity threats posed by climate change. However, there are number of barriers towards this adaptation option that the project is designed to address. These barriers are:

- There is shortage of knowledge or technical capacity to apply advanced groundwater extraction and recharge methods in Djibouti. DespiteMaximising rainwater percolation through various technological innovations (such as infiltration dams or gravel packing in special injection wells) is lacking to help rejuvenate groundwater table and save precious water source. The Water Department of the Ministry of Agriculture has already conducted some technical studies about the possibilities to use dams inside wadis in order to create artificial water reservoirs to capture and infiltrate wadis' periodic flows. These country-led studies also recognized the need to explore and introduce other technical solutions for more robust conjunctive surface and ground water management that show strong potential for success and replication in Djibouti. These include techniques such as percolation wells which were partially tested already a few years ago in the context of a geothermal development project. However, the practical knowledge and capacity to adjust these methods to Djibouti's bio-physical context and requirements of shade-garden development is still missing and will need to be further strengthened with help of the Adaptation Fund.

- As a result of poor surface and groundwater management practice, agro-pastoral practices are underdeveloped in the context of emerging climate pressures, often characterised by poor productivity, offering limited options for excess forage growth for storage or diversification of produce necessary for spreading the risks across seasons or absorb shocks during the severe drought periods;
- Largely pastoral and farming communities lack skills and knowledge for pursuing climate resilient practices such as soil conservation, shade gardens and other essential agronomic measures to improve current productivity levels, an essential first step to build up long term resilience to climatic chocks;
- Even though pastoral communities have been settling in past decades in response to reoccurring droughts that demand greater flexibility and diversification in productive systems they still face shortages in the knowledge, financial capacity, and self-organisation needed to adopt more sustainable and risk-spreading livelihood options, including diversification and commercialization of climate smart dryland products.
- Technical capacity necessary to make the extra step from improvement of date palm tree cultivation to widespread development oasis-type shade garden is still lacking.
- Current set up of micro-finance does not favour pastoral communities that are considered a high risk group and cannot access financing to improve their livelihood, for investing in inputs, productivity and diversification. This poorest and most vulnerable segment of society largely relies on humanitarian and food aid and is offered limited options to build up assets and spread climate risks.

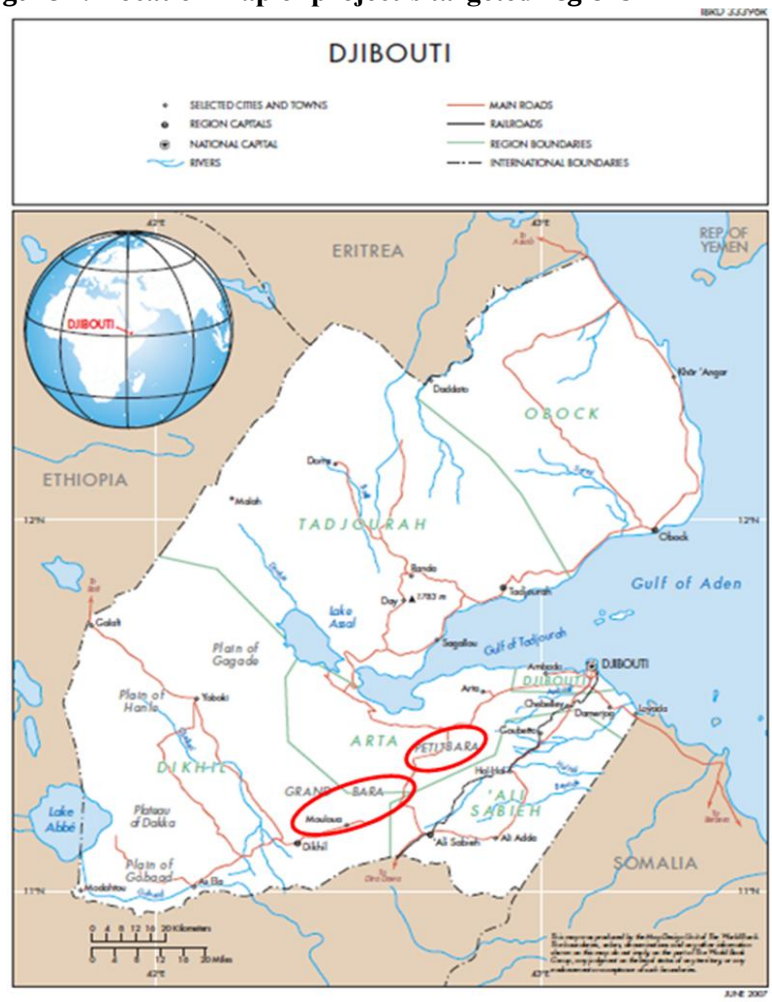
21. The proposed project is designed to address the above barriers. It is also a direct response to NAPA priorities in that it targets rural/pastoral populations and aims to improve and diversify agro-pastoralist production system and thus makes it more climate resilient. The proposed intervention with AF funding has been designed by Government, with the support of UNDP, along three main components: (1) sustainable access to secured water resources in the face of climate change, (2) Shade gardens to support diversified and climate-resilient agro-pastoral production system, and (3) Access to finance secured for climate resilient agro-pastoral enterprise.

**Project regions**

22. The adverse effects of drought and the increased vulnerability to climate change are high in all rural areas of Djibouti. However, the two large, flat and semi-desertic plains of Petit Bara and Grand Bara, which are important cross-roads for transhumance movements (from the eastern part of the country to the south-west), are particularly exposed to desiccation and have been prioritized by the NAPA as priority area that requires urgent adaptation interventions to secure the flows of water and soil related ecosystem services on which local communities depend. The targeted area is located in the district of Ali Sabieh (South of the country) and range over nearly 30 km long and 12 km wide (see Figure 1 below). The plains are crossed by National Road 1 which is experiencing heavy traffic to and from Ethiopia. The local geomorphologic setting is dominated by closed endorheic depressions that correspond to the bed of ancient dried lakes and that are primarily made up of silty and sandy clay deposits. The population of the area is composed for a dominant part of pastoralists living exclusively from livestock production, together with some small agro-pastoral and farming communities. As any region within the country, rainfall consists essentially in the rains of Karma (July-August) that provide an annual average of 150 mm. Temperature remains usually high throughout the year which, associated with heavy wind regimes, results in a potential evapotranspiration rate of about 2000 mm / year. The plains are not crossed by any significant wadi but collect surface water from the mountains all around, most of it being actually evaporated. The vegetative cover is located at the margins of the desert depressions and is made up of fragile steppes habitats used as grazing grounds by local pastoralists. Food security and sustainability of livelihoods in the two plains rely heavily on the efficient use of the water and pastoral resource base.

However, local water resources are becoming increasingly scarce as a result of the combined effect of reduced precipitation and over extraction of groundwater that has caused dramatic drop in aquifer levels. Surrounding rural families frequently need to walk for many hours to reach a single insanitary water point with their animals. Similarly, steppe systems have shown clear signs of degradation over recent years due to increasing aridity and overgrazing, leading to steep decline in productivity of natural pastures.

**Figure 1: Location map of project's targeted regions**




23. Recurrent droughts, disadvantageous hydrological conditions, high evapotranspiration rates, limited availability of water supply and unsustainable landscape and rangeland management are perceived as main root causes of climate change vulnerability in these areas. These factors require the streghtening of the nascent alternative agro-pastoral systems that could help alleviate pressures on steppe habitats through integrated crop and livestock farming and maximize water productivity by enhancing mobilization and sustainable management of surface and ground water resources.

24. Because of the nature of their soil (flat surface, sandy clay with few stones), the two plains demonstrate a relatively good agronomic potential, and have been prioritized by the Djibouti government as one of the most promising regions for agro-pastoral development. Very large areas could be easily transformed into agricultural plots, as this has been demonstrated already on a 5 hectare site in Grand

Bara (date palm plantation trial plot). However, current water scarcity has not permitted local populations to develop agro-pastoral plots at a larger scale. The secured access to water is therefore a prerequisite for the sustainable development of viable agro-pastoral systems highly resilient to climate variability and change. This notably means interrupting the seasonal water run-off with land/stone dikes and creates large temporary water ponds to the benefits of surrounding population and animals. Those ponds, when progressively drying up, also permit the development of new large pasture areas improving forage availability for cattle. The multiplication of such water ponds associated with the sustainable use of ground water sources, could offer an important vehicle for integrated farming and livestock management. A number of hydro-geological studies conducted recently confirm the favourable conditions of the targeted areas for the development of a sustainable model practice of surface water harvesting, groundwater efficient extraction and artificial recharge. Surviving pastoral populations would therefore largely benefit from the advanced hydrological infrastructures and improved groundwater management practice that will help in the development of agro-pastoral activities as a risk spreading strategy for long-term adaptation.

25. The two locations are also easily accessible by the road (both are crossed by the Djibouti-Ethiopia main road), which constitute a strong advantage for the project success and sustainability (for infrastructures building and access to markets). In addition, they have little benefited from previous development initiatives (except for recent grazing management interventions in Grand Bara), and surrounding populations strongly need support for adaptation.

## PROJECT / PROGRAMME OBJECTIVES:

**Overall objective:**

26. The objective of the project is to diversify and promote climate resilient agro-pastoral practices in rural Djibouti

27. This will be achieved through three outcomes:

- Capacities to mobilise and secure sustainable water resources to agro-pastoral communities in the face of climate change developed;
- Sustainable agro-pastoral systems developed, providing greater forage production capacities, diversifying agricultural productions and creating capacities for replication;
- Micro-credit schemes adjusted to scale-up shadow-garden-based agro-pastoral production.

## PROJECT / PROGRAMME COMPONENTS AND FINANCING:

| PROJECT COMPONENTS | EXPECTED CONCRETE OUTPUTS | EXPECTED OUTCOMES | AMOUNT (US$) |
|---|---|---|---|
| 1. Sustainable access to secured water resources in the face of climate change | 1.1 Rainfall-runoff and groundwater models developed and institutionalized within the CERD and the Water Department of the Ministry of Agriculture to project likely climate change impacts on the water availability in the areas of Petit Bara and Grand Bara;<br>1.2. Based on model outputs, controlled groundwater extraction, artificial recharge and climate "smart" management plans that take into account seasonal changes in precipitation as well as long term mean amounts projections, developed, and benefit 30,000 people;<br>1.3. Community-based surface water harvesting infrastructures, such as earth dams, water injection wells established that mobilize water and improve ground water recharge introduced and tested in support of shade-garden pilot schemes (see 2.1)1.4. Good practice guidelines for integrated ground water extraction and recharge developed through stakeholder-led and participatory processes and delivered to government water regulators, Ministry's technical staff, agriculture extension services as well as members of community water management structures. | Capacities to mobilise and secure sustainable water resources to agro-pastoral communities in the face of climate change developed | 1,910,000 |
| 2. Shade gardens to support diversified and climate-resilient agro- | 2.1. A set of 8 pilot community-managed agro-pastoral shade garden plots (10 ha each) that include date palms, fruit trees, | Climate resilient agro-pastoral systems | 1,498,000 |

| | | | |
|---|---|---|---|
| pastoral production system. | multi-purpose fence trees, vegetable and forage climate resilient local and regional varieties henna, dates, jujube, mango, etc...) developed and tested ;<br>2.2. Improved extension service for shade gardening benefit 160 agro-pastoral families - approximately 2,500 people (targeted training for extension service personnel and agro-pastoralists designed and delivered on the issues grazing, forage management, cultivation techniques, crop protection, water efficiency, composting methods, etc, in the context of increasing climate change pressures).<br>2.3- Well-sized feed/forage stocking facilities created in both project locations to allow better management of forage availability over repeated drought periods. | developed, providing greater forage production capacities, diversifying agricultural productions and creating capacities for replication | |
| 3. Access to finance secured for climate resilient agro-pastoral enterprise development. | 3.1. An adaptation-oriented micro-finance scheme thatsupports shadegarden-based agro-pastoral enterprises in the Grand and Petit Bara plains, developed through partnership with CPEC, and generate a total value of $300.000 during project duration (5 years);<br>3.2. At least 300 agro-pastoralists have been organised to form agro-pastoral cooperatives to improve climate resilient agro-pastoral practices and products and develop income-generating activities through microfinance facilities;<br>3.3. At least 4 established agro-pastoral cooperatives develop comprehensive climate adaptation plans with identified public and private sources of funding. | Micro-credit schemes adjusted to scale-up shadow-garden-based agro-pastoral production | 477,800 |
| 4. Project/Programme Execution cost | | | 407,800 |
| 5. Total Project/Programme Cost | | | 4,293,600 |
| 6. Project Cycle Management Fee charged by the Implementing Entity (if applicable) | | | 364,956 |
| **Amount of Financing Requested** | | | 4,658,556 |

## PROJECTED CALENDAR:

*Indicate the dates of the following milestones for the proposed project/programme*

| MILESTONES | EXPECTED DATES |
|---|---|
| Start of Project/Programme Implementation | 05/2011 |
| Mid-term Review | 06/2014 |
| Project/Programme Closing | 06/2016 |
| Terminal Evaluation | 08/2016 |

# PART II: PROJECT / PROGRAMME JUSTIFICATION

## A. Project components

28. The project is fully in line with the AF's portfolio level objective 1 that is to "reduce vulnerability to the adverse impacts of climate change, including variability at local and national levels". By enabling better management of and access to water resources, the project will directly decrease the impact of climate variability; by increasing forage production and allowing the development of diversification solutions to agro-pastoral communities, the project will directly contribute to the AF's corresponding outcome "reduced exposure at national level to climate related hazards and threats".

**Component 1: Sustainable access to secured water resources in the face of climate change**

29. Higher projected temperatures will further increase evapotranspiration rates and redouble water needs for both agricultural production and pasture lands. Given severity of current and anticipated water shortages and chronic dependence of population on food aid, improved management of scarce surface and groundwater resources becomes a critical condition for long term resilience of local food production systems and associated livelihoods. Over 51% of all extracted water in Djibouti is currently used for agriculture. However, the return value and generated productivity remains low. Moreover, while aquifer recharge in Djibouti does occur during seasonal wadi flow, it is estimated that, due to rapid run-off and high evaporation, only 5% of available water resources actually reaches the aquifers, representing a significant loss of water for both human and agricultural purposes. The same applies to rainfall of which 83% is lost to evaporation from the sun heated ground of the country's vast arid plains.

30. Water availability being the main limiting factor of agricultural productivity and livelihood security in Djibouti, improved and secured access to water is a key requisite for developing agro-pastoral systems highly resilient to increasing climate and rainfall variability. Component 1 will therefore foster sustainable climate resilient water mobilization and management– combined with more efficient and conjunctive use of surface and ground water – as the basis of an integrated approach to support diversified and productive agro-pastoral systems. This is considered by Government to be an alternative response to the hydrological impacts of climatically-induced water scarcity on dwindling rain-fed cultivated and grazing lands and subsequent consequences on food security. The main objective of Component 1 is to provide local communities with the means to fulfill their drinking, livestock and cropping water needs and lay the foundation for the development of shade garden-based agro-pastoral systems under Component 2. This will specifically imply a need to implement a series of water adaptation measures to better capture and manage more erratic run-off water and wadi resources during the wet seasons while improving the use of aquifers as natural water storage infrastructures to secure water supply during dry periods. The

additional water produced will be used to improve access to drinking water, to alleviate pressures on degraded pasturelands through the rehabilitation/creation of remote watering points in order to increase accessibility to rangelands currently not being exploited, as well as to support multi-purpose crop and fodder production under new integrated farming and livestock management systems.

31. To do so, AF resources will be used to implement a set of no-regret, soft land and water management solutions aimed at maximizing water availability and quality in the context of increasing aridity. Firstly, funds will be used to fill current knowledge and capacity gaps relating to the understanding of local hydrological resources (state of the resources, physical functioning, etc) and their sustainable management under climatically induced pressures. At present, water managers and users are lacking the technical skill-sets and tools to properly conduct climate change risks assessment on local surface and groundwater resources and use them to make science- and evidence-based decisions as it relates to water and agriculture planning, infrastructure development and more generally, identification and design of cost-effective adaptive responses for water management. The project will review the applicability of and introduce specific decision-making tools for adaptation planning, with particular emphasis on rainfall-run-off and groundwater models to promote use and management of the scarce resource more consistent with emerging climate threats. These tools will be developed and introduced at the Djiboutian Centre for Studies and Research (CERD – *Centre d'Etudes et de Recherché de Djibouti*) and will build upon the current practice and systems available at the CERD, while taking advantage of the latest scientific advances in the use of Geographic Information Systems (GIS)-based hydrological models, such as WEAP 21, that now permits the modeling of physical processes and climate change vulnerability assessments at a higher spatial resolution across landscapes. For Petit Bara water resources have been studied well, therefore input data will be readily available for the models. As for Grand Bara, current data sets are still incomplete which will require the project to support supplementary baseline data collection campaigns and gap-filling hydrological assessments. The selected GIS-based risk assessment tools will be coupled with systematic, real time monitoring tools of water table levels and quality (salt content) so as to strengthen the adaptive capacity of local communities and managers in the face of growing uncertainty in the hydrological cycle. This monitoring network and function should enable the generation of first hand data and information on the quantitative and qualitative state of water flows and reserves that can then be analysed, interpreted and disseminated in a way that supports well-informed and responsive water management decision making and help regional and district level officials deliver relevant early warnings to policy makers and local users. The project will support the conduct of a feasibility study that will detail the technical design, needs for soft and hardware equipments, institutional arrangements, risk indicators as well as rules and protocols best suited for operating and maintaining the established monitoring mechanism in a cost-effective and sustainable manner.

32. Improvement in the modeling capacity of the CERD will also help develop short and long term impact scenarios on local water resources that in turn will inform the development and feasibility (both technical and economic) of appropriate climate 'smart' water management strategies, taking account of short term seasonal variability of rainfall as well as long term shifts in mean precipitation. On this basis, the project will support the design of climate-resilient management plans for Grand and Petit Bara's hydraulic systems, which will incorporate a suite of demand and supply-side management policies aimed at restoring depleted groundwater levels and conserving water balance. In so doing, the project will review and identify good practices of community-based mechanisms for sustainable management of seasonal waters of wadis and groundwater. It will also upgrade local management rules among local communities and enforcement capacity of district level government staff for the application of more responsive and effective monitoring regulations with respect to water access and uses. Participatory approaches will be deployed to develop with pastoral and agro-pastoral communities viable co-management models stipulating the rights and obligations of local users viz-a-viz the resources as well as agreed control mechanisms over water extraction and use. For example, access should be limited to

specific entry points, and water be delivered through controlled pumping, avoiding direct catch-up from people and animals. This will help avoid further degradation and pollution from animal manure.

33. The management plans will also clarify technical feasibility and guide implementation of a set of pilot community water harvesting schemes that will help remove some of the climate-driven water-related limitations to resilient agro-pastoral practices. To this end, the project will upgrade existing surface water and run-off collection practices and introduced new ones well suited to increasing water scarcity. In particular, it will consider measures supporting water capture, storage and aquifer recharge under growing seasonal and inter-annual variability. These measures may include small hydrological infrastructures such as earth dams, water ponds, percolation tanks and injection borewells that could be installed in different locations of Petit Bara and Grand Bara with the aim of increasing water retention and penetration into soil, developing new large pastureland areas, providing new water points to livestock while supporting agricultural intensification and fodder production in shade-gardens for subsequent seasonal storage. Earth dams will be designed to collect and retain run-off water from small watersheds and will serve as barriers that reduce erosion, allow sedimentation and increase aquifer recharge by lowering the speed of water flow during high rainfall events. Water ponds are useful for conservation and storage of supplement water or for recharging the aquifers. Those ponds, when progressively drying up, also permit the development of new large pasture areas improving forage availability for cattle. Percolation tanks will be constructed at appropriate sites selected on geological considerations and designed for supporting artificial recharge and soil moisture conservation. Injection borewells with gravel packing will allow to efficiently filter the rainwater and to help water to pass faster and increase groundwater table as well as reduce salinity. These structures will be devised taking full account of emerging and future changes in local hydrological conditions and will be guided by the use of the adaptation decision-making tools described here above.

34. AF resources will also be used to promote investments in modern extraction technologies, with a particular focus on solar-based pumping systems. Solar-powered pumping (SPP) technology has been introduced in Djibouti since more than 15 years and is now practiced at small to medium scale. There exist today around 50 SPP facilities in operation in Djibouti which are used to abstract surface and groundwater for both domestic and agricultural purposes. At present, the country overall experience with SPP is relatively well developed as indicated by the existence of a national market that provides access to a variety of reliable SPP systems and by the availability of local expertise delivered by a growing number of reliable service providers. This technology needs to be further supported and scaled up in the context of the proposed project on account of the multiple adaptation benefits it can offer for small-scale irrigation, livestock watering and water supply of remote and water stressed communities such as those living in the project areas. Today, most of the pumping systems utilized locally are based on motor pumps which show high recurrent costs and are often overdesigned, leading to overexploitation of aquifers and subsequent salinization of land and water. Solar powered pumping system provides several adaptation-related advantages in the context of this AF project including, *inter alia*,: a) reduced impact on local groundwater resources due less aggressive pumping method, b) low recurrent costs, with motor generators, the cost for fuel is often a financial barrier for ensuring access of the poorest households to reliable water supply especially at time of severe rainfall shortages ; b) reliable and free power source which is essential to lift the current constraints associated with the use of motor engines (i-e. availability of fuel, variation in purchase power of households, possibility to transport fuel by road) that impede local communities' adaptive capacity and that limit the supply of water when and where it is needed, especially in critical cropping periods or in remote grazing areas; c) flexibility and scalability, allowing for convenient expansion to respond to seasonal fluctuations in rainfall and water; d) portability, which makes it movable from one water source to another, helping to cope with climate-driven spatial variability of water and pastures, especially in support of less destructive livestock rearing practices under the new agro-pastoral systems. The project will review the current national practice with SPP and help address the remaining gaps to make it truly work as an optimal and viable solution for building the climate resilience of

pastoralists and agro-pastoralists. This will include to train the end-user groups on the basic requirements and tools for the O&M of SPP systems, to develop appropriate protocols to adequately designed SPP facilities in relation to the amount of water available (through a scalable approach that allows for a gradual and reversible expansion of the systems without undermining the water resources) and to set up appropriate community-based cost/recovery mechanisms to secure the financial resources necessary for the maintenance and upgrading of the system during and beyond the project lifetime (see also below).

35. In parallel, the project will help local users put in place adequate management structures that will provide and empower agro-pastoral communities with the organization and functional capacity required to effectively participate in the identification and implementation of adaptation solutions while ensuring long term sustainability of water resources and the new water harvesting services established. The project, through targeted community mobilization activities, will link up with existing community-based organizations, such as EDDA (Ensemble pour le Développement du District d'Arta), Omar Jacah and PK51 associations, and when necessary, will create new ones based on the best practices and experience available internationally and in Djibouti in the field of participatory community-based adaptation and sustainable management of land and water resources. These structures may take the form of community management committees or dedicated associations (such as farmers or water users associations) and will benefit from targeted training and support programmes that will be developed by the project using participatory action-learning approaches and delivered through local agricultural extension services. This community organization work will provide the opportunity to introduce more adaptive and robust scarcity management strategies and protocols for agricultural water management, including flexible water allocation rules to account for seasonal and inter-annual fluctuation in water availability, as well as appropriate and equitable cost-recovery mechanisms. Cost-recovery will be capital to collect the resources needed to ensure the future maintenance and expansion of the new water systems, including SPPs, The mechanism to be considered could include fee or tariff-based systems that will be designed with full consideration of the contributive capacity of local users. The project will also explore the potential for linking these fees/tariffs to the amount of water effectively used, in order to establish a price-signal, even modest, that could incentivize local households to use water more efficiently and thus contribute to reduce water demand. Through these decentralized water management arrangements, the project will strengthen the adaptive capacity and social resilience of the target groups to prepare and act on time to any changes in their water resources, thereby reducing the risks of drought-induced conflicts amongst local users while increasing the overall effectiveness, robustness and durability of the structural and non-structural risk reduction innovations introduced.

### Component 2: Shade gardens to support diversified and climate-resilient agro-pastoral production system

36. Although agriculture accounts for only a small part of rural livelihoods, agricultural plots, generally situated around wadis, play an important role in diversifying sources of revenue, improving the health status of vulnerable groups and livestock as well as improving food security of agro-pastoralists. However, traditionally pastoral communities lack sufficient farming skills to maximise benefits of hybrid, agro-pastoral productive systems. Indeed, many pastoral families intend to develop small agricultural plots to diversify their food and forage sources, as well as create new income sources, as means to increase their resilience to climate variability. However, those initiatives are frequently failing or remain very limited due to irregular water availability and inappropriate farming systems in the face of increasing aridity that will further aggravate as a result of climate change. It is Government's desire to assist pastoral communities in developing family and community oasis-like shade gardens over height 10-ha plots by using date palm and tree plantations and by securing the necessary water supply through locally relevant water harvesting systems (Component 1) so as to create favourable microclimates for forage and vegetable growth, replicating the traditional practices imported by Yemeni populations in Djibouti

centuries ago. Very well adapted to hot desert conditions, well managed date palms and oasis-type agro-pastoral systems demonstrate excellent robustness to drought and relatively good tolerance to salinity. They also offer multi-functional production potential, including production of dates for food and trade, date stones for feed, palms for feed and handicraft, and can create valuable eco-tourism opportunities, activities which all taken together can help spread the risks from drought hazards through a larger portfolio of food production and economic activities. Specific date palm trees production capacities have already been successfully developed in Djibouti and a good quality knowhow is readily available at the CERD to technically support rural families for plantation, irrigation techniques, and overall management practices for the development of the shade gardens. Under the Presidential Fund, the CERD started the in-vitro multiplication of date palms in 2005 with technical support from Saudi Arabia, French IRD (Institute de la Recherche pour le Dévelopment) and INRA (Institut National pour la Recherche Agronomique). In 5 years, CERD has already reached great success rates, has experimented first fields trials and is now ready to start disseminating its young date palm trees and provide the necessary technical support for plantation and management. The research has been particularly focused towards highest value dates (e.g Majhool, bouffagous, phenix, barhi) that have demonstrated an excellent resilience to drought and soil salinity, critical in the context of climate change.

37. Capitalizing and expanding on the research outcomes and technical capacity available at the CERD, the project will therefore revitalise existing shade gardens with good restoration potential and develop new ones in the zones of Grand and Petit Bara. It will proceed by introducing high quality date palms resilient to current and future climate conditions through provision of a relevant proportion of female species (the only ones producing dates), as current proportions of predominately male composition is not relevant for reproduction. It will also assess the water requirements of the shade garden systems to be restored / developed and will cover the additional water needs through the suite of water harvesting and control measures to be established under Component 1. As a first step, enabling biophysical conditions in the two different locations, such as soil quality, salinity and moisture will be accurately characterized and mapped so as to identify the most suitable zones for the development of the pilot shade garden plots. In addition, factors such as ecosystem characteristics, water regimes, microclimatic conditions, wind exposure, access to road, local population distribution will be duly considered. Other criteria for selecting the most viable sites in the broader territory of Grand and Petit Bara will be the following: (i) the agronomic potential of soils; (ii) possible access to surface and ground water either existing or through new water harvesting techniques under component 1; (iii) protection from floods; (iv) already existing agricultural areas, if any; (v) knowledge of local population and experience with farming practices; (vi) distance from villages, schools and important facilities and (vii) net impact and interaction with traditional grazing areas and transhumance corridors.

38. Plantations and main field works will be ensured by the technical teams of the Ministry of agriculture, in close collaboration with the mobilised agro-pastoralists. Besides date palms, the gardens will also include (i) fruit and other high value (e.g. henna, jujube, etc.) trees; (ii) forages and vegetables; and (iii) agro-forestry with multipurpose local varieties, enclosing each 0.5 ha plot to contribute to the creation of microclimate to offer wind protection and provide multiple potential benefits for drought and water scarcity alleviation.

39. Capacity building of rural families in farming techniques will be a key element of the success of this project, and AF resources will be used to propose improved extension services for shade gardens development. Rural populations in Djibouti are traditionally herders, not farmers. As a consequence, they mostly do not have the knowledge and experience of farming, and will need regular trainings and permanent technical support from the project team. The project plans to identify 10 lead farmers in each target region for good practice demonstration, and will organise regular technical meetings between groups of agro-pastoralists, in order to exchange technical issues, allow for seed exchange and multiplication and arrange for possible collaborations across groups of agro-pastoralists. Regular

community meetings and roundtables with the different stakeholders involved will also be organised in order to monitor the progress and maintain a strong collaborative strategy towards achievement of project results. Criteria for the selection of the champion farmers will include (i) good motivation and openness to new and alternative production systems, (ii) strong traditional legitimacy and (iii) well-proven leadership and personal capacities to influence other community members.

40. Adoption of drought tolerant species and varieties as well as composting and mulching practices, regular break of soil/salt crust and development of conservation agricultural methods will also be necessary to both reduce the demand for water ad increase natural water storage potential of the soil. These are among the adaptation technologies that will be introduced and are hoped to help agro-pastoral communities embark on more climate resilient practices and development pathways.

41. Additionally, the March 2010 Rapid Assessment of drought impacts in rural areas recommends as a medium term adaptation measure, the creation of feed and forage stocks. Such stocks are seen as critical as it would permit rural families to ensure feed/forage self-sufficiency during drought periods. Besides the necessary infrastructure development (based on small community units), creation of such stocks requires excess forage production, as a result of ample harvest during good growing periods. With expected climate change, this desirable condition will be less and less probable. AF resources will therefore be used to increase forage production through two main means. First, forage trees will be planted along earth dikes and grass production increased thanks to the water ponds constructed under Component 1 and their effect on higher penetration of moisture into the soil. Additionally, the project will support ecologically intensive forage production within the irrigated oasis-type shade gardens. As a result of this combined fodder cultivation, it is expected that excess forage production periods will occur and permit the constitution of stocks. Appropriate capacity building of rural families on forage conservation and stocking techniques will be delivered, and the AF funds will be used for the construction of community forage stocking facilities, based on local traditional good practice, knowledge and experience in the broader region.

### Component 3: Access to finance secured for climate resilient agro-pastoral enterprise development.

42. AF resources will be used to support the development of climate change resilient agro-pastoral small enterprises and income generating activities that could ensure a better protection against more frequent and prolonged climate-change induced droughts by spreading the residual climate risks across more diverse on- and off-farm livelihood activities and by maximisingcapital accumulation at the household level. For this to happen, a secured access to credit is essential. The microfinance sector in Djibouti is currently undergoing a serious restructuring that aims at strengthening the sector to help generate new employment opportunities and incomes so as to contribute to livelihood development and poverty reduction. Initially there were two micro finance institutions in Djibouti: the *Caisse Populaire d'Epargne et de Credit* (CPEC) supported by the African Development Bank and the *Caisse Nationale d'Epargne et de Credit* (CNEC) supported by IFAD. The CEPEC has provided loans to 4.000 people and the CNEC to - 400. Currently the two microfinance facilities are merging and harmonizing their credit-giving practices. The CPEC is also expanding and plans to have branches in the interior regions already in 2011. In fact, two subsidiaries are currently being established, namely CPEC of Tadjourah and CPEC of Ali Sabieh (region where Grand Bara plains are located).

43. Currently, there is no specific credit schemes geared towards pastoralists for adaptation in Djibouti. The main barrier for this relates to pastoral mobility. Pastoralists (as nomads) move to different areas depending on seasons and rain. Pastoral communities, as a result, have no real possibilities to build up assets and increase income to better absorb shocks and cope with sudden and slow-onset disasters, or with more

complex emergencies that combine multiple inter-*related* disasters (food crises, malnutrition, disease outbreaks and human losses). The strongest case for employing microfinance for adaptation is its ability to help low income households to build and diversify assets, and thereby expand their range of coping strategies. The project will work towards this solution by offering pastoralists an exit strategy whereby nomadic livestock practices that are now severely impacted and compromised by climate change will be gradually complemented, or even replaced, by semi-sedentary and sedentary agro-pastoral shade-garden-based production systems. As a result, local communities engaged in shade-gardens will be more permanently located in Grand and Petit Bara and have greater financial literacy which will provide them with more secured and enabling conditions to access the loans provided by local micro-finance institutions. .

44. It is well known that in order for microfinance to facilitate adaptation certain modifications may be required. This includes, (i) alignment of financing modalities with the specificities of a more uncertain and fast-changing climate, and (ii) inclusion of activities that are not currently part of existing microcredit portfolios –all with a view to facilitating adaptation to the impacts of long term climate change that at the same time yield immediate relief and livelihood development benefits. Regarding the former pre-requisite, the project will closely work with the current micro-credit schemes to adjust repayment schedules that take into account the mobility of the agro-pastoral community. For example, seasonal repayments especially for the clients that are engaged in shade-garden developments could be allowed

45. As for the latter condition, new agricultural products from shade gardens may offer various possibilities for the development of income-generating activities (e.g. henna jujube products and date palm products of high market value.). In order to improve access to microfinance the agro-pastoralists will be organised in community groups or organisations that will allow pooling their resources for stronger asset / property base and chances to qualify for loans. Creation of cooperatives will be facilitated and can even be conditioned in the microloan contracts. Agro pastoralists will be trained on microloan schemes and their financial literacy will improve to better understand the livelihood development opportunities this may unfold. Access to microfinance in Petit Bara that falls under the Arta district will be negotiated with CPEC during the preparatory stage as currently there is no CPEC affiliate there and alternative arrangement need to be sought for.

## **B.** Economic, social and environmental benefits of the project

46. The AF project will yield significant economic, social and environmental benefits by promoting high-value agro-pastoral developments that will increase climate resilience of more than 30,000 people, in the country's poorest regions. Better water management and improved availability will directly benefit settled and nomadic populations, decreasing their vulnerability and increasing forage availability. The development of height agro-pastoral shade gardens over 10 ha each shall produce, after a few years of growing, as much as 200 tons/year of dates per year, which can be self-consumed, thus improving people's diet, or sold on the local market with the potential to generate revenues approaching $ 555,000 / per year[4]. The demand for quality dates is high in Djibouti (the few tests conducted so far have shown a great selling success[5]) and mostly satisfied by imports so far. In addition, fruits, vegetables, improved forage production (and thus improved meat production) and other products such as henna, jojoba, etc. will provide other sources of income to rural families, which can be estimated up to $ 200,000 / per year.

[4] It is estimated that a well managed date palm can produce an average of 50 kg of dates per year. The project plans 160 gardens with 25 date palms each. 50*160*25 = 200 tons. The average price of dates in Djibouti is estimated at a minimum of 500 DJF/kg, which results in an annual turnover reaching 555,000 USD.

[5] Since 2005, CERD has developed first shade gardens nearby the research station in collaboration with local farmers. The first harvests have been successfully sold in the streets of Djibouti within a few hours which shows that the local demand for such commodity is high. Consumption of dates, through import from the Arabic Peninsula, is also widespread in Djibouti.

Although hard to estimate at this early stage, other socio-economic benefits will come from multipurpose trees and plants, as well as reduced wood and water burdens for women and children who, with the tree plantations and water supplies newly established and directly accessible in their settlements, will no longer be forced to walk long distance to collect firewood and domestic water. The resulting gain in time will then be used to develop alternative livelihoods, improve women well-being or for children to attend school.

47. The Government of Djibouti understands this project to be a unique opportunity for ensuring climate-resilient development pathways in rural areas. Therefore the project will also work at a more systemic level, developing and testing new approaches that will break the desertification/poverty increase trend currently occurring in most Djibouti rural areas towards pro-active reinforcement of resilience and capital accumulation. By setting the base for a large scale replication in other rural regions, the AF project will provide social, economic and environment benefits to a large number of rural communities.

48. A more elaborated analysis of the project's benefits will be conducted and further details provided during the preparation of the full project.

## C. Analysis of the cost-effectiveness of the project

49. Cost effectiveness is firstly assessed against other possible climate change adaptation solutions. In the rural regions targeted by this initiative, no alternative livelihood options (such as industrial or mining) exist for the moment. Tourism demand is scarce. It could be developed at national scale, including some tours in the semi-desert with nomadic populations, but this should be a national effort and requires heavier investment including promotion. In addition, it is not a climate change resilient strategy, many studies demonstrating that increasing temperatures will impact tourism flows from Europe, and decrease the attractiveness of warmers places. For those rural populations, when conditions for living become too harsh, the usual adaptation option is migration to Djibouti-Ville, trying to benefit from the current economic growth of the port and related services. However, unemployment rate in Djibouti is still very high (around 60%). If employment opportunities growth in the coming years is real, Djibouti people usually lack needed capacities, a big gap existing between the educational system and employment offers. For the rural poor, many of them illiterate, no long-term opportunities can be hoped. And strong demographic growth also calls for alternative solutions in rural regions, as well as the urgent need to improve the country's food security.

50. In rural areas, the population is therefore more or less constrained to primary sector activities. The adaptation alternative supported by the proposed project is therefore seen as much more cost/effective strategy than migration and resettlement of pastoralists in urban and peri-urban areas. Such alternative solutions would require high level of investments in the development of urban infrastructures and services, especially water supply, whose additional costs are clearly beyond the financing capacity of an LDC country like Djibouti. Similarly, relying almost exclusively on food aid and international assistance programmes to address the impacts of droughts and water scarcity on food production is unlikely to be a cost/effective solution in the near term, given that the extreme drought events underwritten by such international/national solidarity mechanisms are likely to become regular risks under a climate change regime. The most cost effective way to improve the living conditions, food security and climate resilience of the traditional pastoralist communities lies therefore in the enhancement of the dryland ecosystem production potential in terms of quantity and value of agricultural products as well as in the diversification of employment and income opportunities for rural dwellers as risk spreading strategies and as economic incentives for them to remain on their lands while accumulating the necessary capital to better cope and recover from more frequent low-rainfall events. As described above the restoration/development of oasis-type shade gardens will provide micro-climatic conditions that will in

turn enable to maximize the productivity of both soil and water resources in a way that is more resilient to further aridification than the current practices which rely only on precipitation and is therefore highly sensitive to the vagaries of climate. In combination with improved groundwater use and recharge practice these multi-purpose agro-pastoral systems will provide the most viable and cost-effective solutions for many rural residents to survive tthe food insecurity threats posed by climate change.

51. Several intrinsic characteristics further provide strong justification for the costs-effectiveness of the proposed solution. The project will predicate the development of the shade garden on a series of decentralized and rustic water harvesting techniques that have been analyzed as being much more cost-effective than large scale supply-side strategies consisting for example in constructing big water retention systems (dams or flood capture infrastructures) which are increasingly vulnerable to the growing uncertainty and unpredictability of rainfall patterns due to climate change and also extremely costly when it comes to use them to deliver water over long distance in remote areas such as Grand and Petit Bara. Next to this, the project will put an important focus on promotion of adaptation measures based on climate-compatible and environmental-friendly agricultural and pastoral practices that will maintain the resource base and ensure conservation, restoration, sustainable management and maximization of dryland agro-ecosystems resilience capacities and services for water and food provisioning. There is now a shared recognition that these resilience-based measures are highly cost-effective and sustainable as compared to hard solutions. As natural infrastructures, agro-ecosystems are often less expensive to maintain than physical engineering structures to cope with long term and structural changes in the hydrological and environmental conditions. Also, inducing a shift from reactive management of climate-change impacts towards preventive planning and development of dryland soil, water and pastoral resources, through improved adaptation modelling and planning capacity and support tools, will significantly reduce the cost of dealing with climate change and its effects and will strengthen the sustainability of the management systems put in place. On a technological level, the project will promote cheap and simple local solutions/techniques, and avoid to the highest extent any dependence from outside inputs in order to ensure sustainability (for example the dependence on costly fossil fuels will be limited through the systematic investment into renewable energy run equipment, such as water pumps).

52. Lastly, given the level of revenues expected from agro-pastoral gardens for each farmer, the project is seen as highly cost-effective as regards initial investment from AF resources. Based on the available literature regarding yield rates and economic return potential of date-palm production in shade-garden in Djibouti[6], the project shall directly yield between 800,000 and 1 million dollars a year of new revenues for the local population. Compared to the approx. 5 million dollars investment over 5 years, this means that 1 million dollar will be invested every year for 5 years (corresponding to the necessary growing time for trees) and then 1 million dollar will be earned as income for the next 20 years at least. Maintenance and other costs will have to be paid from those revenues, but the rural population will then have the means to self-sustain and even develop further the system and a capital accumulation cycle will begin. This process will generate additional resources that will be directly available to the target groups for further investment in adaptation and resilience building activities

## **D.** Consistence with national or sub-national sustainable development strategies

53. The project idea has emerged as the logical continuation of the cumulated recommendations made in the Initial National Communication to UNFCCC, the Climate change vulnerability study funded by the

[6] G. Peyron, "Cultiver le palmier-dattier", La librairie du CIRAD, France
A. Daher, "Détermination du sexe chez le palmier dattier : approches histo-cytologiques et moléculaires", Ph.D Thesis, University of Montpellier 2, December 2010

GEF, the Proposal for funding for the preparation of a National Adaptation Programme of Action and the NAPA itself, as well as the more recent studies implemented within the framework of the Great Green Wall initiative. The AF project is fully in line with the National Adaptation Programme of Action (NAPA) document, which is based on a large consultative process at all levels from governmental authorities to vulnerable communities, including priority stakeholders and the most vulnerable segments of population. Among other activities, the NAPA formally recommends capacity building activities for agro-pastoralists, the dissemination of performing forage species, the strengthening of cooperative organisations, the introduction of clean water pumping technologies and the protection of agricultural zones from erosion and floods. Activities in this project respond to multiple priorities expressed by vulnerable populations in the NAPA, including the implementation of better water mobilisation and management practices, the improved forage production and ecosystem regeneration, the development of integrated, oasis-type agro-pastoral production systems, the structuring of local initiatives within cooperatives and community organisations, with access to appropriate capacity building possibilities and financial tools

54. The fight against desertification and agricultural development are key elements of Djibouti's government development strategy. This is illustrated by previous attempts to diversify the rural economy towards agricultural production, the development of the Centre of studies and Research of Djibouti (Centre d'étude et de recherche de Djibouti – CERD) date palm reproduction laboratory (with the objective to propose drought and salt tolerant plants and develop shade gardens in Djibouti), as well as the Great Green Wall initiative in which Djibouti is strongly involved. The GGW is a pan-african initiative spearheaded by Heads of State of eleven African countries along the southern border of the Sahara desert and aimed to employ a mosaic of approaches to combat desertification, soil degradation and limit Sahara desert expansion over a 15 km wide and 7,775 km long ecological buffer zone stretching from Senegal in the west to Djibouti in the east and. This collaborative action will aim to ensure the planting, natural regeneration and integrated development of economically interesting drought-tolerant plant species, water retention ponds, agricultural production systems and other income-generating activities, as well as basic social infrastructures with a view to achieving protection of natural resources, rural development and poverty alleviation. The GGW is expected to lead to the sustainable management of land, water and vegetation on up to 2 million hectares of croplands, rangelands, and dryland forest ecosystems per country, protection of threatened dryland biodiversity, and the sequestering of 0.5 to 3.1 million tons of carbon per year. The project is receiving increasing support from the international community and has been endorsed by the participating countries and potential Bilateral and multilateral donors and international financial institutions in a a Ministerial Meeting held in Bonn in February 2011 and co-hosted by the UNCCD and the GEF. The Global Environment Facility expressed interest in supporting the GGW with what could be up to US$115 million. Other development partners also made pledges in support of the proposed investments which could ultimately reach US$3 billion.

55. In this context, Djibouti has conducted detailed studies to identify the most suitable areas to implement the green wall actions, identifying the constraints, risks and key elements of tree plantations and promoting agro-pastoral development. Recently, a National Green Wall Implementation Strategy has been released, setting out the main strategic and operational ingredients of the Djibouti's GGW component. This strategy formally recognizes and retains the development of date palm-based shade gardens as an environmentally and economically-sound approach to overcoming the barriers to agro-pastoral development and achieve the green wall objectives. As such, Petit Bara and Grand Bara have been selected as one of the 5 landscape units retained for the implementation of the GGW in Djibouti. The proposed project is closely aligned with this national and supra national initiative in that it will pursue the similar objectives of (i) conserving, restoring and enhancing biodiversity and soils, (ii) diversifying production systems, (iii) meeting basic food needs and increase revenues through the promotion of income generating activities (iv) improving / installing basic social infrastructures, in particularly in the area of rural water delivery services.

56. Given the limited water availability, the development of more efficient agro-pastoral systems, is a key national priority for the government, as illustrated by many national development programmes and plans that have underlined the necessity of integrated rural development initiatives based on improved water management and agro-pastoral development. As such, the 2003 Strategy to fight poverty aims to stop rural decline in the country through the rationalization of the exploitation of natural resources and the transformation of the agricultural system to offer a decent exit strategy to drought-prone pastoral communities while improving agricultural yields and food production. The National Programme of Action for the Environment (PANE) and National Plan to Combat Desertification (PAN) also underline the urgent need to protect the environment and better manage soil, water and pastoral resources. The PANE and PAN three-year Action Plans started in 2006 from the Ministry of agriculture underscore the challenges posed by drought and water scarcity of pastoral communities and the need to counteract current trends of ecosystem overexploitation in the most fragile drylands through appropriate investments technological and non-technological solutions. All the actions proposed in this plan enter the economic development law 2001-2010 and the Poverty reduction strategy. The proposed project is deeply embedded in the priorities and objectives pursued by these plans which both support the fight against drought and desertification through community-based water harvesting and management schemes, protective soil and water conservation measures, integration of crop and animal husbandry and agroforestry using drought and salt tolerant varieties such as date palms with the overall aim to build more favourable microclimatic and ecological conditions for the development of alternative and productive agro-pastoral livelihood systems.

57. More recently, Djibouti endorsed in 2009 a National Food Security Strategy, backed by the creation the same year of the National Food Security Agency in charge of its implementation and monitoring. These policy innovations marked a major breakthrough in the way Djibouti approaches its food insecurity situation and outlines a comprehensive way forward to more thoroughly address the main root-causes behind it. Acknowledging the mounting evidence on the role of climate change in shaping both structural and episodic food security crises in Djibouti, the Strategy‘s main purpose is to reduce the dependence of the country on food importations, reduce the cost of food purchase for rural households, ensure self-sufficiency of most households for their basic food needs, reduce the vulnerability of the poorest to external shocks, improve water management practices and mainstream food security concerns into national poverty reduction frameworks. To do so, the strategy specifically supports the increasing of the agricultural production through greater integration of agricultural and livestock production practices, improvement of the productive potential of dryland ecosystems and restoration maximisation of food and water regulation ecosystem functions. It also recognizes the criticality of promoting more diversified and robust economic activities and livelihoods outside the agriculture sector as ‘’safety nets’’ for the rural poor against climate and economic crises. The AF project fully fits with these orientations and priorities and will offer a strategic opportunity to further operationalize and localize them in the project regions.

58. The project is also fully consistent with the NEPAD agricultural development programme – to which Djibouti adheres – that calls for urgent action in areas related to:

- Investment in water and land management;
- Investment in rural infrastructures, in particular roads and food products storage facilities;
- Direct incentives for agricultural production and productivity, and implementation of safety nets for most vulnerable populations;
- Support to science and technology development for long-term productivity.

59. The framework law for environment in the Republic of Djibouti is currently being updated. The natural resources chapter does insist on the protection of soil and sub-soil resources as well as animal and plant resources preservation.

60. Also, the proposed AF project perfectly resonates with a number of additional national development frameworks, such as the poverty reduction strategy, the economic development law 2001-2010 as well as the Strategic document to fight against poverty of the country. These policies set out priorities for the primary sector that consists in the growth of agricultural outputs and increase in the revenues of farmer communities up to an annual minimum of 600,000 FDJ (3,000 USD) from the exploitation of an average 0.5 ha of land. The agricultural systems developed by the project, especially the production and marketing of dates will enable to generate revenues for agro-pastoralists that fully satisfy the above targets[7]. The project will therefore constitute a key instrument in support of the national poverty reduction policy. .

## E. Describe how the project / programme meets relevant national technical standards, where applicable.

61. The proposed project will comply with all relevant laws, regulations and existing technical standards relating to hydrological resources mobilisation, agricultural and pastoral development. On the socio-economic aspect, the project will duly respect norms and laws applying to labour, and public procurement procedures for investments and works. On the environmental side, the project will obviously respect all current regulations relating to water, biodiversity and soil protection, and work for a better management of natural resources. The strong involvement of the Ministry of environment and the Ministry of agriculture into the project will ensure that all procedures regarding water mobilisation, infrastructure development and shade gardens creation duly respect existing procedures and comply with all regulations in place. The concerned Ministry services, as well as CERD scientific team, have indeed a great experience in water investments and perfectly know the rules and generally accepted practices in this matter. Currently, the water legislation in Djibouti does not require any particular groundwater abstraction permits or rights to be granted for government-led investments in favour of agropastoral development. Similarly, the current water code doesn't yet include quantitative norms or standards to regulate water extraction and use in the project zones. Working on strengthening the water legal framework in Djibouti would clearly be outside the scope of the proposed project. However, the AF intervention will not ignore this situation and will be particularly mindful of the need to set up appropriate co-management rules and participatory monitoring mechanism to ensure a sustainable and long-lasting utilization of the mobilized water resources. Under component 1, the project will make a valuable contribution towards the improvement of the national water regulations by demonstrating appropriate water management targets, allocation principles and enforcement protocols that will be established with the local user groups and aimed at securing a controlled and climate-resilient exploitation of groundwater resources. This will be further supported by the creation of local water management committees for which Djibouti has very positive track-records and experiences. For example, the villages of Gallamo located in the region of Dikhil has developed promising participatory water allocation rules whereby water is alternatively shared on a daily basis between agricultural and domestic purposes according to a sophisticated community monitoring and decision making system. Best practices of this kind will be systematically reviewed and fed into the community-based management standards to be developed by the project. Such participatory mechanisms are fully consistent with the social standards prevailing within pastoral and agropastoral communities who are already subject to traditional and customary rules as it relates for example to the resolution of conflict over land and water resources or community development decision-making.

62. . In addition, the water resource monitoring procedures and systems implemented in the project will provide knowledge on groundwater 'reaction' to shade-gardens development, and certainly provide

[7] 0.5ha plots will be planted with 25 date palm trees as a start, yielding 1250 kg of dates per year, at a market price of 3500 USD/year for the sole date sell. This will be completed by other products such as vegetables, fruits, increased meat production, etc. that area also expected to generate additional revenue streams.

lessons to be learnt, assisting in the further development of (legal or not) protocols for other projects of this type.

63. All UNDP supported donor funded projects are required to follow the mandatory requirements outlined in the UNDP Programme and Operational Policies and Procedures (UNDP POPP). This includes the requirement that all UNDP development solutions must always reflect local circumstances and aspirations and draw upon national actors and capabilities. In addition, all UNDP supported donor funded projects are appraised before approval. During appraisal, appropriate UNDP representatives and stakeholders ensure that the project has been designed with a clear focus on agreed results. The appraisal is conducted through the formal meeting of the Project Appraisal Committee (PAC) established by the UNDP Resident Representative. The PAC representatives are independent in that they should not have participated in the formulation of the project and should have no vested interest in the approval of the project. Appraisal is based on a detailed quality programming checklist which ensures, amongst other issues, that necessary safeguards have been addressed and incorporated into the project design.

## F. Describe if there is duplication of project / programme with other funding sources, if any.

64. The proposed project for AF funding takes an alternative agro-pastoral development and livelihood diversification approach to adaptation that considers more reliable control and productive utilization of surface and ground water as a fundamental mechanism to respond to the impact of more irregular rainfall on the productivity of traditional rain-fed pastoral and farming systems. Increasing the control of water resources available for agriculture and alternative livelihoods, either through artificial (water ponds, basins) or natural storage (soil moisture and aquifer) reduces vulnerability to climate variability and related water shortage and leads to greater agricultural resilience. Whereas most rural development projects focus on animal husbandry or vegetable production only, this project brings back the concept of integrated agro-pastoral development, based on a long lasting oasis tradition that needs to be protected and revitalised. It consistently links investments in water resource mobilisation and management to agro-pastoral development through shade-gardens and improved animal rearing thanks to increased access to water, increased forage production and storage facilities. No duplication with other funding sources has therefore been identified. Instead, potential actions on surface water harvesting and grazing land management from other initiatives in the region may positively complement the AF project.

65. The project also focuses on two different geographic locations (Petit Bara and Grand Bara) where very limited agro-pastoral development activities have been implemented so far (if we except a recent palm tree cultivation trial in Grand Bara). In those regions, on-going initiative related to rural and agricultural development consists exclusively of the PROMES-GDT (Surface water mobilisation and sustainable land management programme) programme that is focused entirely on pastoralism development. This programme aims to improve grazing land management and animal rearing practices by regenerating and increasing productivity of natural pastures and improving livestock production conditions so as to augment animal nutritional intake and income of pastoral communities. This intervention does not address the long-term adaptation needs of pastoral and agro-pastoral communities, including possible exit strategies for pastoralists in areas where extensive livestock breeding could become no longer viable as the result of climate change driven degradation of natural pasturelands in both quantity and quality. There will therefore be no conflict between the two projects since the AF project's activities address a different set of adaptation strategies, more long-term and geared towards increasing forage stock and agricultural diversification through irrigated-based agro-pastoral shade-gardens. There will be rather a high complementarity as the two projects can be regarded as two side of the same adaptation coin. In the very short term, the needs for ''no-regret'' grazing land management improvement

around the AF project sites must be tackled given the large population concerned (only part of it will directly benefit from the AF project) and the very large areas supposed to be covered by the PROMES-GDT programme. In the near to medium term, it is an urgent importance for the country to devise innovative and rural resilience solutions that would allow to gradually depart from problematic and less effective migration 'solutions' to urban centres and to more effectively cope with more intense and chronic aridity. Coordination between the two initiatives will therefore enhance the region's overall adaptation capacity in the face of multi-faceted and gradually emerging climate change threats.

66. Other projects under implementation in the country rural areas are listed below. The results of those different projects/programmes will of course be taken in due consideration for the AF project implementation (e.g. using the various water studies results that are often conducted):

| **Project name** | **Source** | **Estimated budget** | **Status** |
|---|---|---|---|
| Ambouli wadi development | EU | 19 million EUR | Procurement process launched |
| Marsaki (Tadjourah) and Behidleh (Ali Sabieh) watershed development | BID-ADDS | 300,000 USD | Under finalisation |
| Support to water resource mobilisation for households and agriculture | African development Bank | 1,937,000 EUR | Under implementation since June 2008 |
| Surface water mobilisation and sustainable land management programme (PROMES-GDT) | FIDA and others | 3.6 million USD | Under implementation in Day forest since December 2008 |
| Drinking water catchments in rural areas | Saoudi Fund | 3 million USD | Phase 1 : completed since 2006<br>Phase 2: under implementation since December 2009 |
| Drinking water catchments in rural areas | Abu Dhabi | 800,000 USD | Under finalisation |
| Fight against thirst | EU / UNICEF | 2.06 million EUR | Phase 1 (EU) : completed since December 2009.<br>Phase 2 (UNICEF) implemented since January 2010 |
| PSSA project: water management | BID FAO Djibouti | 800,000 USD | Under finalisation |
| Mapping, assessment and management of transborder water resources within IGAD sub-region | IGAD | 2.5 million USD | Phase 1 completed since October 2009<br>Phase 2 launched |
| JICA project | JICA | - | Started in February 2010 |

| | | | |
|---|---|---|---|
| Second National Communication on Greenhouse gases | GEF-UNEP | - | Since 2009 |
| Identification of saline water: Djibouti watershed | UNESCO | 200,000 USD | 2010-2011 |
| Technical assistance for the analysis and monitoring of natural disaster risks | World Bank GFDRR | 2.5 million USD | 2010-2012 |
| Geophysical study of 44 sites and water management | African development Bank | 5 million USD | 2008-2010 |

*Source: Etude sectorielle eau, Projet GMV, 2010*

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

67. First of all, the project will launch a large awareness raising and population mobilisation initiative on climate change, organising the participatory design of adaptation strategies around the project main components. Current knowledge on climate variability and future trends of change is limited in those rural areas, and there is a strong need to mobilise people around concerted actions improving their resilience.

68. The project integrates strong capacity building, technical support and technical monitoring (of water resource and agro-pastoral development) components. All related activities will contribute to knowledge management along the project implementation for the different categories of stakeholders: agro-pastors, their organisations (cooperatives, associations), technical support staff, and governmental organisations. The project will systematically document key lessons, good practices and challenges experienced in establishing sustainable water resources management plans and subsequent agro-pastoral oasis gardens development as adaptation measures for rural community resilience. As described under component 2, the project will organize regular technical meetings with farmers' groups as well as stakeholder round tables as part of the monitoring exercise, to document lessons for further adjustments and replication. Adaptation Learning Mechanism http://www.adaptationlearning.net and other relevant platforms such as http://www.weadapt.org/ will also be used for knowledge dissemination and experience sharing.

69. The Government of Djibouti understands this project as a pilot experience that will generate foundational capacities and develop basic tools and information to replicate the project water resource mobilization and agro-pastoral development concepts in other regions of the country, and increase resilience to climate change and food security. A particular effort will therefore consist in the close monitoring of a large number of technical and socio-economical parameters, both concerning the water mobilization component and the agro-pastoral development (with particular focus on oasis ecosystem management and date palm development), as well as the capitalization of lessons learned from community organizations structuring, income-generating activities development and the use of micro-finance tools. This will enable experience and knowledge capitalization among project stakeholders at local and central levels for dissemination and replication.

## H. Consultative process and list of stakeholders consulted during project preparation

70. The overall consultative process has started years ago with the NAPA process. Various initiatives have enriched initial proposals for adaptation among stakeholders and the proposed strategy for agro-pastoral development based on the development of date palm-based shade gardens has emerged as the

most adapted cost-efficient strategy for the project region. During project preparation, the following stakeholders have fully contributed to technical/institutional/strategy choices made in the AF project.

| **Stakeholder name** | **Potential role in the Project** |
|---|---|
| Min. of Housing, Environment and Territory Management - MHUEAT | Project overall coordination |
| Ministry of Agriculture, Livestock, and Sea, in charge of Water Resource - MAEM-RH | Project execution |
| Djiboutian Centre for Studies and Research - CERD | Project research and development components |
| State Secretariat to the Prime Minister in charge of National Solidarity | Coordination of project activities with current social development initiatives |
| Djiboutian Agency for Social Development - ADDS | Project execution |

71. In addition, the project's main components have been discussed at the highest administration levels and specific orientations have been given at this occasion. Other projects/other donors have also been consulted in order to collect information regarding their own activities and their opinion regarding the AF project components: AFD/FFEM, European Union, PROMES-GDT project team, and UNDP of course. A field visit has also permitted to assess project potential and feasibility in the selected locations.

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

72. Djibouti's status as a least developed country (LDC), located in the sahelo-soudanian strip where desertification and increasingly arid conditions occur, that makes its fragile ecosystems and the population highly vulnerable to climate variability and long term change. The national budget alone cannot cope with the urgent adaptation needs. The new robust systems and knowledge need to be brought in order to build resilience of rural economies and people residing in this climate sensitive ecosystems. .

### **Component 1: Sustainable access to secured water resources in the face of climate change**

73. Baseline (without AF Resources): The knowledge of the water resource has been globally improved and a set of solutions to growing needs have been defined, from the expensive desalinisation option to improved use of rainwater and a sustainable exploitation of new ground water resources. However, the intensification of droughts and climate variability, associated with growing water needs and population pressures, result in the salinization of many water points, silting up of wells, destruction of water points by erosion and floods. This process is directly accelerated by climate change and results in a dramatically unsecured access to drinking and irrigation water for the rural poor. In the project area, rural populations must sometimes walk for 4 hours to get access to surface water collected by small earth dams. The time and energy spent walking, associated with the bad quality of the water consumed and the uncertainty of resources represents a considerable risk and generates a high vulnerability for rural populations. No agro-pastoral development can be envisaged without secured water resources for herders, who have very limited adaptation choices and are getting increasingly trapped in urban poverty.

74. Additionality (with AF Resources): AF resources will permit to tackle vulnerability to water by (i) the in-depth study of the water resource potential in the target regions in the face of climate change, (ii) investments into more advanced technology of surface water collection (iii) investments into controlled ground water extraction, combined with artificial recharge that offers integrated ground water management solution that is more resilient to projected water stresses (iv) strong capacity development by long term water resource management plan and associated real-time monitoring plan to track the resource management dynamic and needs for adjustments in response to climate change impacts. Detailed guidelines that will present the good practice for groundwater management in the conditions of increasing aridity will also be produced.

**Component 2: Shade gardens to support diversified and climate-resilient agro-pastoral production system**

75. Baseline (without AF Resources): The country has invested in drought management within a number donor funded projects in the past, but the approach was mainly dedicated to the multiplication of wells and drillings, which has certainly improved access to water in a first instance, but has also played a role in nomadic population settlement, resulting locally in increased pressure on the ecosystem and unsustainable water abstraction leading to salinization of soil and water bodies.. Today, most of the rural population still lives almost exclusively from animal breeding and agriculture is very poorly developed, despite national efforts. In fact, previous rural development efforts has tend to focus either on animal husbandry or vegetable production only, and did not leverage the potential of agro-pastoral systems, based on agro-forestry and more integrated livestock/farming production, to diversify production, increase food security while releasing pressures on dwindling land and water resources. Baseline efforts are further constrained by climate change driven heat and drought that are intensifying; and engendering critical challenges on agricultural development, including agro-pastoralism. New, innovative solutions therefore need to be introduced to adapt to those new conditions and to provide vulnerable rural populations an alternate source of revenues, increasing their resilience to climate change. Promoting the culture of date palm and using it as the cornerstone for the revitalisation of climate-resilient oasis-type agropastoral systems is a critical strategy in this regard. However, there are important gaps to be addressed in Djibouti towards this solution: (i) plant species demonstrating a greater resilience to drought and salinity, and producing good value products, must be strongly promoted, (ii) agricultural systems must be adapted to more intense climate conditions, and there is a strong need for capacity building of both extension services and farmers, and (iii) tree plantation, being date palms, fruit trees or forest trees, need time to grow and generally do not respond to most urgent needs. Well aware of those gaps, the government of Djibouti has, as a first step, started to create new capacities for the development of date palm tree with the successful launch of a date palm trees production laboratory in 2005. The country has now the capacity to produce Djiboutian date palm young trees and has developed internal expertise, but there is very limited capacity to actually support the widespread development of agro-pastoral oasis gardens as proposed in this project.

76. Additionality (with AF Resources):, This project brings back the concept of integrated agro-pastoral development by introducing interrelated irrigated farming and livestock management as a cost-effective alternative to cope with increasing climate-induced drought and desertification. AF resources will be used to create local capacities to develop climate resilient agro-pastoral systems by rejuvenating and upgrading the traditional practice of oasis type shade garden that was imported centuries ago in Djibouti by Yemeni populations. The traditional memory of this model has now been lost as a result of gradual rural out-migration and devitalisation of areas where it was originally present. Therefore, the project will help build the necessary capacities to restore and expand this practice amongst drought vulnerable rural community of Grand and Petit Bara who have never been involved before in this type of agriculture. These capacities will enable to develop multi stage farming system for growing forage, vegetables and other high value drought and salinity resistant varieties, such as henna and jojoba. The shade provided in such gardens improves moisture retention in the soil and creates multi-functional, micro agro-ecological system with

improved productivity and diverse benefits. This integrated agro-pastoral system is seen as a viable adaptation strategy for Djibouti, whereby animals can be raised without exacerbating pressures on degraded steppe ecosystems and more diversified agricultural and non-agricultural commodities produced through better control and productivity of soil and water resources, thus contributing to spread the risks from climate change across a broader portfolio of rural activities and livelihoods.

**Component 3: Access to finance secured for climate resilient agro-pastoral enterprise development**

77. Baseline (without AF Resources): A more favourable environment for agro-pastoral enterprise development has yet to be put in place so as to diversify adaptation responses to climate variability. Access to micro-finance in Djibouti is poor, in particular for agro-pastoralists. Being semi-nomads and poorly organised, they do not present a sufficiently reliable profile for microfinance institutions. Existing cooperatives strongly need to be reinforced and climate resilient agro-pastoral activities would positively enhance capacities of these communities to adapt to climate change.

78. Additionality (with AF Resources): AF resources will permit (i) to structure involved agro-pastoralists into well established cooperatives and/or associations, with a physical location (concretely represented by the shade gardens) in Petit Bara and Grand Bara; (ii) to foster community responses to climate change impacts and subsequently launch and support adaptation initiatives through income-generating activities; (iii) to closely work with the microfinance institution in place in order to define a loan offer adapted to agro-pastoralists needs and specific context; (iv) to train and follow-up involved populations so that they learn how to use microfinance and what it can bring them.

# PART III: IMPLEMENTATION ARRANGEMENTS

## A. Arrangements for project implementation.

**Institutional Context:**

79. The Department of Land Management and Environment is the key institution on issues of climate change and the environment in Djibouti. This institution is a department of the Ministry of Housing, Urban planning, the Environment and Land Management. This department co-ordinates all climate-related issues in the country, and works in collaboration with various NGOs and other Government departments. A National steering committee for climate change had been established for the elaboration of Djibouti national communication under UNFCCC, and then of the NAPA.

80. The Ministry of Environment is legitimate, has a transversal mission and therefore collaborates with the Ministry of Agriculture, highly concerned by most of the activities of this AF project, the State Secretariat for National solidarity, the Centre of studies and Research of Djibouti (Centre d'étude et de recherche de Djibouti – CERD) and other relevant institutions having the necessary executive teams.

**Institutional Arrangements:**

81. As a direct request by the Government of Djibouti, the project will be implemented through The United Nations Development Program (UNDP), in its capacity of accredited MIE to the AF. The project will be implemented in close coordination and collaboration with all relevant government institutions, local communities and NGOs, as well as other related projects in the region. UNDP-CO will support project implementation by, contracting project personnel, experts and subcontractors, undertaking procurement, and providing other assistance upon request of the National Executing Agency. UNDP-CO will also monitor the project's implementation and achievement of the outcomes and outputs and ensure

the proper use of Adaptation Fund resources. Financial transactions, reporting and annual auditing will be carried out in compliance with UNDP regulations for national project execution modality.

82. The **Executing Agency** will be the Ministry of Housing, Urban development, Environment and Land settlement (MHUEAT). The Executing Agency/Implementing Partner will appoint a National Project Director and will appoint jointly with UNDP CO a Project Manager and an administrative/financial assistant. A summary of the roles and responsibilities of the National Project Director, the Project Manager, and the Administrative and Financial Assistant are provided below.

83. The **National Project Director** will be a high-level government official primarily responsible for overall implementation of the Project. This responsibility includes representing and supporting project objectives at high decision making levels within the Government of Djibouti. The National Project Director also takes the primary responsibility for ensuring that the required government support to reach the milestones of the Project is available.

84. The project will be nationally executed by the MHUEAT, the Ministry Agriculture, livestock and fisheries (MAEM-RH), the Centre of studies and Research of Djibouti (CERD) and the Djiboutian Agency for Social Development (ADDS). National Execution enables the project to exercise greater national ownership whereby, UNDP will only provide technical backstopping, quality assurance and compliance with fiduciary standards in its capacity of MIE.

85. **Project Board**: The Project Board will be responsible for steering the activities of the PMU. Heading the project board will be the Ministry of Housing, Urban development, Environment and Land settlement (MHUEAT), and members will include the CERD, the MAEM-RH, the State Secretariat in charge of National Solidarity (SESN), the External Finance Director of the government, Prefects of the two concerned regions (Arta and Ali Sabieh) and UNDP CO representative. Additional members, or occasionally invited members, will be decided during the project inception phase. The Project board will be responsible for steering the activities of the PMU, ensuring overall political guidance of the project and delivery of its outputs and outcomes.

86. **Project Management Unit (PMU)**: The day-to-day implementation and management of the project will be undertaken by the Project Management Unit, under the overall guidance of a Project Board. During project design, consulted parties have expressed their willingness to limit the costs of personnel under AF resources as much as possible, concentrating AF resources on concrete investments and actions. The PMU will therefore be limited in size, and mostly organise its activities in close coordination with the executing organisations. The PMU will be managed by the Project Manager, assisted by a financial assistant. The team will be completed by two technical professionals transferred by the MAEM-RH: an experienced agricultural expert, and a water resources expert, which salaries will be covered by the MAEM-RH. The team will also be reinforced by two UN volunteers contracted by UNDP-CO (one agro-pastoral/oasis systems expert, and one water resource management expert). The role of the PMU will be to: a) ensure overall project implementation, management and monitoring, b) facilitate communication and networking among key stakeholders, and c) organize the meetings of the Project Board. The project will hire short-term national and international experts for specific project assignments. Project activities to be implemented by the private sector will be contracted out on a competitive basis through public procurement.

87. **The Project Manager** will assume overall responsibility for the successful implementation of project activities and the achievement of planned project outputs. S/he will work closely with the national and international experts hired under the project, as well as the Project Assistant, and will report to the National Project Director and to the UNDP Country Office. The Administrative and Financial Assistant will provide assistance to the Project Manager in the implementation of day-to-day project activities. S/he

is responsible for all administrative (contractual, organizational and logistical) and accounting (disbursements, record-keeping, cash management) matters related to the project.

## **B.** Measures for financial and project risk management.

88. The following risks – and possible mitigation measures – have been identified:

| **Risk** | **Risk Rate** | **Risk mitigation measure** |
|---|---|---|
| Reluctance of farmers or pastoralists to engage in agro-pastoralist practices of shade gardens | Low | The agro-pastoral development component will start gradually, with the objective to identify a limited number of 'lead' farmers that will serve as examples and possible success stories to the others. Those lead farmers will also serve as a basis for the organisation of technical group meetings with other farmers in order to maintain a strong cooperation between involved families and support their efforts in developing their oasis garden. |
| Repeated drought | high | Whereas the repeated occurrence of drought is a serious probability, the project has been designed so as to be sufficiently resilient thanks to a diversified and secured access to water resources, combining both surface and ground water, as well as the implementation of adapted cultivation techniques and forage and other crop varieties. |
| Initial studies reveal insufficient water availability and quality | Low | The risk concerns only the Grand Bara location, the Petit Bara water resources already being well known and defined as sufficient in quantity and excellent in quality. If the combination of surface and ground water uses in Grand Bara do not reveal sufficiently productive and secured, the project will limit agro-pastoral development in Grand Bara and extend activities in Petit Bara, the two locations being close to each other. |
| Low level of cooperation between executing institutions | Medium | The implementation arrangements have been decided at the State highest-level and accepted by all involved parties. The MHUEAT is strongly willing to coordinate activities with the different executing agencies, and UNDP CO will closely monitor the project good execution, so as to limit any deviation. All involved parties are strongly interested in the project activities and outcomes, and will benefit from capacity building from the project. |
| Insufficient interest and social cohesiveness amongst sedentary pastoral communities to adhere to the alternative production models proposed by the project | Low | Local populations have already partly settled and the need for technical cooperation will play a critical role in social relations. Consulting services for social mobilisation will be appointed during the project course, starting with an initial social study and community mobilisation activities and possibly complemented with other activities later in the project. Climate change response workshops will also serve as a mobilisation and conflict resolution tool. |

**C.** Monitoring and evaluation arrangements and budgeted M&E plan.

| Type of M&E activity | Responsible Parties | Budget USD | Time frame |
|---|---|---|---|
| Project M&E plan set-up and preparation mission | UNDP CO | 20,000 | Within first two months of project start up |
| Inception workshop and report | PMU / MHUEAT and UNDP CO | 3,000 | Within first two months of project start up |
| Monthly reports | PMU | - | At the end of each month |
| Annual reports | PMU and UNDP CO | 2,500 (500 per year) | At the end of each year |
| Meetings of the Project Board | PMU, Project director | - | After the inception workshop and thereafter at least twice a year |
| Technical reports | PMU and External consultants | - | To be determined by PMU and UNDP CO |
| Mid-term review | PMU, UNDP CO and external consultant | 25,000 | At the mid-point of project implementation. |
| Final evaluation | PMU, UNDP CO and external consultant | 30,000 | At the end of project implementation |
| Final report | PMU, UNDP CO | - | At least one month before the end of the project |
| Audits | PMU, UNDP CO | 15,000 (3,000 per year) | Yearly |

NB: the above costs relate to expenditures that need to be incurred by the project for monitoring and reporting on project deliverables. UNDP related costs are not included in the above. Such costs are covered by the fee to UNDP as a MIE for this project.

**D.** Results framework for the project proposal

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

**A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT**[8] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

| | |
|---|---|
| *Mr. Dini Abdallah Omar*<br>Ministry of Housing, Environment and Territory Management, Djibouti | Date*: April, 14, 2011* |

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.

**B. IMPLEMENTING ENTITY CERTIFICATION** *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme 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 and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme. | |
|  <br>Yannick Glemarec<br>Director<br>Environmental Finance<br>Implementing Entity Coordinator | |
| Date: April 18, 2011 | Tel. and email: +1-212 906-6843; yannick.glemarec@undp.org |
| Project Contact Person: Keti Chachibaia | |
| Tel. And Email: +421 2 59337422; keti.chachibaia@undp.org | |