



## PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

### PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category:	Regular project
Country:	Turkmenistan
Title of Project/Programme:	Scaling Climate Resilience for Farmers in Turkmenistan
Type of Implementing Entity:	MIE
Implementing Entity:	UNDP
Executing Entity/ies:	Ministry of Agriculture and Environment Protection of Turkmenistan
Amount of Financing Requested:	\$7,000,040 (in U.S Dollars Equivalent)

#### Project / Programme Background and Context:

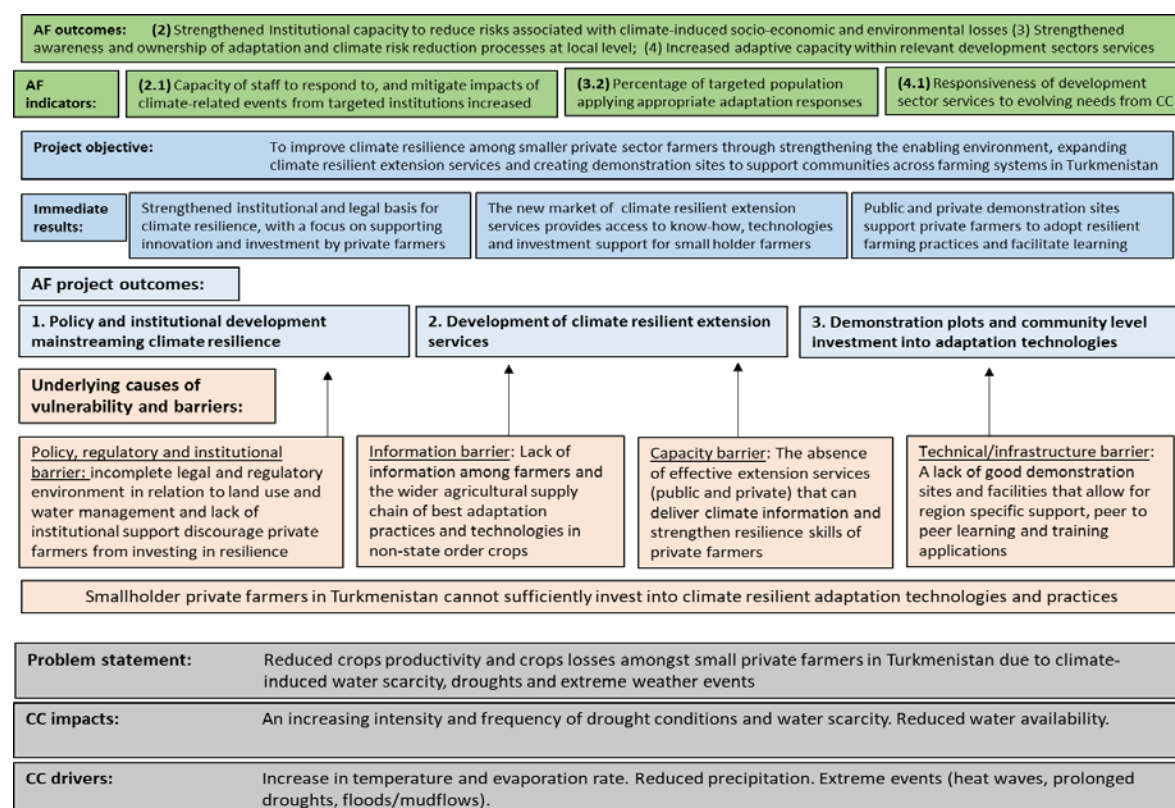
##### Summary

1. This project seeks to build resilience to climate change among the emerging class of small and medium private farmers in Turkmenistan, including women farmers. Over the past 60 years, intensive warming has been observed all over the country. Future climate scenarios project an increase in average annual temperature and in the number of extremely hot days, a reduction in annual average rainfall, an increase in average evaporation rates, an increase in the frequency and intensity of drought and flood spells, and a reduction in river flow rates. These climate changes are projected to result in reduced yields, improved conditions for pests and diseases, crop failures and diminished productivity. Shortages in irrigation will also increase the degradation of valuable arable land in the form of intense salinity, soil erosion, degradation and reduction of natural grasslands, decrease the productivity of pastures, and will lead to a less efficient livestock industry. Of particular concern are the increase in water demand and the reduction in water availability which taken together, may result in a significant deficit of agricultural irrigation water. The higher evaporation rate predicted as a result of climate change is likely to increase the water requirements for irrigating crops by 30-40%, thereby aggravating existing water scarcity and irrigation concerns. Increased water demand of up to 60% is expected for vegetables, a growing subsector.
2. Approximately 50% of the Turkmen population are involved in agriculture, with a large and increasing number now engaged in the non-state crop and livestock sector as the country undertakes an economic transition towards agricultural diversification and privatization. This project directly reflects climate change adaptation priorities as set out in the Turkmen NDC submitted as part of the Paris Agreement, and supports the government's strategic aim of moving towards diversification and privatization in agricultural sector, self-sufficiency and import substitution across a range of agricultural areas.
3. The project will seek to strengthen the institutional and legislative base for encouraging climate resilience among private farmers by addressing key barriers in the land and water sector. It will support the development of a competitive market for climate resilient extension services to transition private farmers towards more resilient agriculture practices and water use. It will do this by working with a range of public and private providers to build capacity and mainstream climate resilience into

agricultural support services. The project will at the same time develop a series of demonstration plots and training centers for climate resilient technologies and best practices across Turkmenistan, help improve access to climate information among private farmers and encourage community and cooperative level investments in resilience. The project will take into consideration gender sensitive barriers to accessing such information and will encourage participation by women through the clear setting of targets and mainstreaming gender considerations where appropriate.

4. Project direct beneficiaries will include 20,000 micro, small and medium private farming enterprises across Turkmenistan (including at least 30% female headed enterprises), which employ approximately 100,000 farmers (including at least 30% female farmers) and provide livelihoods for 100,000 families. Thus, the project will increase climate resilience of 500,000 people in Turkmenistan rural communities<sup>1</sup>. Indirectly, the project will enhance adaptation capacities and climate risk knowledge among a much larger number of smallholder and household farmers by setting up accessible extension services and demonstration plots and enhancing their food security.
5. The project builds on the earlier successful Adaptation Fund investment which promoted more resilient water use and seeks to scale these practices much more broadly through systemic change. The Union of Industrialists and Entrepreneurs, which represents private sector interests in Turkmenistan, will act as a key intermediary and facilitator, ensuring that the agricultural sector in Turkmenistan can transition towards more resilient practices. Figure 1 sets out the theory of change for the proposed project.

**Figure 1: Theory of Change for the proposed project**



<sup>1</sup> An average family size in Turkmenistan is 5 people.

## Overview of Turkmenistan

6. *Country profile:* Turkmenistan is a country in Central Asia bordering with the Republic of Kazakhstan to the North, Uzbekistan to the northeast and east, with the Islamic Republic of Afghanistan to the Southeast, and the Islamic Republic of Iran to the south. From the west Turkmenistan is bounded by the Caspian Sea. The total area of Turkmenistan is 491.2 thousand km. Administratively, the country is divided into five regions (velayats) - Dashoguz, Lebap, Mary, Akhal, and Balkan. The population is approximately 5.8 million, of which just under 50% are rural. Turkmenistan depends directly on irrigated agriculture for food security and the economic livelihoods of about half of its citizens.

**Figure 2: Turkmenistan water resources and administrative regions (velayats)**



7. *Water resources:* Water resources in Turkmenistan are mostly formed of surface runoff from the Amudarya, Murgab, Tejen, Kashan, Kushka, Etrek, and Sumbar rivers, which, together with small streams are flowing down from the North-eastern slopes of the Kopetdag, as well as groundwater. The total volume of water resources of Turkmenistan is 25 km<sup>3</sup>, of which the Amudarya constitutes the majority (88%). Ground water resources represent only 2.5% of total estimated reserves. All major rivers are cross-border, and more than 95% of water resources originate outside the country. River flow is used primarily for agricultural purposes, but also for drinking water and industry. Turkmenistan has among the highest water consumption per capita in the world, reflecting its relatively inefficient use. Used water is collected from agriculture (6km<sup>3</sup>/year) and industrial/domestic use (0.3km<sup>3</sup>/year) through a collector drainage network. Of this, only 0.2% is subsequently used for irrigation.

**Table 1: Mean annual runoff in the Aral Sea basin (km<sup>3</sup>/year), FAO**

Country	River basin			Total Aral Sea basin	
	Syr Darya	Amu Darya	Tedzhen-Murghab	km <sup>3</sup>	%
Kazakhstan	3.30			3.30	2.8
Kyrgyzstan	27.42	1.93		29.35	24.8
Tajikistan	1.01	*59.45		60.46	51.0
Turkmenistan		0.68	0.3	0.98	0.8
Uzbekistan	4.84	4.70		9.54	8.1
Afghanistan		11.70	3.1	14.80	12.5
Islamic Republic of Iran			n.a.	-	-
Aral Sea basin	36.57	78.46	3.4	118.43	100.0

8. *Land and soil resources:* In terms of geography, 80% of Turkmenistan consists of flat desert and semi-desert plains lying between 0-200 m above sea level. Approximately 20% of the territory is occupied by mountains. Soils in Turkmenistan have a very low content of humus, which is caused by low levels of precipitation and high surface temperatures. Soils in Turkmenistan are soft and sandy, and a considerable amount of irrigation water is lost to infiltration into deep soil layers inaccessible to crop roots. This in turn limits the development of vegetation. The total area of agricultural lands is estimated at c. 40 million ha of which desert pastures accounts for 96% (c. 38 million ha). Approximately 1.7 million ha are irrigated. The main areas of irrigated agriculture are the Amudarya, Murgab, Tejen and Etrek oases and the Kopetdag foothill plain. A further 15 million ha have the potential for arable development, but water availability is a constraint. Salinity is a significant problem.

**Figure 2: Aral Sea river basin**

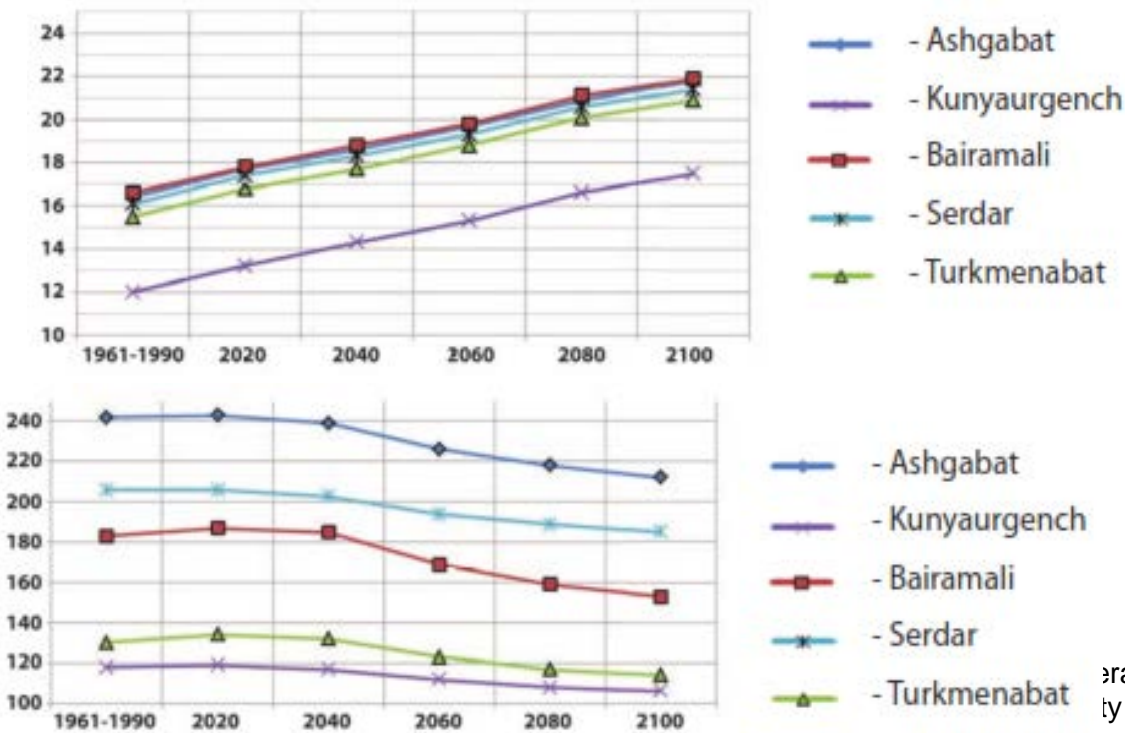




# Turkmenistan and Climate Change

9. *Turkmenistan already has an extreme and varied climate.* Turkmenistan is characterized by sharply continental and extremely dry desert climate, although there are sharp differences between the Northern and Southern parts of the country. The northern part of the country, located in the Siberian anti-cyclone area, is characterized by severe and long winters with continuous snow cover and average yearly temperatures fluctuating between 13°C – 16°C. The southern part of the country, on the other hand, is characterized by mild winters with only occasional snow cover and average yearly temperatures ranging between 18°C – 22°C. Drought is a semi-permanent across large parts of the country. In the warm season (from May to September), daytime air temperatures often exceed 40C and occasionally surpass 50C in the south-eastern Karakum desert. The coldest month is January, with minimum temperatures in the North (Dashoguz velayat) falling as low as -36C.
10. *Turkmenistan is already experiencing significant climate change:* Since 1950, there has been a significant warming trend, with average temperatures increasing by more than 2C over pre-industrial levels. This represents a more rapid rate of warming than in many other parts of the world. Temperature increases have been accompanied by a reduction in rainfall, compounding problems already associated with the existing hot and dry climate. The trend shows that in recent years variability in monthly precipitation has increased, with increasing severe events. For example, since 1969, the Amudarya basin has repeatedly experienced seasonal floods, causing damage to farmlands, homes, public utilities and infrastructure.
11. *Future projections show increasing temperatures and falling precipitation:* Compounding the existing impacts of climate change, the 2016 Third National Communication (TNC) projects continuing increases in temperature (by up to 5C by 2100) and reductions in precipitation (with significant falls of more than 20% post 2040). Flows in the Amu-Darya river, the main source of agricultural irrigation water, are also expected to fall by up to 10-15% by 2050, with declines of between 5-8% expected in other rivers that are already fully used for irrigation purposes.

**Figure 3: Historic and projected Changes in temperature (C) and precipitation (mm) under B1 and A1FI scenarios (Source Third National Communication to the UNFCCC).**



12. The  
pr

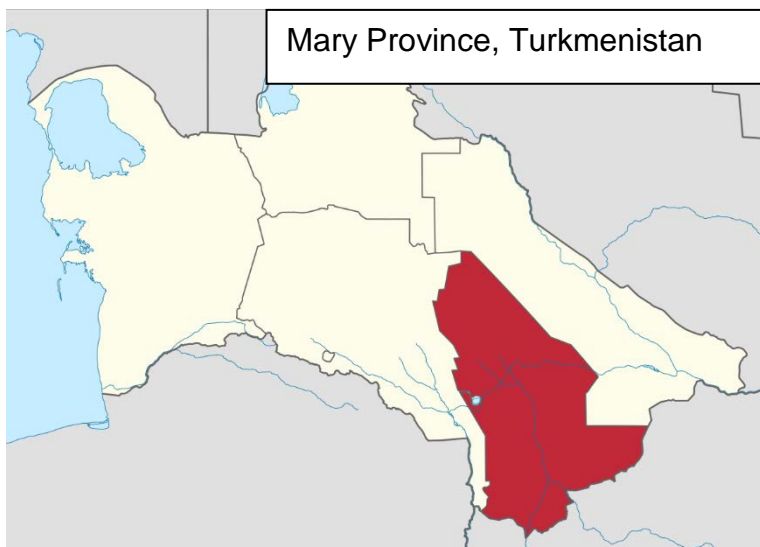
perature and  
ty of natural

disasters (droughts, floods, storms). Extreme weather events are expected to increase in frequency and magnitude, in particular: a 10% p.a. increase in the number of flash floods and mudflows – especially in the mountainous areas, a 5% p.a. increase in heavy rains and a 1.6% p.a. increase in intense heat periods. Please refer to **Annex 5** for a detailed climate outlook of Turkmenistan.

### Profile of Turkmenistan farming communities

13. *Turkmen farming communities are based around the former collective management structures developed in the 1950s:* Following from the pattern of collectivized agriculture, most agricultural communities in Turkmenistan are based on the structures of the Daikhan farm or Daikhan Association. These may be structured around crop or livestock production. Daikhan structures engaged in agriculture tend to be smaller in geographic size with a proportion of land dedicated to irrigated agriculture and populations of between 10-50,000 in the associated communities. Livestock-based Daikhan structures are much larger in geographic size (e.g. 100,000 ha+) but tend to have lower populations 1-5000 reflecting the more extensive nature of livestock farming and the fact that the majority of land use given to desert pasture.

14. *Of particular interest to the project is the **Mary Province** in Eastern Turkmenistan which will be a focus of the project in terms of investments in state managed demonstration plots as well as community level investments under Component 3.* Mary Province has been selected on the basis of its vulnerability to climate change (in particular drought) as well as the important role that it plays in agricultural production within Turkmenistan. It has 23% of the total population, and the highest proportion of rural population (72%), reflecting its agricultural status. The province provides between 15-25% of total production of key agricultural products including wheat, vegetables, fruits and berries, grapes, melons, eggs, meat and milk.



15. While the selection of specific communities (e.g. Daikhan farms) under Component 3 will be done as part of a structured vulnerability assessment process, the following example provides a typical example of a Daikhan association community in the Mary Province with which the project might expect to engage with investment and resilience planning support:

#### **Example of typical agricultural community in Mary Province: Zakhmet Daikhan Association**

Zakhmet Daikhan association in Mary province was founded in 1950 and operates as a collective farm fulfilling both state order crops as well as engaged in private sector agriculture, selling produce at market prices. The Daikhan association consists of 5800 ha of land, of which approximately 63% is currently irrigated. The agricultural community suffers from significant salinisation of land to a depth of 1.5-2.5m as a result of use of heavily mineralised irrigation water, and flood-based irrigation approaches. Approximately 50% of the territory has medium or high levels of salinisation which impact upon productivity. Within the communities associated with the Daikhan Association, there are approximately 10,000 people, made up of 4000 families and/or entrepreneurs that rent land from the Daikhan structure.



Key climate risks identified through consultation with farmers in Zakhmet farm include drought, increased temperatures, extreme events (heavy precipitation), and salinisation, compounded by weak investment in infrastructure and maintenance and poor management of water resources. Key resilience requirements prioritised by the community included the rehabilitation of water management systems, the shift to more efficient irrigation, and the introduction of more drought resistant crops.

Engagement with communities will not be limited to the Mary Province, however, and the project may also engage with communities in those provinces and districts where private sector demonstration sites are established. Further detail on the profile of typical Daikhan Associations in other provinces (agriculture and livestock) is provided in Annex 9.

#### **The problem that the proposed project will address:**

16. *Supporting private sector farmers to adapt to climate change:* This project will seek to address the challenges of climate variability and climate change being faced by the emerging class of micro, small and medium private sector farmers operating outside of the state crop sector in Turkmenistan. There are currently no official statistics available for the number of private farmers in Turkmenistan, nor gender disaggregated data. Approximately 50% of the working population is engaged in agriculture (an estimated 1 million people). Agriculture represents 10% of all female employment in

Turkmenistan according to the World Bank.<sup>2</sup> In practice all farmers engage in small scale production of non-state order crops and or livestock as households alongside engaging on both state order and commercial crops and livestock through Daikhan Farm or leaseholder models. These goods are both for self-consumption and sale in local markets. For larger producers, they are fed into public and private food processing industries. Key crops include vegetables (potatoes, tomatoes and garlic), sugarcane, apple, dates, pear, alycha, silverberry, apricot, walnut, pistachio, and figs. Silk production (sericulture) is also common. Among livestock, rearing of karakul sheep is widely popular while other animals include cattle, goats, chickens, horses and camel.

**Figure 4: Main structures of agricultural production in Turkmenistan. Source FAO (2012)**

	Households	Daikhan farms	Leaseholders
Land ownership	Privately owned	Long-term lease from the state	Lease from the peasant association
Land quality	Arable	Arable + unirrigated desert	Arable
Farm size	0.5-1 ha	20-50 ha	3-10 ha
Crop mix	Horticulture, some grain	Grain, cotton, some horticulture	Grain, cotton, some horticulture
Livestock	Yes	Very little	In household plots only
Orientation	Semi-subsistence	Commercial	Commercial
State orders	None	None; "voluntary" for strategic commodities	Obligatory for strategic commodities; none for other
Sales arrangements	Market	State channels (direct), market for surplus and non-strategic product	State channels (through peasant association), market for non-strategic products
Farm inputs, services	Market	State channels (direct), market	State channels (through association), market

17. There is an increasing number of private farmers ('entrepreneurs') engaging in more commercial farming on the basis of the Daikhan farm and leaseholder model. This number has been estimated by the Union of Entrepreneurs and Industrialists as being between 20,000-30,000 and they are currently engaged in surveying to assess the current market structure. These are farmers who are making capital investments in private sector agriculture at a small and medium scale (e.g. land improvement, irrigation, greenhouses), and employing others to develop commercially oriented businesses. There is also some level of market consolidation underway. The total number of people working in the private sector is therefore much higher than this figure suggests. These farmers produce a wide range of fruit and vegetable crops, support livestock and are increasingly looking at downstream added value packaging and processing. They are increasingly active across all regions

<sup>2</sup> <https://data.worldbank.org/indicator/SL.AGR.EMPL.FE.ZS>



of the country. The sector is rapidly expanding due to ongoing economic reform and diversification, and in particular an increasing government focus on import substitution.

18. Agricultural production is increasing steadily (5.1% in 2017), with private sector production (enterprises within the Union of Industrialists and Entrepreneurs increasing 31.9%). This includes both primary production (livestock and poultry farming, vegetable and fruit production, melon and water melon growing) as well as downstream processing (milk products, meat processing, bakery, processed foods wine production etc.). There has been considerable investment in greenhouses for fruit and vegetable production by local entrepreneurs such as the Dovletly Farmers Association in Dashoguz Velayat which will produce 800 tons of tomatoes per year in greenhouses. Recent government statements indicate that the private share of agriculture was estimated to have reached 90%.
19. *Agriculture is the most vulnerable sector to climate change.* Despite the recent growth trends, given the reduction in water availability and associated impacts on land and water quality, the future sustainability of the sector depends on more resilient approaches to agriculture being adopted at scale. Agriculture is the main consumer of water in Turkmenistan and consequently the most susceptible to climate change impacts. Climate change is likely to significantly alter the balance between demand and supply of water resources for agriculture in Turkmenistan. Average temperature, number of extreme heat days and water availability are the key factors that determine agricultural productivity. The key climate challenges are set out below:

**Table 2: Impacts of climate change on water and agriculture**

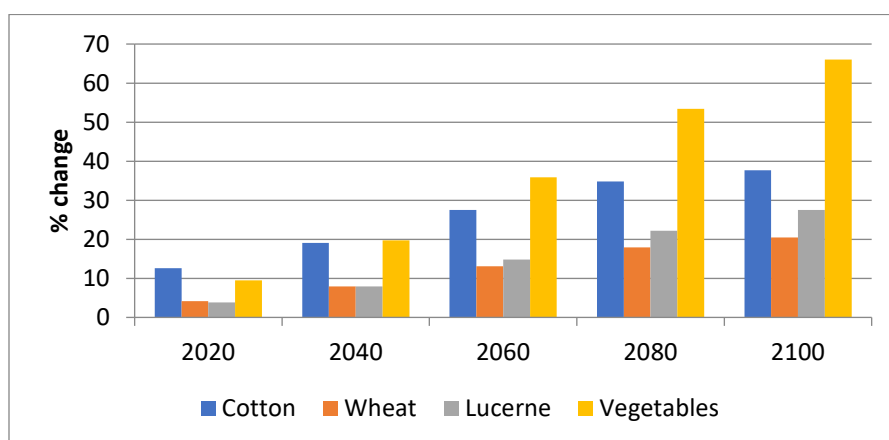
Climate-related stresses	Impacts on the agriculture sector
Increase in temperature and evaporation rate	Decrease in water supply; Changes in glacial fed river flows; Decrease in soil moisture; Increase in land degradation; Decrease in agricultural productivity; Increase in salination; Decrease in livestock productivity and pasture yield; Decrease in biodiversity <sup>3</sup> ;
Changing precipitation patterns	Increase in drought frequency; Increase in flood frequency; Decrease in agricultural productivity.
Extreme events a) Heat waves b) Prolonged droughts	Increase in heat waves resulting in: <ul style="list-style-type: none"> <li>- Decrease in water supply and quality;</li> <li>- Decrease in crop and livestock productivity<sup>4</sup>;</li> <li>- Decrease in desert pasture productivity;</li> </ul> Increase in number of prolonged droughts resulting in: <ul style="list-style-type: none"> <li>- Decrease in water supply and quality;</li> <li>- Decrease in crop and livestock productivity;</li> <li>- Decrease in vegetation cover</li> <li>- Increase in land degradation and desertification.</li> </ul>

<sup>3</sup> Loss of biodiversity is a cause of degradation of habitats due to deforestation, soil erosion and water pollution.

<sup>4</sup> Sheep breeding will be adversely affected by frequent heat waves and longer hot periods due to its dependence on the productivity of natural grasslands.

20. *Demand for water is likely to increase:* The higher evaporation rate predicted due to climate change is likely to increase the water requirements for irrigating crops by 30-40%, thereby aggravating existing water scarcity and irrigation concerns.<sup>5</sup> Increased water demand of up to 60% is expected for vegetables, a growing subsector. In the case of cotton and wheat, the two most important crops in the country, water demand is expected to increase by close to 20% and 10% per unit of area by 2040, respectively. By 2100 these figures will be close to 40% and 20%. Irrigation norms for key crops are likely to have to increase by 13% by 2030-2040.

**Figure 5. Expected water demand increases for A1F1 scenario for key crops.**



Source: Turkmenistan Second National Communication

21. *At the same time water availability is likely to decrease:* On the supply side, increasing temperatures, a decrease in precipitation, and the likely reduction in surface water availability are all likely to lead to an increase in aridity and accelerate desertification. River flows are expected to reduce drastically. An increase in the evaporation rates will also contribute to a significant reduction of water available for irrigation. According to estimates from Uzbekistan, the flow of the Amy Darya is likely to decrease by 15% by 2050. Flow rates of other rivers are expected to decline at even faster rates (up to 30% reduction). Turkmenistan is also likely to be heavily impacted by changes in the glacier systems in the Pamir Alai in the longer term.<sup>6</sup> The average reduction in run off rates in terms of surface water collected in national storage and distribution systems is expected to be 10%, whereas during vegetation periods the reduction in run off rates will reach 30-40%.

22. *These factors are very likely to reduce agricultural productivity.* Further drying of soils as a result of climate change impacts is likely to significantly affect the main cotton and grain cultivating areas.<sup>7</sup> Research in Uzbekistan indicates that yields are expected to fall for all crop types (cotton, wheat, apples, tomatoes and potatoes) across all agro-ecological zones by up to 13% by 2050. Current crop choices and agricultural practices are adapted to specific latitudinal climatic zones. However, any shift in these zones is likely to place pressure on existing practices and systems.<sup>8</sup>

<sup>5</sup> Turkmenistan Country Analysis. United Nations, 2008.

<sup>6</sup> The First National Communication to UNFCCC, Turkmenistan, 1998

<sup>7</sup> Initial National Communication of Turkmenistan under the United Nations Framework Convention on Climate Change. Phase 2: Capacity building in priority areas of the economy in response to climate change. 2006.

<sup>8</sup> Initial National Communication of Turkmenistan under the United Nations Framework Convention on Climate Change. Phase 2: Capacity building in priority areas of the economy in response to climate change. 2006.

23. *Pastoralism is also likely to be adversely affected by climate variability change.* Because of increasing temperatures and a reduction in rainfall, grassland productivity is expected to be reduced by 10-15% by 2050.<sup>9</sup> In dry years the expected reduction of forage volume is by a magnitude of 3–5, ultimately leading to a decline in sheep breeding production. As a result of increasing aridity in Turkmenistan, the yield of desert pastures has already decreased over the past decade. The predicted increase in annual average temperature and in the number of extremely hot days is expected to reduce wool production and livestock reproductive rates by 10-20% and 5-25%, respectively.<sup>10</sup>
24. *These impacts are expected to result in significant economic losses:* Negative impacts on agricultural productivity are expected, both in the crops sector and in animal husbandry. These have the potential to translate into significant economic losses. Under a business as usual scenario, a reduction in wheat production by nearly 4 million tons, and in cotton production by 3 million tons might be expected during the 15-year period (2015-2030)<sup>11</sup>. The economic damage related to the climate-induced decline in crops production could reach \$2.5 billion per year by 2030, reaching a total of \$20 billion (discounted) over the period 2015-2030. It may lead to decrease in livestock numbers and productivity of livestock due to water scarcity.
25. *Climate losses are compounded by other anthropogenic factors:* The impacts of the above climatic threats are exacerbated by a range of anthropogenic factors that will reduce Turkmenistan's natural resilience to withstand current climate variability and future climate change impacts. Non-climate change-related challenges include unsustainable agricultural practices, poorly maintained irrigation infrastructure, environmental degradation, including the long-standing impacts of the Aral Sea basin environmental crisis, and weak adaptive institutional capacity. These are explored in more detail below.

### **Adaptation solution: reversal of the problem**

26. *Private sector farmers are now the key driver of increasing economic development and climate vulnerability in the agriculture sector:* The adaptation solution sought by this project is increased resilience to climate change impacts among the growing class of private sector farmers operating outside of the state crop sector in Turkmenistan.
27. These climate change driven challenges can be addressed through the development of an enabling environment that encourages private sector investment in resilience through the provision of climate smart extension services that specifically target the emerging class of small holder private farmers in Turkmenistan. These solutions would include:
- a. A clear legal and regulatory basis to encourage and allow private farmers to invest in longer term resilience measures;
  - b. An institutional mandate and strategy within the Ministry of Agriculture and Environment Protection to promote resilience in the non-state crop and livestock sector;
  - c. Greater awareness of resilience best practices and technologies in the non-state crop and livestock sectors among policy makers, farmers and agricultural experts;

---

<sup>9</sup> UK89 GCM (Turkmenistan's Initial National Communication, 1998).

<sup>10</sup> Turkmenistan: Initial National Communication on Climate Change, 1998.

<sup>11</sup> UNDP (2016). Socio-economic analysis of climate change impacts in the agricultural sector

- d. An accessible, flexible and cost-effective platform for providing agricultural extension services across the different regions of Turkmenistan;
- e. Effective mainstreaming of climate change resilience into agricultural development practice and extension services in the non-state crop and livestock sector;
- f. High visibility accessible demonstration sites across Turkmenistan allowing for the showcasing of best available adaptation technologies, training, and peer-to-peer learning.

### **Barriers to the adaptation solution**

28. *Many barriers exist to keep private farmers from adopting resilient agriculture practices:* There are several barriers that prevent the development of climate smart agriculture among the emerging sector of smallholder private farmers. In addition to a basic lack of capacity and awareness among farmers, we recognize three key structural barriers which are described in more detail below:

- a. Legal, Regulatory and Institutional Barriers
- b. Weak public and private provision of climate resilient extension services
- c. Lack of access to best practice demonstration sites and training centers

#### *Legal, regulatory and institutional barriers:*

- 29. There is underdeveloped legal and regulatory environment in relation to land use, water management, creating disincentives for private farmers to invest in resilience. The Ministry of Agriculture and Environment Protection has a weak institutional mandate to provide adaptation support to farmers, particularly for those in the private sector.
- 30. Currently, Turkmenistan does not have a legal and institutional framework that manages climate adaptation in a holistic, integrated and comprehensive manner. There is a clear disconnect between policy, law, planning, budgeting and climate change adaptation needs; and there is no mechanism for monitoring vulnerability and adaptation indicators and using such data in development planning. In addition, adaptation opportunities are further hindered by inadequate use and availability of evidence-based methodologies and toolkits. The National Adaptation Plan (NAP) is under development.
- 31. There remain several issues in relation to formulation and implementation of the land code and water code (including the lack of clear sub-regulations to support implementation). Where changes in the legislative and regulatory environment are made, these are not well communicated to private sector farmers. This creates disincentives for private farmers to invest in resilience. There have been some legislative advances over recent years (e.g. revisions to the Water Code supporting transitioning to water metering and tariffs and collective investments by water user associations facilitated by the previous Adaptation Fund project) but these could be further strengthened, alongside revisions to the Land Code.
- 32. The regulatory environment also is characterized by weak coordination and harmonization between legislative documents as well as a lack of implementation and weak enforcement of policies and secondary legislation. There is a lack of clear process for collecting information and updating risk and vulnerability information, and for the elaboration and prioritization of adaptation measures.
- 33. In terms of financing, the government has enjoyed relatively little access to international development finance. OECD analysis undertaken in 2017 Turkmenistan receives much less climate related development finance compared to other countries in Eastern Europe, the Caucasus



and Central Asia (EECCA), only 2% of the average between 2013-14. This to some extent reflects Turkmenistan's focus on financing climate actions from domestic sources.<sup>12</sup>

#### *Lack of private sector oriented resilient extension services*

34. There is a lack of awareness of climate resilient approaches (best practices and technologies) and the absence of delivery and distribution platforms (both public and private) for extension services that can strengthen resilience skills and awareness of private farmers. This is compounded by a lack of consideration of climate change within existing agricultural practices, training approaches and information materials. There is only limited capacity to advise farmers on climate change and sustainable water/land management practices.
35. Currently, private farmers are expected to find their own access to information on climate resilient technologies and best practices (e.g. through the internet). Wealthier commercial farmers are able to access international expertise and technology (e.g. from Iran, Turkey and Israel), but at a high price. Hundreds of thousands of small-holder farmers lack the capacity to procure equipment, including advanced irrigation equipment and field machinery needed to maximize productivity. As a result, they are slower to innovate. Language issues remain a significant barrier to accessing international expertise. There are few domestic providers of support to private sector farmers, with farmers having to learn by trial and error and from peer-to-peer farmer networks. There is also a lack of clarity around gender aspects in relation to capacity and access to new knowledge, best practices and technologies.
36. There is also limited access to climate information products tailored for the private sector. Turkmenhydromet has received significant investment in equipment financed by the Government of Turkmenistan. However, the agency lacks the capacity to develop tailored and user-oriented climate information services for the private sector. Currently, generic forecasts and warnings are shared among government agencies and media, but with little effort made to contextualize these services to end users engaged in specific types of agriculture or livestock.

#### *A lack of a national network of demonstration sites and facilities for training, capacity building and research*

37. Existing state-managed research sites, while having access to land, remain primarily focused on state order crops (cotton, wheat, sugar beet), are poorly funded and lack technical and scientific capacity. Larger private agricultural companies who are investing in best available technologies and sourcing expertise internationally have no interest in sharing their expertise (for commercial and competitive reasons).
38. As a result, smaller scale farmers have little or no access to best practice demonstration sites and there is little opportunity for peer-to-peer learning. There has been some development of demonstration sites (for example under the UNDP/GEF financed programme on of energy efficient and water efficient technologies in agriculture) which might be used as a model. However, such examples are isolated. There is a need for a broader set of sites across Turkmenistan (both public and privately operated) that can facilitate access and learning for a range of stakeholders. Coverage is particularly important given that poorer farmers in Turkmenistan can struggle to gain access to communication facilities and information technology and may face cost and logistic challenges to travel large distances to reach major demonstration centers.

#### **Baseline**

---

<sup>12</sup> [https://www.oecd.org/environment/outreach/Turkmenistan\\_Financing\\_Climate\\_Action.Nov2016.pdf](https://www.oecd.org/environment/outreach/Turkmenistan_Financing_Climate_Action.Nov2016.pdf)

### *Importance of private sector agriculture is growing*

39. Agriculture, while representing c.10% of GDP employs nearly 50% of the population. The agricultural sector in Turkmenistan has historically been dominated by state order crops (cotton, wheat, sugar beet) where most people are employed. The focus on the state sector, the use of quotas, low government-mandated prices together with state provision of free inputs (water, fertilizer) has reduced the incentive for innovation and resulted in a relatively low level of capacity and very slow uptake of new technologies and best practices. Low farm gate prices prevent farmers from fully realizing upside benefits from improvements in productivity, and subsidies shield them from downside losses. The costs of innovative technologies are often prohibitively high in relation to the revenues available. According to FAO, the farmers' income would be higher if they were paid at world market prices and received no subsidies.<sup>13</sup> As a result, the state sector has suffered from relatively low productivity, high labour intensity, high use of inputs and inefficient use of water and soil resources.
40. As a response to these structural challenges, increasingly state lands are being reallocated to other vegetable and fruit crops to facilitate import substitution. The fruit and vegetable subsectors are the most independent of the agricultural sectors Turkmenistan with almost 100% of production generated privately both by independent farmers and leaseholders. More than 80% of all livestock products are also now produced by private farmers. Private sector farmers operate to market prices (both inputs and outputs), with limited state support. The private sector is also active in the food, meat processing, confectionery and other downstream processing industries. The economic importance of the private sector has been increasing steadily over recent years, and larger enterprises have good access to finance, apply advanced technology and practices, and can be highly profitable.
41. The GoT is supporting a gradual transition towards more market-based approaches. The GoT have already initiated reform in its water and agriculture policies that includes privatization and diversification of agricultural production and reconsidering water and energy subsidies.<sup>14</sup> In 2015-2016, the state policy of Turkmenistan was aimed at strengthening import substitution and export orientation, diversification of agriculture. Some land has been allocated on a leasehold basis for non-state crops to be grown in each of the five provinces based on regional soil and climatic conditions. Crops include maize, barley, lucerne and other forage crops, aimed at promoting crop rotation and thus improving soil quality. State-owned livestock farms are currently being considered for privatization. The drive towards diversification, added value processing and export orientation is intensifying as a risk management strategy against over reliance on natural gas exports.

### *Policy, regulatory and financing environment for private agricultural resilience*

42. Turkmenistan has a long-term commitment to addressing climate change: In 2012, the Government approved the National Climate Change Strategy (NCCS) that lays out the policy framework for building climate resilience and a low-emission economy. Agriculture has also featured prominently in the three National Communications submitted to the UNFCCC in 2006, 2010 and 2015. These have all included vulnerability assessment of the agriculture sector, along with adaptation recommendations and policy actions. Turkmenistan was also a signatory to the Paris Agreement on Climate Change in 2016 and submitted its NDC as part of the UNFCCC process setting out its priorities relating to investment in resilience of agriculture and water management. The NDC includes a strong section on adaptation to climate change and highlights vulnerability of the

---

<sup>13</sup> FAO, Turkmenistan agricultural sector review, 2012.

<sup>14</sup> <http://www.dw.com/en/turkmenistan-leader-wants-to-end-free-power-gas-and-water/a-39152012>

agriculture and water sectors. The National Adaptation Plan (NAP) is under development as part of the GCF readiness process.

43. The state has made investments into the agriculture sector over the last few years, including a number of large state programmes investing in agricultural technology (e.g. tractors, drip irrigation and sprinkler systems). However, these have been directed primarily into the state sector and related enterprises. Private sector farmers are expected to invest their own resources or to borrow at highly subsidized interest rates through the state-owned agricultural bank (Daikhanbank).
44. The Government offers several subsidized loan programmes for different types of agricultural production. The state commercial agricultural bank Daikhanbank is by far the largest channel of the state loans to the agricultural sector. Approximately 10 percent of Daikhanbank loans are issued to private farmers and entrepreneurs, while the majority of funds is channeled to large agricultural collective associations (daikhan associations) producing state-order crops. However, the share of private borrowing has been gradually growing.
45. The most favorable preferred credit is issued by Daikhanbank to farmers and collective associations producing state-order crops for the purchase of agricultural equipment, tools, and devices, water-conserving irrigation equipment, and pipelines, for a 10-year term based on expected equipment lifetimes, with annual levelized repayments and an annual interest rate of 1 percent. Financing of other types of agricultural activity – such as husbandry of livestock and fowl, production and recycling of agricultural products beyond the state-order crops, and various other services carried out by private agricultural enterprises and individual smallholder farmers – are also subject to concessional lending, for ten-year terms with an annual interest rate of 5 percent. Loans to private farmers and individual smallholder farmers require collateral.
46. In addition, the Union of Industrialists and Entrepreneurs of Turkmenistan, through its associated bank called Rysgalbank, is running its own loan programme with Government funds targeting more sophisticated private farmers who are dues-paying members of the Union, and who grow mostly high-margin crops such as fruits and vegetables. The current financing instruments serve well the larger private farms and enterprises, which have no problems with collateral. The Union has been developing more accessible loan products with the aim of outreaching small farmers.
47. Whereas collective farms have the legal framework and collateral to invest, small holder farmers lack the collective legal structures to borrow and invest in more efficient practices and investments. One issue is that many investments are at a larger scale than the individual plot (e.g. water supply, drainage, land preparation) and therefore require collective investment and planning. Water User Groups (WUGs) recognized under the new Water Code (and piloted under the earlier Adaptation Fund project) could act as a vehicle for collective land management and investment. However, this would require further legal and capacity development. To conclude, private farmers have access to state concessional finance to invest into the adaptation technologies but require regulatory incentives, information and technical advice to facilitate their investment decisions.

#### *Institutional mandates for promoting climate resilience in private agriculture*

48. In January 2019 the new Ministry of Agriculture and Environment Protection of Turkmenistan (MAEP) was established as a result of merging the former Ministry of Agriculture and Water Resources (MOAWR) and the State Committee for Environmental Protection and Land Resources of Turkmenistan. The new MAEP assumed the functions of the former MOAWR and SCEPLR and has overall responsibility for the agriculture sector. However, it has to be noted that MOAWR's mandate was heavily focused on the state crop sector (cotton, wheat), and it had less role to play in relation to the private sector (fruit, vegetables, livestock) which has been allowed to develop

independently. MOAWR was closely involved in developing the National Climate Change Strategy and provided inputs into relevant documents (e.g. National Communication, NDC, NAP). The Union of Industrialists and Entrepreneurs of Turkmenistan is leading the development of private sector agriculture in practice, but does not have significant capacity or mandate in the area of climate resilience.

49. Overall responsibility for the development, management and coordination of environmental and climate change policy used to be with SCEPLR until January 2019 and is now with the MAEP, the national focal point for the UNFCCC.<sup>15</sup> This includes climate change adaptation, as well as monitoring and management of non-agricultural land resources.
50. The National Committee for Hydrometeorology (Turkmenhydromet) was also merged into the new MAEP in 2019 as the Hydrometeorological service under the Ministry of agriculture and environmental protection. It is responsible for meteorological, hydrological, and agro-meteorological monitoring, developing forecasts for hydrometeorological events, surface water flow probabilities, accurate climate data for use in planning for crop sowing and harvesting, and, providing general hydromet information to the public. It is also tasked with developing scientific and technological cooperation in the area of hydrometeorology with neighboring countries, systemized exchanges of hydrometeorological information, complying with common methodologies of hydrometeorological observations, and hydrometeorological data collection and dissemination.
51. State Committee for Water Economy of Turkmenistan was established in January 2019 as part of the reform in agriculture and water sector (by detaching corresponding departments from the former MOAWR). The Committee is responsible for the overall water management and distribution, including development of policies on water management, planning and management of state irrigation systems. The Committee above all has a mandate over water tariffs and pricing policies.
52. However the practical institutional and resourcing arrangements for mainstreaming climate resilience into private sector agriculture are not clear. Neither the National Climate Change Strategy nor any of the other relevant documents elaborate on specific implementation modalities, roles or responsibilities. The growing role of the Union of Entrepreneurs and Industrialists in private sector development (including agriculture) complicates the institutional picture.
53. All stakeholders lack awareness of and capacity to support the adoption of climate resilience within the private sector. Some of the capacity challenges are set out below:

Table 1: Capacity issues related to climate change policy and institutions

Sector Specific (Technical)	Core Organizational Functions
Enabling Environment	
<ul style="list-style-type: none"> <li>There is a need to strengthen climate related monitoring systems for sectorial implementation activities</li> <li>Limited awareness about climate change adaptation and linkages with existing programs and activities</li> </ul>	<ul style="list-style-type: none"> <li>Lack of clarity for institutional and operational arrangements for the climate change adaptation</li> <li>The existing administrative/technical capacity for reporting to the UNFCCC is insufficient</li> <li>Level of understanding of sectorial based climate impact and vulnerability</li> </ul>

<sup>15</sup> Replaced the Ministry of Environment



Sector Specific (Technical)	Core Organizational Functions
Organizational	
<ul style="list-style-type: none"> <li>Limited understanding of current capacities and climate change adaptation needs at sector and local levels and almost no awareness of adaption fundamentals</li> <li>Insufficient data about sector specific climate impacts and their economic implications, including damage and loss analysis, especially at the local level and including gender specificity</li> <li>No available financing schemes for supporting integration of climate change adaptation measures into key economic sectors</li> <li>Limited gender desegregated data relevant for initiation of gender sensitive climate change actions</li> <li>There is a need for Training of Trainers programs in climate change fundamentals for national training institutions and selected sector staff to improve sectorial capacities</li> </ul>	<ul style="list-style-type: none"> <li>Climate related participatory decision-making and stakeholder input processes for managers and decision makers are unclear</li> <li>Limited cross-sectorial collaboration on climate adaptation and DRR programming at national and sub-national levels</li> <li>There is no climate related focal person (or department) in each sector</li> <li>Lack of financial incentives for initiation of climate change adaptation activities, per sector, disaggregated per national and local level</li> <li>Gaps in the availability and communication of hydro-meteorological risk information, especially at the local level</li> </ul>
Individual	
<ul style="list-style-type: none"> <li>Language barriers prevent staff access to relatively low-cost knowledge and training; further limiting the pool of qualified staff available to attend international training</li> <li>Gender barriers prevent women's access to: 1) decision making on the level of household and Daikhan farms in shaping the sustainable development of their communities. 2) strengthening of women- farmers ability to realize their rights 3) control over the resources and benefits of development.</li> </ul>	<ul style="list-style-type: none"> <li>Deficit in the required trained personnel (numbers and expertise) to meet climate related and adaptation related challenges and functions</li> <li>Lack of trained personnel (number and expertise) to meet gender challenges and functions</li> </ul>

Source – UNDP Stocktaking Report (2017)

#### *Existing platforms for provision of climate resilient extension services*

54. The Government of Turkmenistan has provided limited extension services support through district administrations and Daikhan associations, mostly targeted at state order crops. However, these do not generally provide best practice techniques. There has been limited development of private extension services for agricultural and livestock production. Larger commercial farmers have begun to access expertise and technology from overseas (particularly Turkey, Iran and the Middle East). However, these services are expensive and typically beyond the reach of small and medium scale private farmers.

55. State research institutes under the Ministry of Agriculture and Environment Protection and the State Committee for Water Economy have some technical knowledge around different types of agricultural practices and water saving technologies. However, they do not have the mandate or capacity to provide advice for private farmers, and their methods are often outdated or based on Soviet-era standards. Key institutes include:
- a. Teaching institutes (e.g. Turkmen Agricultural Institute)
  - b. Agricultural scientific research institute
  - c. Water design and research institute “Turkmensuwlymtaslama”
56. The Agricultural scientific Research Institute has been historically responsible for developing best practices for supporting state crops (e.g. seed selection for cotton and wheat) and managing best practice demonstration plots. The institute maintains some interest in other areas of agricultural production outside the state mandate, but these are limited in size and scope. The Water design institute has a focus on effective water management (e.g. efficiency of large-scale water transport (supply and drainage) as well as farm level systems. Both have sub-national facilities across Turkmenistan which have the potential to be used for demonstration plots.
57. Agricultural universities in Ashgabat and Dashoguz are the main academic institutions to provide new generations of water and land related professionals for the country. Both of these entities are in possessing of training and research sites to allow for student-level scientific work and studies. These will as well be explored in terms of potential conversion into sites for extension services. The site in Dashoguz can have direct focus on mitigating the adverse effect from the Aral Sea crisis through application water, land and other resource efficient technology and practices.
58. Daikhanbank employs agronomists in all local branches to support agricultural lending, but their capacity and mandate is limited. Otherwise, there is little or no domestic consultancy capacity. Some opportunities exist. For example, EBRD is supporting the commercial development of SMEs in the agriculture sector. The Union of Industrialists and Entrepreneurs is also beginning to provide its members operating in the agriculture sector with limited services (e.g. laboratory, testing and certification services), but these are aimed primarily at larger agricultural businesses.
59. Commercial agricultural development is currently being heavily shaped and influenced by the Union of Entrepreneurs and Industrialists of Turkmenistan. The Union is a non-governmental organization which is emerging as the dominant player in the development of private agricultural markets in the country. It provides membership and business support services through a large central office in Ashgabat and regional offices in each of the Velayats. Reflecting its growing role in the agriculture sector, it is currently diversifying to offer a range of technical extension services (e.g. product certification, testing laboratories) in line with the GoT export-based strategy. The Union has typically focused on larger companies in the agricultural sector, many of which are already operating to a high standard using purchased foreign expertise and equipment. The Union is currently undertaking a national audit of all non-state farmers across the country and is committed to extend its membership services to smaller farmers free of charge, recognizing this as a core growth sector. They estimate the total number of commercial farm enterprises and entrepreneurs to be in the region of 20,000-30,000.
60. Turkmenhydromet has the mandate for developing the national system for weather and climate modelling, including its application to the agriculture sector. This involves early warning systems, forecasting and agrometeorological modelling. It has received significant investment from the government of Turkmenistan into new radar and equipment. However, it does not currently produce tailored information for end users in non-state sectors such as the private agriculture and lacks a

complete network of agro-meteorological monitoring stations to provide a full picture of the impact of climate on soil and growing conditions.

*Learnings from earlier Adaptation Fund project*

61. The proposed project builds on an earlier Adaptation Fund project that ran from 2012-2017 - *"Addressing climate change risks to farming systems in Turkmenistan at national and community level"*. The project aimed to overcome the above barriers to addressing immediate and long-term adaptation needs in the water sector in Turkmenistan in order to achieve greater water efficiency and productivity under climate change induced aridification. The project strengthened water management practices at national and local levels in response to climate change induced water scarcity risks to local farming systems in Turkmenistan. It did this by working at national level water policy and local community level action to improve water efficiency and supply services.
62. The project was structured so that the majority of its activities were at a community level to deliver concrete adaptation benefits to identified communities in three typical agro-pastoral regions (mountainous, desert and oasis). The project worked directly with selected communities to help improve their resilience to increasing aridity and water stress through identifying and implementing effective and locally acceptable adaptation measures.
63. The AF project focused on the development of community level water management approaches in those regions where there is significant potential for diversified non-state agriculture, horticulture and livestock management. It sought to ensure water availability for the non-state sector by addressing the lack of fiscal incentives for more efficient water use in the state sector and developing progressive tariffs.
64. The project evaluation identified several successes:
  - a. The project developed a package of amendments, additions and changes to the draft Water Code of Turkmenistan (the concept of "association of water users and water users groups WUA", rights of water users on the establishment of WUAs / WUGs, the transition of water management to the basin principle, the right to transfer on the balance or for the use of the inter-farm collector and collector-drainage networks, fixing the norms of the differentiated approach in determining the tariffs for water supply services, etc.). these were adopted by Parliament of Turkmenistan in October 2016
  - b. Project experts contributed to the adoption of Law on Pastures by introducing amendments and recommendations into it
  - c. Based on the VCA assessment, the socio-economic report on impacts of climate change risks onto local economies of three project regions was prepared including cost-benefit analysis of all adaptation measures/investment activities conducted in pilot regions of the project
  - d. More than 35,000 people at pilot communities of the project greatly benefitted from concrete adaptation measures related to water management and efficient use of land and water resources in the context of climate change such as construction of water basins, dams, wells, water storage tanks, nursery, drip irrigation, sand fixation, water regulating devices, drainage collectors, land levelling, etc. with some element of community level replication
  - e. A series of trainings conducted during lifespan of the project enabled to strengthen capacities of local population in pilot communities to efficient use of water and land resources and their resilience to adverse effects of climate change. More than 40% of participants in project activities were women.

- f. More than 10 booklets and brochures related to concrete adaptation measures and best practices in this field were printed in three languages – Turkmen, Russian and English and distributed to beneficiaries in the communities, to educational institutions, to government agencies.
  - g. 8 water user's groups (WUG) were established in pilot communities of the project with defined goals and organizational structure. As a group, they could develop and implement investment projects with funding from external sources and local contribution. WUGs were designed to incorporate at least 30% of women in their management.
  - h. Innovation was introduced in pilot Region Karakum by lining the bottom of 2 desert water ponds with HDPE geomembrane and with special cover to avoid evaporation which will help to increase water availability in desert conditions
65. There were a number of lessons learned from the project that will be incorporated into this proposal. These include the following:
- a. Changing the legislative basis to recognize climate impacts is a long multi-year process and depends upon national policies and processes and efforts need to be begun early, and combined with other legislative reform programmes or processes;
  - b. It is important to work both at the local and national level to promote scaling and ensure ownership of the policy agenda by key institutions in terms of agricultural and water resilience;
  - c. Community level adaptation measures work out more efficiently through grant arrangements as this allows communities to take ownership of the project, since they are directly involved in carrying out the labour and contributing their own resources for co-financing;
  - d. There is strong potential for replication and peer-to-peer learning in relation to climate resilient water management and agricultural adaptation measures implemented in pilot regions such as drip irrigation, water harvesting;
  - e. The importance of working through existing (community, public and commercial) structures rather than developing new platforms or systems to deliver climate resilience to ensure ownership and effective delivery.
66. The first AF project demonstrated effectiveness and efficiency of a number of climate resilient farming technologies and concluded with the recommendations for replication and scaling-up through strengthened climate risk informed agricultural extension services. The AF project final evaluation noted, above all, that *"...The positive results of implemented adaptation measures in all three pilot regions have expanded the number of participating and supporting the continuation of the project in general and more specifically, replicating it elsewhere in the country. There is some evidence of the neighboring Etraps getting interested but the concern is that the same level of interest is not as yet emanating from communities further away, pointing to the acute need in sharing the experience with all the communities: this should indeed be the role of the government through an extension service but in Turkmenistan such service is non-existent. It is important that UNDP...documents all the lessons learnt ... and disseminates these widely... Additionally, the Government could be supported in strengthening its agricultural extension services..."*

### **Project / Programme Objectives:**

67. The project objective is as follows: 'To increase the climate resilience of vulnerable smallholder farmers in the non-state crop and livestock sector by strengthening the enabling



environment, developing access to climate smart advisory services and building regional and community-level demonstration sites to allow for peer-to-peer learning.’

68. The project will achieve the following results:

- A. Strengthen the institutional and legal basis for climate resilience in Turkmenistan, with a specific focus on supporting innovation and investment by private farmers;
- B. Develop the market for climate resilient extension services that provide access to know-how, technologies and investment support for small holder farmers;
- C. Establish public, private and community led demonstration sites that support private farmers to adopt climate resilient farming practices and facilitate practical learning and research linkages

#### Project / Programme Components and Financing:

Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
1. Mainstreaming climate resilience into policy and institutional framework	<p><b>Output 1.1.</b> Climate resilience is mainstreamed into policies and regulations in agriculture, water and land management sectors; new gender-responsive regulatory incentives for farmers are in place.</p> <p><b>Output 1.2:</b> Capacity built for key government ministries and other relevant institutions to promote climate resilience in private sector agriculture (taking into consideration gender aspects).</p>	<p>Outcome 1: The enabling environment developed to encourage and facilitate private sector investments into climate resilient agricultural development</p> <p><i>Indicator target 1.1.</i></p> <p>a). At least 3 gender-sensitive laws or sub regulations amended or developed supporting climate resilience for private sector farmers by 2024.</p> <p>b). At least 2 gender-sensitive guidance notes prepared explaining legislative changes in the water and land code to small scale private farmers.</p> <p><i>Indicator target 1.2.</i></p> <p>A gender-sensitive Strategic Concept to support climate resilience among smallholder farmers is developed and agreed with MAEP and other stakeholders.</p> <p><i>Indicator target 1.3.</i></p> <p>a) 50% increase in institutional capacity (measured through an institutional capacity assessment scorecard)</p> <p>b) At least 50 officials and other key national/regional stakeholders trained on improving the enabling environment (including at least 30% women)</p>	\$774,000
2. Development of climate resilient extension services	<b>Output 2.1:</b> A public-private network of at least 50 extension service	<b>Outcome 2:</b> Climate resilient extension services developed to benefit 20,000 small and medium sized non-state order farming enterprises and	\$2,999,950

	<p>providers is trained to deliver climate risk management and adaptation information and advice to farmers, ensuring equal benefits for men and women</p> <p><b>Output 2.2.</b> 20,000 farming enterprises and entrepreneurs (including female led) receive climate risk information and resilience advice through improved and accessible extension services, best practice guidance and improved climate information services.</p>	<p>entrepreneurs (including women) in adopting climate smart agriculture practices.</p> <p><i>Indicator target 2.1.</i></p> <p>a) At least 50 organizations or consultants agree to participate and are trained to deliver climate resilient agriculture extension and advisory services in all 5 regions of Turkmenistan. Gender sensitivity of advisory services will be ensured through engendering the training's materials.</p> <p>b) On-line portal / virtual library of resilient technologies operationalized</p> <p><i>Indicator target 2.2.</i></p> <p>a) At least 20,000 private sector farmers access information on climate resilient best practices and best available technologies and change behavior or adopt new approaches (of which at least 30% women)</p> <p>b) At least 2000 private sector farmers receive direct field training in climate resilient agriculture and best practices of which 80% are small-scale farmers in vulnerable regions of Turkmenistan. (At least 30% women)</p>	
3. Demonstration plots and community level investment into adaptation technologies	<p><b>Output 3.1:</b> At least 1 MAEP research institute site developed providing access to best available technologies and practices for non-state order crops and supporting improved research links.</p> <p><b>Output 3.2:</b> At least 3 larger private sector farming enterprises invest in demonstration sites for specific technologies (e.g. high efficiency irrigation, renewable energy, greenhouse technologies) that form a basis for local learning and best practice dissemination.</p> <p><b>Output 3.3:</b> At least 3 resilient best practice sites developed by private farmer collectives or groups of small holder farmers through collective community planning and investment.</p>	<p><b>Outcome 3:</b> Demonstration plots and collective investments enable scale up of climate resilience measures, support peer to peer learning and improve resilience outcomes for farmers</p> <p><i>Indicator target 3.1.</i></p> <p>a). At least 1 new demonstration site (min 20 ha) developed on the base of existing Government of Turkmenistan Agricultural Institute facilities showcasing best practice technologies and approaches in non-state crop sector.</p> <p>b). At least 3 accessible demonstration sites developed in partnership with larger private sector agricultural companies to showcase specific crop or livestock specific technologies</p> <p>c). At least 3 community level cooperatives or groups of private sector farmers (gender balanced) design and implement climate resilient best available agriculture measures</p> <p><i>Indicator target 3.2.</i></p> <p>At least 15 different technologies or best practices are covered collectively by investments in demonstration sides</p> <p><i>Indicator target 3.3.</i></p> <p>At least 1000 farmers visit project demonstration sites for field training and to learn about best practices and technologies (at least 30% women)</p>	\$2,581,200

4. Project Execution cost	\$96,500
5. Total Project/Programme Cost	\$6,451,650
6. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)	\$548,390
Amount of Financing Requested	\$7,000,040

**Projected Calendar:**

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

Milestones	Expected Dates
Start of Project/Programme Implementation	2020
Mid-term Review (if planned)	2022
Project/Programme Closing	2026
Terminal Evaluation	2026

## PART II: PROJECT / PROGRAMME JUSTIFICATION

- A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

### ***Component 1: Policy and institutional development to mainstream resilience***

69. Component 1 will support the development of the legal and institutional basis for climate resilience in Turkmenistan. It will focus on building frameworks that encourage private sector farmers to invest in climate resilience and to manage water and land resources in an effective way.
70. Under the previous Adaptation Fund project, major progress was made in relation to the development of the Water Code, creating incentives for more efficient use. The project prepared a range of amendments related to the development of water user groups, the transition towards water basin management, the ownership rights of on-farm water infrastructure and the development of differentiated water tariffs. Approximately 80% of project recommendations were adopted in 2016 by the Mejlis (Parliament) as part of the revision process.
71. However, further work is necessary on both the Water and Land Codes, particularly with regards to secondary regulations which are critical for their practical implementation and uptake by private sector farmers. Work is also needed to communicate the implications to farmer groups and their service providers, as well as to build capacity among regulators in relation to the evolving landscape for private agriculture. Component 1 has two outputs:

### ***Output 1.1. Climate resilience is mainstreamed into policies and regulations in agriculture, water and land management sectors; new regulatory incentives for farmers are in place.***

72. Building on the earlier successes in relation to reform of the Water Code, the project will provide support to legislators to promote more effective management of land and water resources by private farmers. This will involve ongoing support to revision of the Land Code, together with the development of sub-legislative acts and regulations that allow the revised Land and Water codes to be implemented effectively. Key objectives include encouraging entrepreneurship and investment by strengthening land tenure rights, supporting the development of legal structures to facilitate collective planning and investment, and promoting the shift towards market-based pricing for water access. This is likely to include providing support for the development of the following laws and sub-regulations:
- i. In the field of land resource management, activities are likely to include:
    - i. Typical land lease contract for private farmers;
    - ii. Regulations on the procedure for maintaining the state land cadaster;
    - iii. Draft Law of Turkmenistan "On Soil Protection";

iv. The Law of Turkmenistan "On Amendments and Additions to the Law of Turkmenistan" On Daikhan Farms "(2013).

j. In the area of water resource management, activities are likely to include

- i. Model agreement between state water management organizations and water users on the supply of irrigation water;
- ii. Typical water use rules for water user groups;
- iii. Draft Law of Turkmenistan "On Associations of Water Users (WUAs)";
- iv. Tariffs for water supply services to water users;
- v. Methodology for calculating the tariff for water supply services;
- vi. The procedure for charging fees for water supply services to water users;

73. It is also important that both farmers and extension service providers understand the practical implications of emerging legislation on their ability to invest in better land and water management. The Water and Land Codes are written in such a way that their implications are not easily understood by the farming community. Nor are changes in legislation easily or quickly translated into activity on the ground. The project will therefore prepare a series of practical guides for farmers and other agricultural stakeholders on the implications and practical application of emerging legislation. These will be prepared from a farmer-oriented perspective, translating the implications of new legal frameworks into practical opportunities and process guides for leaseholders and other farmers. Examples might include emerging opportunities are associated with changes in land tenure, and water access. Two Turkmen language guides are proposed:

- a. Commentary on the Land Code of Turkmenistan.
- b. Commentary on the Water Code of Turkmenistan.

***Output 1.2. Capacity built for key government ministries and other relevant institutions to promote climate resilience in private sector agriculture***

74. To date, the Ministry of Agriculture and Water Resources has typically focused on management and technical support for the state crop sector (primarily cotton and wheat). This has involved setting quotas, providing inputs, overseeing quality control and undertaking scientific research. Over the last decade, MoAWR has begun to consider and integrate the impacts of climate variability and climate change on state-order crops into its operations. This reflects the priorities under the high-level National Climate Change Strategy (2012). It has, however, dedicated fewer resources to supporting the non-state crop sector as this has been outside its primary mandate and the sector has developed without direct state involvement. Going forward, there is a key role for the MAEP to play in helping coordinate and promote the development of resilience best practices and norms for the non-state agriculture and livestock sector. The strategic concept will identify the approaches that are most likely to result in private farmers obtaining good access to the best available resilience know-how, technology and finance. The project will therefore work with MAEP to develop a strategic implementation concept to include:

- a. Strategic objectives and organizing principles of a resilience strategy for private agriculture and livestock production;
  - b. Potential stakeholders that could be involved in promoting climate resilience to smallholder farmers, including roles and responsibilities;
  - c. The potential coordinating role of MAEP from a regulatory, governance and advisory perspective;
  - d. Resourcing requirements and sources of support;
  - e. An assessment of capacity needs within MAEP and other key stakeholders to promote resilience in the non-state crop sector;
  - f. Guidance on approaches to identifying and transferring best practices and innovative technologies.
75. Drawing upon the above capacity assessment, the project will build capacity among a range of key stakeholders relevant to the development of resilient agriculture for private sector farmers. This will be done through a series of seminars, training workshops and guidance notes. Participants are likely to include the Ministry of Agriculture and Environment Protection (MAEP), State Committee for Water Economy and other key government stakeholders (e.g. Ministry of Economy, State Hydrometeorological Service). Other key institutional stakeholders (e.g. Union of Industrialists and Entrepreneurs) will also be included. Capacity building will be organized around themes relevant to the development of climate resilience private agriculture. Topics are likely to include:
- a. Detailed approaches to water tariffs to encourage water saving
  - b. Best practice technologies for non-state crops
  - c. Developing legal structures for private farmer collectives/WUGs
76. The project will closely coordinate with other ongoing initiatives (e.g. NAP development) to ensure that capacity building and policy support activities are complimentary and mutually reinforcing.

## **Component 2: Climate resilient extension services**

77. Component 2 aims to develop platforms and processes that will support the large-scale dissemination of climate resilience knowledge and best practices to the most vulnerable small holder private farmers in Turkmenistan. This will be done by including resilience as an integrated part of agricultural extension services delivery.
78. Given the current weak state of extension services in Turkmenistan, and the ongoing dynamic transformation from public to private sector farming, the project will identify and build the capacity of those potential extension service providers best suited to operating in those regions, sub-sectors (crop, livestock) and market segments (micro, small and medium scale farmers) relevant to the project. The primary focus of the project will be upon targeting micro, small- to medium- scale farmers currently unable to access high quality advisory and technology support. This will include the emerging class of Daikhan farmers who operate on longer term leases and have the option to make their own crop choices.



79. Of particular importance will be the targeting of resources at those farmers most vulnerable to the impacts of climate change. To do this, we will use criteria by which extension service providers will target those beneficiary farmers and SMEs. This will be through the use of a high-level **vulnerability risk screening process** that will be undertaken at the level of the individual farmer or SME, or average profile of farmer at a community level (e.g. Dayhan Association). The following **criteria** will be applied by the Union of Industrialists and Entrepreneurs and other potential extension service providers to select eligible farmers for support:

- a. *Geographic exposure*: Operating in geographical regions with demonstrable exposure to climate impacts (particularly water-related). It is expected that given the severe impacts of climate change in Turkmenistan, most small-scale farmers will be eligible on the basis of this criterion. As part of the selection process for participation in the program, the project will be informed by an assessment of the key climate risks to agriculture on a province by province basis to ensure there is clear guidance around key risks and priorities that might inform differentiated for inclusion by province;
- b. *Sectoral exposure*: Engaged in primary productive activities that are exposed to climate impacts (agriculture, horticulture, livestock rearing), or engaged in downstream agricultural processing but where water availability is a core concern, based on a clear set of climate impacts and risks;
- c. *Socio-economic vulnerability*: Below a certain size (e.g. individual farmers or small SMEs of <10 farmers) and below an average income threshold for the farmers involved (both owners and employees). Support will be targeted at reaching and promoting access to the poorer and more vulnerable groups. Income thresholds for classification will be determined with the Union of Entrepreneurs and will be set as part of the inception phase to reflect prevailing currency movements given current market volatility;
- d. *Gender balance*: Extension service providers will screen to ensure that at least 30% of those receiving support (either heads of enterprises or individual entrepreneurs) are women.

80. The criteria are high-level and designed to be suitable for application as part of process to support scaling resilience to a national level program dealing with a potential decentralized population of thousands of individual commercial farmers and SMEs across the various provinces of Turkmenistan. The approach recognizes that all small farmers in Turkmenistan are highly vulnerable to the effects of climate change, given the hydro-meteorological conditions in which they operate, and the socio-economic profile of the sector. Within a scaled national system, it is not feasible to pro-actively undertake detailed vulnerability and risk assessment for each individual farmer or SME individually as this would incur very high transaction costs. Vulnerability will therefore be to a large extent self-reporting, with a quality assurance process.

81. It is envisaged that the process for selection and inclusion in the program will be as follows:

- a. The Union of Entrepreneurs (or other private sector consultancies, agricultural companies or public bodies seeking to provide climate resilient extension services) will market participation in the program to their farmer members, clients or networks using materials developed in conjunction with the program team;

- b. Each individual farmer or SME will then make an application to the program in the local language (online or by paper application) setting out the profile of their current operation (size, scale, main crop or livestock types), together with an easy to understand resilience checklist detailing the impacts that they face (such as water availability and quality, soil salinisation, erosion, extreme heat, desertification and soil erosion). This process may be facilitated by the extension service provider;
  - c. A parallel application track will also be made for application at a community, collective farm, or other farmer association level where larger groups of private farmers can participate in the programme in a more collective and structured way. This will look at the average socio-economic and climate risk profile of farmers within the group;
  - d. Applications will be reviewed by the extension service provider to ensure that they meet the minimum criteria for participation (e.g. geographic and sector exposure, social economic profile) before inclusion in the program;
  - e. As part of a quality assurance process, the UNDP AF program team will undertake a **monitoring review** of a statistically robust sample of participants from all extension service providers to check to what extent resources are being targeted at the most vulnerable (in terms of both socio-economic and climate risk vulnerability) and take corrective action where this is not the case. This monitoring mechanism will also ensure that farmers have access to facilities developed under Component 3. This will be done on an annual basis;
  - f. Participants will be eligible for inclusion in the programme if they meet the minimum criteria set down in the above process.
82. Mobile resilience extension services will have a more robust selection criteria and be aimed at the poorest farming communities and those with the greatest limitations in terms of access to knowledge and best practices (i.e. distant from urban centres, poor infrastructure (access to roads, communications)).

83. The project envisages the following two Outputs under this Component:

***Output 2.1. A public-private network of extension service providers is trained to deliver climate risk management and adaptation information and advice to farmers***

84. *Extension services provider identification:* The project will develop an extension service provider database (both public and private). This will include an assessment of skills and resources available in the market, as well as a gap analysis to identify current strengths and weaknesses in service provision. To do this, the project will market the concept of advisory services to potential providers and explore the possibility of a formal project membership or association structure. It is envisaged that this would be maintained and developed for the duration of the programme by the Union of Industrialists and Entrepreneurs and could serve as a formal membership structure on programme completion. Based on the review, the project will make agreements where appropriate with identified service providers who will then participate in capacity building activities and bid for project resources as appropriate. Several potential types of providers of climate resilience extension services have been identified:
- a. The Union of Industrialists and Entrepreneurs: could itself act as a provider of extension services or operate more as a coordinating and capacity building platform for third party providers, matching supply and demand;

- b. Private sector consultancies and agricultural companies: Both existing agricultural producers (e.g. those already involved in developing best practices in their own operations and supply changes), as well as business consultancies expanding into more technical agricultural services could play a role as advisors. Providers could include current members of the Union, consultancies (e.g. those supported by the EBRD SME business services programme) as well as financial institutions (e.g. agronomists employed by Daikhanbank). While these organizations have strong membership, consultancy and service skills, they may lack the technical capacity and knowledge to promote climate resilient agriculture to their clients;
  - c. Public sector institutions and academic bodies: Public sector suppliers might include national and regional structures within the Ministry of Agriculture and Environment Protection (MAEP) that currently provide support services for the state crop sector, and their representatives in district administrations, collective associations and regional mechanization centers. It might also include the various Agriculture and Water research institutes and universities (mostly operating under the auspices of MAEP). These institutes have regional affiliates of varying capacity and quality. Public sector institutions tend to have some level of technical knowledge with regards to agricultural planning and techniques. However, approaches may draw heavily upon historic methods, advisory support can lack practical focus and relevance, and such institutions may lack the commercial and service capacity to meet service expectations of private sector farmers. Special attention will be given towards developing climate-resilient extension services in the Aral Sea basin area and appropriate entities will be identified in this regard, taking into account the specific nature of water and land related concerns.
85. *Non-state farmer needs and gap analysis:* The project will undertake a farmer needs assessment, focused on private farmers and small holders. This will incorporate an assessment of climate vulnerability, current capacity (knowledge and resources), and other constraints. Regional patterns will be identified based on growing conditions and agriculture types. Needs will be stratified by size of farm, regional aspects etc. This will inform the basis for targeting further component elements (best practices, capacity building, resource provision): Needs are likely to revolve around the following issues:
- a. Assessment of land, soil and water conditions
  - b. Crop selection and planning (e.g. timing and rotation)
  - c. Economic analysis (yield, input costs, profitability)
  - d. Business planning
  - e. Use of efficient irrigation technologies
  - f. Improving structure and lining of irrigation channels
  - g. Adoption of renewable energy technologies (e.g. solar pumping, desalination)
  - h. Opportunities for greenhouse development
  - i. Land management and preparation (e.g. laser levelling)
  - j. Water rotation optimization
  - k. Tilling and water evaporation management
  - l. Efficient use of pipes and siphons for water transfer

- m. Water and forage assessment for livestock in desert pastures
- 86. *Capacity building for identified extension service providers on climate risk management and adaptation technologies:* The project will provide training and support services to potential extension service providers, primarily in the private sector. Training will be provided in Ashgabat or in the respective regions, with the potential for international study tours to understand how extension services are provided in similar contexts. This training will be supported by technical expertise and coordinated through the National Union of Industrialists and Entrepreneurs. Topics for training are likely to include:
  - a. Impacts of climate change on the agriculture sector;
  - b. Best practice methods and technologies to build resilience;
  - c. Community engagement, participatory planning approaches;
  - d. Extension service business model and service offering.

***Output 2.2: More than 20,000 farming enterprises and entrepreneurs receive climate risk information and resilience advice through improved and accessible extension services, best practice guidance and improved climate information services.***

- 87. This Output will be achieved through the following activities with the objective of reaching out to the majority of small holder private farmers through different means of delivery of climate information.
- 88. *Financial support for delivery:* The programme will make available funds to support the inclusion of resilience into agricultural extension services provision. It will seek to organize this based on payment by results (i.e. per farmer supported to a minimum quality threshold), with some level of co-finance depending on the profile of the extension service provider. These funds may be used for a range of purposes:
  - a. *Expanding reach* – Supporting the marketing and provision of extension services to a wider group of farmers than might usually be considered (i.e. cross-subsidy to move down the income chain to reach poorer and more vulnerable farmers). These farmers will be selected on the basis of exposure and vulnerability criteria as set out earlier (climate impact, exposure, socio-economic vulnerability, gender balance);
  - b. *Expanding scope* – Developing institutional capacity (e.g. staff resource) to provide climate resilient extension services alongside existing business support services in the agricultural sector, or to move from other sectors into agricultural support;
  - c. *Investing in demonstration technology* – Capital support for the acquisition of climate resilient technologies, or development of demonstration plots that can be used for farmer training and capacity building.

- 89. *Mobile resilience advisory:* In addition, the programme will make available funds to support the development of a mobile resilience training service to be operated by the Union or other identified extension service providers. The programme will support a vehicle and training team, equipped with demonstration materials, technologies and develop modular courses that can be implemented over short periods (up to 1 week) in a given location. This will be done to increase reach and provide flexibility for delivery of services for poorer and more vulnerable 'harder to reach' communities that might otherwise struggle to access more centralized services or travel for training. It would be expected that such a service could service up to 20

communities a year over a 3-year period, directly reaching more than 1000 farmers and having significant spill over impacts for their wider communities. These communities will be selected on the basis of their socio-economic vulnerability (i.e. poorer and smaller scale farming groups lacking adaptive capacity).

90. *Best practices resource library*: The project will compile and maintain a virtual library of best practice training and information materials relevant to Turkmen agro-ecological conditions and farming practices. This will partly draw upon technical material already developed under the previous Adaptation Fund project and would be maintained by the Union or by other designated body after project completion. These resources will be made available to all extension service providers and farmers in a range of formats (online, in print). Activities will include:
- a. Identification of existing best practice materials and their adaptation/translation into Turkmen language;
  - b. Development of 'How to guides' for common crop and livestock types;
  - c. Commissioning of targeted research and marketing materials where these do not exist;
  - d. Database of best practice demonstration sites and research resources that extension providers/farmers can access in country.
91. *Development of tailored hydromet products for private sector farmers*: The programme will support Turkmenhydromet to undertake the development of pilot climate information services targeting private sector farmers. These products and services will be user-led (in terms of the type of information required and the format in which it is presented) to ensure that the value of information is preserved down the information chain. The programme will work to identify the most suitable formats, distribution channels and potential financing models for future scale up. The type of information delivered might include:
- a. Early warning notice for severe weather forecast
  - b. Advisory on planting and harvesting timescales
  - c. Advisory on decision making with regards to crop choice

### **Component 3: Regional demonstration plots and community level investment into adaptation technologies**

92. Component 3 aims to build awareness, create demand for and facilitate investment by private farmers in climate resilient practices and technologies at the regional and community level. It does this through the establishment of sustainable, open-access demonstration sites, supporting the adoption of best practice in each province, and by encouraging the dissemination of best practice to local private farmers. Each demonstration and learning site will be designated to service the technological and training needs of its targeted province. For example, the site in Dashoguz province will focus above all on promoting resilient solutions relevant to the Aral Sea basin area. It will partner with both public and private sector institutions to develop facilities that are accessible to farmers for training purposes, and by supporting farmer groups or collectives to make community level investments in resilience that can in turn facilitate peer-to-peer learning. This demand side activity complements and strengthens the impact of the 'supply side' extension services under Component 2.

93. Key technologies and approaches will be demonstrated at the community level. Further details are provided in the Annex 6. Example technologies might include:
- a. Water storage technologies (tanks, underground storage)
  - b. Lining technologies for water transport and canals
  - c. Efficient irrigation techniques (e.g. drip, sprinkler)
  - d. Greenhouse technologies
  - e. Renewable energy technologies (e.g. pumping, irrigation, desalination)
  - f. Land stabilization: e.g. Tree planting and sand dune fixation
  - g. Use of bio-hummus and other organic fertilizers
  - h. Resilient seeds and agricultural management practices
  - i. Development of sustainable wells and water pipes
  - j. Water management (sluices) and metering
  - k. Laser levelling and land management
  - l. Agro-meteorological posts (in conjunction with Turkmenhydromet)
94. The siting of demonstration plots (whether state, private or community-led) will be informed by the potential for access by poorer and more marginalised groups. This will include both location (i.e. proximity to vulnerable communities) as well as access arrangements (i.e. willingness to host extension service providers and providing training and capacity building for vulnerable communities). The access of vulnerable farmers and associated groups to these demonstration plots will be monitored on an annual basis through a formal review mechanism (alongside the monitoring mechanism envisaged in Component 2), with corrective action undertaken where such access is not being prioritised. Location of all sites will also be informed by Environmental and Social screening, in line with AF ESP requirements, as detailed in the ESMF (Annex 7).
95. The selection of potential technologies and investments will be based on a full assessment of their likely benefits, any identified AF ESP concerns, and the use of cost-benefit analysis to prioritise interventions. This will be done for both public, private and community level investments. See Section C for further details on cost-benefit analysis and the prioritisation criteria for cost effectiveness of proposals under Component 3.

***Output 3.1. At least 1 MAEP research institute site developed providing access to best available technologies and practices for non-state order crops and supporting improved research links***

96. The project will develop a regional best practice demonstration plot (likely in the Mary Province). A site on an existing MAEP research institute facility (Yoloten) in a desert irrigated oasis has been provisionally earmarked for this purpose, pending ESP screening. Mary has been selected as it is the province where private sector agriculture and food processing are most developed and have the highest concentration in Turkmenistan. The region has good access to irrigation water and is likely to deliver the greatest benefit. The site will be approximately 20-40 ha in size. The facility will focus on the specific climate resilience challenges associated with key non-state crop types and practices and explore the potential for diversification into higher value-added crops. A larger polygon will be established around the site where small scale private farmers can then develop their own operations drawing upon expertise from the main facility. These polygons will provide land for private farmers to



manage on a semi-commercial basis with the technical support of the demonstration plot staff and technology. The project will explore joint business models (e.g. profit share between farmer and demonstration plot service) to encourage sustainability of the polygon structure, whilst providing incentive for private farmers and small holders to engage. The sites may also serve as the basis for academic and scientific research (thereby helping to strengthen the institutional knowledge base).

**Figure 3: Yoloten Etrap and Surrounding Daikhan Associations (Desert Oasis)**



97. The profile of the demonstration site would reflect the agro-ecological zone and farming practices of the location selected. This sub-component would draw upon the experience of the UNDP-managed GEF project 'Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan'. Under this project, a Green Polygon pilot project was established on 145 ha of arable land 50km from Ashgabat. The land was allocated to pilot new technologies in irrigated agriculture and pumping for energy efficiency, water conservation, and sustainable land management. The site would also be open to extension service providers supported under Component 2 to help facilitate their training and capacity building work. The project will arrange for practical demonstrations, supported by advice on climate change and resilient agriculture. The facilities will also be used to provide training to extension service providers (trainer of trainers) supported under Component 2.
98. A review will be undertaken of technologies and methods piloted at the site to examine the technical and economic potential (e.g. cost benefit analysis, GHG mitigation benefits, water

saving benefits, economic benefits). This cost effectiveness analysis will help prioritise and inform the selection of the most impactful investments.

***Output 3.2. Private sector-led best practice demonstration facilities:***

99. The project will work with larger private sector agricultural and agro-processing companies to co-invest in at least three best practice climate resilience demonstration sites in different regions of Turkmenistan. Private farms and agricultural companies will provide land and support while the project will provide expertise and guidance for setting up the plots, the additional costs of resilient technologies and support the costs of training and development at the sites. The selection of investments will incorporate cost-benefit analysis. These sites will provide access for field training and best practice dissemination for small scale farmers (under Component 2) but also form the basis for commercial operations for the companies involved. Companies will be encouraged to support the dissemination of climate resilient practices as part of their agricultural supply chain development (i.e. to secure reliable inputs) or through the use of out-growers.

***Output 3.3. Adaptation investments in community scale farmer-led cooperatives:***

100. The project will work with smaller private farming cooperatives or other similar private farmer-led collective groups to develop investment plans for development of climate resilient best practices at the community level. These groups will be screened and prioritized on the basis of their vulnerability to ensure that resources are targeted at those most at risk from climate impacts. They are likely to be located in the Mary region (Yoloten), thereby allowing for synergies with the publicly developed demonstration site.
101. These groups or cooperatives will be selected on the basis of an open and transparent selection procedure managed by the project team in conjunction with relevant regional authorities. Prospective communities will be invited to undertake a high-level climate risk and socio-economic assessment with facilitating support from the project. Selection will be made on the basis of clear criteria to include:
- a. Climate impact assessment: Identifying communities facing particularly severe climatic impacts (e.g. drought, soil degradation, flood risk)
  - b. Sector exposure: Communities where agricultural systems and livelihoods have concentrated exposure to identified climate risks
  - c. Socio-economic vulnerability: Income levels and levels of adaptive capital/opportunities for economic diversification
102. Support will be given to climate adaptation planning (vulnerability assessment, best practice identification and prioritisation, business planning). Adaptation investment plans will incorporate cost-benefit analysis to ensure that funds are prioritised towards the most beneficial areas whilst ensuring a high degree of community ownership. Using the adaptation investment plans developed, the project will make investment funds available. Locations will be selected based on climate vulnerability assessment (including both climate and socio-economic assessment). Funds will be made available for collective infrastructure that can benefit groups of farmers, rather than for individual plots, unless there is significant demonstration value. Private farmers will be encouraged to apply collectively, either based on Water User Groups (WUGs) as piloted under the previous phase of the Adaptation Fund or using other collective private farmer institutional structures. Funds will be made available based on competitive grant, with farming groups expected to be able to demonstrate resilience

gains alongside socio-economic benefits in order to secure funds. There will be expectation of co-financing from private farmers (in the form of labour or other inputs). Typical investments that might be supported include:

- a. Water collection and storage (tanks, pasture wells)
- b. Efficient water delivery (metering, pipes, canal lining)
- c. Efficient irrigation (sprinkling, drip)
- d. Greenhouse technologies
- e. Renewable energy technologies
- f. Horticultural techniques to improve yield
- g. Effective soil preparation (e.g. laser levelling) and fertilizer use
- h. Drainage and desalination techniques (e.g. canal lining and maintenance)

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

*Socio-economic benefits*

103. The programme, through the provision of agricultural extension services, climate-resilient agriculture capacity building and investment in innovative technologies and cooperatives at the local level (among other key outputs), is likely to result in economic benefits for up to 20,000 private farming enterprises, entrepreneurs as well as supporting the wider communities in which they operate and where they employ workers. These farming enterprises employ approximately 100,000 farmers and provide livelihoods for 100,000 families. Thus, the project will increase climate resilience of 500,000 people in Turkmenistan rural communities<sup>16</sup>. Indirectly, the project will enhance adaptation capacities and climate risk knowledge among a much larger number of smallholder and household farmers by setting up accessible extension services and demonstration plots and enhancing their food security, hence catalysing a shift among smallholder farmers towards sustainable, climate-resilient agriculture, with exponential benefits. These groups represent the most vulnerable economic communities in Turkmenistan. Such socio-economically disadvantaged farmers currently cannot effectively benefit from existing state support (e.g. subsidised loans) due to their low incomes and subsequent lack of assets. They lack access to resources and know-how to invest in climate resilient practices and technologies, and in terms of how to manage water and land resources in an efficient way.

104. Farm-level resilience will be increased by implementing measures designed to improve the capacity of private sector farmers to deal with increased heat and reduced water availability, as well as increasing soil degradation. The project will both raise the awareness

---

<sup>16</sup> An average family size in Turkmenistan is 5 people.

among farmers of potential methods to maximize water efficiency (e.g. efficient irrigation and land management techniques, more climate resilient varieties, improved horticulture and livestock methods) as well as supporting demonstration plots (public and privately managed) and financing community level investments where these technologies and approaches can be piloted alongside water collection and distribution activities. Farmers will also be supported to gain improved access to finance and business planning services through existing government-led agricultural support and financing programmes.

105. Improving the resilience of private farmers is likely to result in reduced economic losses associated with lack of water, greater agricultural productivity, increased revenue, greater employment, as well as allowing diversification of income sources. Greater resilience will also result in a reduction in economic losses associated with climate shocks and stresses. At a national level, these losses are believed to be substantial, estimated at \$2.5 billion USD per annum by 2030. The damage to agricultural assets at the household level would be reduced significantly, though it is not possible to quantify the reduction in financial terms at this stage. Analysis under the earlier Adaptation Fund project indicated that cost benefit ratios for typical investments would be in the range of 4:1 (i.e. avoided damages and improved productivity benefits of \$4 for every \$1 invested). Further cost benefit analysis will be undertaken for individual investments made in demonstration plots across the project portfolio (state, private, community-level).
106. As outreach increases, there is the potential for replication across Turkmenistan to support the large and growing proportion of the population engaged in private sector agriculture. The Union of Industrialists and Entrepreneurs estimates between 20,000-30,000 agricultural companies and entrepreneurs engaging in commercial non-state agriculture (ranging from large agricultural companies to smaller farmers).
107. From a social perspective, the project will target regions and farming communities that are particularly vulnerable from a social and climate change perspective (high poverty, high vulnerability) for example through the use of mobile extension services. The project will encourage cooperative and community-based risk planning and investment methods that facilitate cooperation between groups of private sector farmers. This approach has the potential to support scaling and efficiency and greater community cohesion among smaller decentralised smallholder farmers.

*Environmental benefits:*

108. The techniques and technologies that will be promoted through climate resilient extension services and demonstrated through demonstration plots and community level benefits are likely to have significant environmental benefits at the local level. Key activities and associated environmental benefits are as follows:
  - a. Efficient Irrigation – Reduced water use and conservation, reduced salinization
  - b. Boundary planting and reseedling – reduced erosion, land fixation, biodiversity
  - c. Improved land management – reduced fertilizer use and lower chemical inputs
  - d. Improved drainage – Reduced salinization and soil degradation
109. Integrated, equitable and efficient use of water resources is a key environmental issue in Turkmenistan, with significant impacts on an array of environmental factors, including climate change resilience, land degradation and biodiversity. Turkmenistan has one of the highest water use rates in the world, with 90 per cent of the country's water resources going to

irrigation, and the inefficiency and water waste of current irrigation systems being one of the most acute national natural resource management problems. The project directly addresses this issue with the promotion of efficient irrigation systems, decreasing water use per output and hence putting the integrated environmental benefits of water-use efficiency at the center of project design. Furthermore, the project aims to build awareness as well as create demand for climate resilient practices and technologies at the regional and community level, ensuring that the importance of efficient water use is forefront in the planning of all stakeholders in addressing Turkmenistan's environmental degradation.

110. In addition to the water losses, the extensive use of outdated irrigation technology has led to the salinization of more than 60 per cent of agricultural land. In addition to soil salinity, waterlogging has increased in the last decade from roughly 25 per cent to 50 per cent of the irrigated land, resulting in a decline in crop yield of 20-30 per cent. Improving the use of water and more sustainable farming methods, through extension services, investments in capacity building and technology, and the creation of demonstration centers for better irrigation technology, is likely to result in lower levels of mineralization and salinization of soils associated with poor water management practices and overuse of chemical fertilizers, with further significant environmental benefits.
111. In addition to improving water and agricultural practices, effective water and land management, provision of extension services and capacity-building through a water-use efficiency and climate resilience lens has the additional benefit of improving awareness of wider environmental sustainability and practices within targeted communities and the sub-basin in which they are situated.
112. Regarding biodiversity co-benefits, it has been recognized that the biodiversity of Turkmenistan has declined significantly over the past century due principally to desertification, land degradation and overexploitation. By directly addressing the root causes of desertification and land degradation through the improvement of water use and agricultural techniques, as well as through better integrated water and land use planning, including the introduction of regulatory instruments to decrease water use, the project also has potential co-benefits to support national biodiversity conservation strategies in a synergistic manner, by addressing the degradation of habitats on which Turkmenistan's biodiversity depends.

*Gender considerations:*

113. Turkmenistan adopted legislation and a National Action Plan for Gender Equality for 2015-2020 that was approved by the Resolution of the President of Turkmenistan in January 2015. In the pilot farmer associations and livestock farm, women account for, on the average around 51-52% of the population. They are mainly engaged in housekeeping, teaching, and administrative support services. Many more women form part of the unpaid family labour in home farming and lease of agricultural lands.
114. The different responsibilities that women generally have in agricultural activities include: (a) participation in planting and harvesting activities in the production of state crops (around 30% by women), and particularly in growing vegetables and fruit crops in the private household plots (in the latter case, 65-70% of cultivation in household plots is done by women); (b) at the household level, many hours a day in the preparation of food for the farm workers, raising livestock and poultry, fetching water and engaging in non-farm activities; (c) some women are responsible for managing farm finances and marketing products from private

household plots; (d) despite these roles, women have limited role in control of land and decision making on agricultural practices; and (e) have limited access to capacity-building services and training.

115. The different roles that women play in agriculture require a targeted set of adaptation and resilience measures addressing their needs. This indicates a need for rethinking the gendered roles of women in small holder agriculture and their access to resources, training and inclusion in local political processes which govern their relationship to land and water, beyond domestic needs. Regional experience shows that insufficient attention is paid to the participation of women in user association management, and that without leadership examples women do not try to enter onto boards or become user association managers. It has also been noted that management positions within the municipal authorities and Daikhan Associations are occupied predominantly by men. Thus, women at the local level have generally less access to decision-making, capacity building and knowledge. This can be explained by both current conditions of land and water use and poor awareness and knowledge among women.
116. Gender considerations, noting the above assessment and constraints, will be fully mainstreamed into project implementation. The programme will provide opportunities for women to learn about climate resilience and integrate best practices into their operations, and ensure that women are also able to access the capacity building and training, required to practice climate-resilient agriculture, as well as to diversify their livelihoods in more resilient ways. The project will ensure that there is gender balance in project activities (e.g. seminars, community level events) including access to project financial assistance. Gender considerations will inform any community level vulnerability analysis linked to local infrastructure or demonstration plot development through consultation regarding needs and preferences on types of training and investment. The project will also gather gender-disaggregated data for evaluation purposes and use gender sensitive indicators (particularly around beneficiaries) to facilitate planning, implementation and monitoring.
117. As necessary the project will partner with local NGOs and women's cooperatives in order to integrate and support on-going local initiatives, and to make capacity-building and agricultural extension activities gender-sensitive (adjusting factors such as content and training times to ensure that the needs of female beneficiaries are equally accounted for). The following national and local NGOs could be engaged into gender mainstreaming, community engagement and capacity building work of the project: "Nature Conservation Society of Turkmenistan", "Bosphorus", "Keik okara", "Yenme", "Dap-dessur". These NGOs have been active in the areas of environmental information and awareness, environmental education, SME support, rural development, women empowerment and could be engaged in the community outreach and gender mainstreaming work of the project.
118. The project will be built upon the lessons and successful approaches to gender mainstreaming and women participation piloted by the first Adaptation Fund project, including promotion of women participation and leadership in the management of water users' groups and farming cooperatives. The project will engage with eight water user's groups (WUG) established in pilot communities Nohur, Karakum and Nohur in the framework of the previous AF Project, members of which went through numerous trainings on establishment and management of WUG, decision making and gender involvement in efficient use of water and land resources and their resilience to adverse effects of climate change.



119. In terms of ensuring gender mainstreaming, a number of practical steps will be undertaken. The project team and partners (Union of Industrialists and Entrepreneurs) have committed to delivering the following:

- a. Commitment to integrate gender sensitive considerations into the design of new laws, regulations and associated explanatory materials relating to agricultural sector strategy development.
- b. Targets for inclusion of women in training and capacity building initiatives among policy makers (minimum 30%)
- c. At least 30% of farmers and farming entrepreneurs receiving climate resilient extension services being women
- d. Gender balanced approach to selection of participating private sector partnerships (female led enterprises) and community demonstration plots
- e. At least 30% of those receiving field training being women.

Implementation strategies to deliver these targets will be designed and delivered by the project team in conjunction with key project partners. This will be done through the clear setting of targets in project agreements, payment by results and regular monitoring of progress.

#### *Risk mitigation*

120. In regard to environmental and social risk assessment and mitigation, the programme is committed to complying with the Environmental and Social Principles (ESP) of the Adaptation Fund, with UNDP's Social and Environmental Standards (SES), as well as with applicable national and international policies, laws and regulations.

121. Methodologies for risk assessment are detailed in Section K below. Those aspects of the project which are fully formulated at this stage have been screened against the AF ESP Principles. These aspects of the programme do not involve significant on-the-ground activities or significant environmental or social impacts.

122. As the project's on-the-ground activities involve further site selection, and in some cases grant applications, full screening will be required on a site-by-site basis to establish social and environmental compliance before investment decisions can be made. Some activities and sites may require further studies or formal impact assessments, together with mitigation methods. These parts of the project are considered Unidentified Sub-Projects (USPs), and will be assessed in line with AF guidance. This aspect is further elaborated on in Section K and in the ESMF (Annex 7). Potential environmental and social risks have been outlined in the ESMF and Section K below, which includes a screening checklist of possible risks, and identifies currently-foreseen potential risks tied specifically to project activities, and the assessment and management measures to address those risks. It also describes how the project mainstreams environmental sustainability, human rights and gender equality into project design and associated environmental and social co-benefits. The environmental and social risks have been reviewed in the risk register and will be fully monitored during programme implementation, with formal review of any potential issues by the project team and the project board. USP activities at this stage have to be considered in a high-level or generic manner, looking at inherent risks involved in work of this type. Foreseen impacts are therefore described here as non-specific and high-level. It is important to note that each on-the-ground activity will be subject to on-site AF ESP and GP compliance assessment and,

where required, associated impact management measures, a Sub-Project specific ESMP, and appropriate monitoring arrangements.

123. Based on the Environmental and Social screening process, it has been determined that the currently-formulated parts of the proposed project have limited potential for causing adverse impacts to the environment, natural habitats and/or ecosystems and ecosystem services. Rather, the project will likely have significant benefits in regards to enhancing natural habitats and ecosystems services through improved and more efficient use of water resources. Given that the project has a few, potential adverse impacts, which are small in scale, not widespread, and easily mitigated the project should be considered a Category B project, with only limited assessment required. Regardless, risks will be monitored according to potential impacts noted in the ESMF report (Annex 7).
124. The project is not expected to generate potential adverse trans-boundary or global environmental impacts or secondary or consequential development activities that could lead to adverse social and environmental effects. The project is also unlikely to generate cumulative impacts with other known existing or planned activities in the area.
125. The proposed project will not result in significant greenhouse gas emissions nor would exacerbate climate change impacts, but rather has been designed to mitigate anticipated impacts of climate change. Furthermore, the benefits from improved agriculture and land management can include reduced greenhouse gas emissions from the soil and improved carbon storage. The project will therefore indirectly increase social and environmental resilience to climate change, in addition to its explicit goal of enhancing environmental and social resilience in the face of climate change through adaptive agricultural practices.
126. The project will not involve any large-scale infrastructure development, but may involve some small-scale infrastructure in pilot/demonstration plots, which will be assessed on a site-by-site basis. The project will not involve support for employment or livelihoods that may pose a potential risk to health and safety of communities and/or individuals or to biodiversity and ecosystem functions.
127. The project will not involve either temporary or permanent physical displacement, nor will there be the need for land acquisition– even in the absence of physical relocation. Project demonstration activities will be implemented on state land under the management of the Ministry of Agriculture and Environment Protection, which would not exacerbate land tenure arrangements and/or community-based property rights/customary rights to land, territories and/or resources.
128. There is some possibility of restriction of access to water through the introduction of tariffs for water supply services to water users, and such a tariff which regulates water use is essential to ensuring future supply for all rural farmers. Regardless, the possibility of marginalization will be monitored, as well as accounted for in the tariff structure, to ensure that the most vulnerable water users are not marginalized, through the incorporation of ability-to-pay data gathered through consultation.
129. More detailed environmental and social assessment, which may take the form of an Environmental and Social Impact Assessment (ESIA) depending on the scale and type of infrastructure, will be undertaken with regards to any direct investments in infrastructure (e.g. demonstration plot development) so as to ensure that potential direct and indirect negative impacts are identified and mitigated. For further information on environmental and social risk

mitigation, please refer to the ESMF Report, and the screening checklist for USPs in Annex 7.

**C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.**

130. The project is designed to ensure that its investments are undertaken in the most cost-effective manner, and that project approaches and institutional mechanisms are easily replicated and scaled up using existing facilities and platforms in country. The project will use existing national and local institutional arrangements for delivery of project interventions, rather than creating additional and costly alternative project-specific alternatives. These include:

- a. Developing a strategic concept for private sector farming climate resilience through the MAEP and other relevant government stakeholders
- b. Using the networks and reach of the Union of Industrialists and Entrepreneurs to promote climate resilience to private sector farmers and their communities
- c. Partnering with state institutes and larger private sector entrepreneurs to develop demonstration plots that can serve as showcase facilities and training sites;

131. Investment in climate resilience in Turkmenistan is likely to be highly cost-effective. Economic modelling under the previous Adaptation Fund project indicated that the projected water deficit has the potential to result in significant economic losses. In the absence of new policies and measures, the economic costs could reach \$2.5bn per annum by 2030 or a cumulative \$20bn (discounted) for the period 2015-2030. These are the 'costs of inaction'. While the costs of adaptation were large (\$600m per annum by 2020), they are significantly lower than the costs (benefit cost ratio 4:1)

132. Climate resilient agriculture targeted at the most vulnerable micro-, small- and medium-sized non-state farmers will be encouraged using lower cost adaptation measures, alongside more capital-intensive infrastructure, drawing on lessons and economic analysis from the earlier Adaptation Fund project. At a farm level, cost-benefit analysis of specific adaptation measures undertaken across three agro-ecological zones indicates positive socio-economic returns, with some adaptation measures delivering high benefit cost ratios (>10:1) based on water saving and yield improvements, with short payback periods of less than 5 years. Some examples are set out below:

**Table 2: Cost benefit analysis for selected agriculture and water adaptation measures**

Measure	Benefits assessed	Internal Rate of Return (IRR)	Benefit cost ratio (BCR)	Payback period (years)
Construction of drip irrigation systems	40-50% increase in fruit and vegetable yield/ha	29%	8:1	5

Construction of dams with water reservoirs	Increase in water availability leading to expanded cultivation area	140%	21:1	2
Repair of dams and reservoirs	Increase in water availability leading to expanded cultivation area	227%	20:1	1
Repair and lining of water storage basins	Reduction in water losses, leading to increased supply and expanded area under cultivation	15%	4:1	8
Construction of new wells for sheep pasture	Increase in pasture availability supporting 200 head per well	12%	1.2:1	7
Repair of water regulation sluice gates	More effective use of water	24%	4.6:1	3
Reconstruction of the on-and inter-farm drainage collectors in	30% increase in cotton yield/ha	21%	1.8:1	5
Laser levelling and planning of cotton and wheat fields in Sakar Chaga (150 ha)	Reduction in water use and increase in productivity	11%	1.1:1	7

133. Further information of the socio-economic assessment of adaptation measures in the context of climate change and increasing water scarcity conducted by the first Adaptation Fund project is included in Annex 6.

134. The project will undertake ex-ante additional cost benefit analysis as part of the design of individual demonstration plots (state, private, community level) under Component 3 prior to investment and will monitor outcomes during implementation. This will ensure that all investments maximise the socio-economic benefits to the relevant beneficiaries. The process that will be followed is set out in more detail below:

- a. Under component 3, stakeholders will be invited to develop and submit proposals for funding that can increase the resilience of their operations whilst serving as demonstration plots for wider community learning;
- b. The development of these proposals will be facilitated by the project team, including both technical experts but also with the support from an experienced national economist to provide capacity for stakeholders to undertake effective cost benefit analysis where this capacity does not exist;
- c. Each proposal for funding will include an ex-ante cost benefit analysis (based on the likely avoided losses and productivity returns at the community/firm/state entity level). It should be noted that the economic returns are highly context specific and therefore challenging to apply the same assumptions across all projects (although they can provide an indicative indication);

- d. The results of the cost-benefit analysis will be used as one factor in the selection and prioritisation of community level interventions and will influence which of the interventions are selected and presented to the project board for approval;
- e. As part of the approval process, the cost-benefit analyses will be formally reviewed by the technical working group and an international economist as part of a quality assurance mechanism;
- f. The selection criteria will be focused around the benefit-cost ratio (BCR) and the likely payback period (yrs.) of the interventions. Those interventions that cannot demonstrate a BCR in excess of 2:1 and a payback period of less than 10 years will not be funded. Proposals will be ranked on the basis of their economic returns as part of the selection process;
- g. The cost-benefit analysis will be one of a broader set of criteria used to identify the cost effectiveness of individual interventions to be used by the Project Board. These criteria will include:
  - i. *Targeting most vulnerable groups*: Extent to which the intervention will be relevant to/supportive of vulnerable groups of commercial farmers or SME's exposed to climate risk;
  - ii. *Deliverability*: Assessment of the feasibility of the intervention from a technology and project management perspective (including timing and budget parameters);
  - iii. *Alignment with national/local priorities*: Extent to which the intervention is aligned with national/and or local priorities in terms of resilient agricultural development (including evidence of co-development of proposals with key stakeholders);
  - iv. *Economic case*: Evidence that the socio-economic returns are likely to be higher than the costs of the project (as evidenced by estimated payback period and benefit cost-ratios);
  - v. *Sustainability*: Evidence that interventions are likely to be maintained over time post-project in terms of operations, maintenance and commercial viability;
  - vi. *Replicability*: Extent to which proposals are likely to be replicated and/or scaled within the project area or through national structures.
- h. The programme team, together with the beneficiaries will undertake ex-post analysis as part of the project following implementation to review and assess the actual socio-economic impacts of the interventions in order to learn from experience and feed through into future national planning;
- i. Further examples typical cost benefit analysis undertaken under the previous Adaptation Fund project can be found in Annex 6.

**D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications,**

**or national adaptation programs of action, or other relevant instruments, where they exist.**

135. The project has been developed in close partnership with a range of government agencies and is fully aligned with a range of national development plans and strategies related to climate change, agriculture, water and sustainable development. Key enabling strategies, plans and frameworks are set out below:

#### *Climate change*

136. *Third National Communication to the UNFCCC (2015)*: The Third National Communication to the UNFCCC sets out a broad range of climate risks and provides an overview of the social, economic and environmental vulnerability of the agriculture sector. It sets out a broad range of adaptation measures to promote better water use and land management in the context of reduced water availability and increasing temperatures. The project is fully in line with the high-level objectives.
137. *National Climate Change Strategy of Turkmenistan (2012)*: The National Strategy sets out the overall risks and priorities associated with climate change in Turkmenistan. The strategy sets out how addressing climate change challenges is a core component of sustainable development and the need for the promotion of innovative technologies and know how. Within the agriculture sector, the strategy calls for the optimization and specialization of agricultural production, a focus on drought and salt resistant crops, improved land management (e.g. crop and pasture rotation), soil desalination and drainage efforts, pasture management. The project is fully in line with the objectives and approaches set out.
138. *Nationally Determined Contribution of Turkmenistan (2014)*: Turkmenistan submitted its NDC to the UNFCCC in advance of the Paris COP. The NDC sets out the broad policy goals and targets for the period 2020-2030. Mitigation is based around an emissions intensity target, recognizing Turkmenistan's large fossil fuel reserves. Adaptation policy identifies agriculture and water resources as core sectors vulnerable to climate change. Costs of adaptation are given a preliminary estimate of \$10.5 billion USD.

#### *Agriculture*

139. The main legislative framework dealing with the agriculture sector relates to legislation on land and water, particularly, the Water Code (2004, updated 2016), the Land Code (2004) and the Law on Pastures (2015).
- a. *Water Code of Turkmenistan*: The Water Code of Turkmenistan defines the structure of management of water resources and the distribution of functions and powers of governance in relation to water. In accordance to this legislation, the Ministry of Water Economy is responsible for regulation of the use of water, while the Ministry of Nature Protection is entrusted with the responsibility of protection of water resources. The Water Code stipulates that inter-farm irrigation and drainage networks belong to the state water management organizations, while water users having direct responsibility for operation of irrigation and drainage networks and hydro-technical facilities, at their own costs, with technical support from the water management authorities, although in practice this might not always be the case. In August 2012, Turkmenistan acceded to the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes. By joining the Convention, Turkmenistan undertook to review the Water Code to meet some of the basic provisions of the Convention, including the rational use of water by the transition to the basin principle of water resources management, involvement of water



users in the management of water resources, and improving tariffs for water supply services to ensure its more efficient use. This review was completed, and recommendations adopted in 2016. The programme of the development of water management of Turkmenistan for 2018 – 2030 is currently under development.

- b. *Land Code of Turkmenistan*: The Land Code is aimed at the rational land use and the protection, preservation and improvement of the natural environment. The Land Code stipulates measures for efficient use of land resources, procedures for state land management, maintenance of state land resources and monitoring, measures for improving soil fertility and conservation of natural resources. The Land Code includes a system of legal, organizational, economic and technological and other measures for rational use of land resources, protection from adverse anthropogenic impacts and improvement of soil fertility. It recognizes two owners of land, the citizens of the Turkmenistan and the State.
- c. *Law on Pastures*: The Law on Pastures stipulates measures for the rational utilization, enrichment and sustainable development of natural pastures for use by livestock, and the avoidance of degradation and destruction of pastures. The Code defines measures to ensure that rational utilization is based according to a number of prescriptions, including determination of carrying capacity, regulations regarding use of pastures, measures to enhance productivity and sustainability of lands, and the collective role of local government entities and grazing right holders or lessees in the effective management of these lands.

#### *National development strategy*

- 140. The National Programme “The Strategy of Economic, Political, and Cultural Development of Turkmenistan Until 2030” sets out targets in relation to agricultural outputs. The Programme envisages an increase in agricultural production of more than 15 times only due to utilization of the current natural resource and accelerated industrial potential. Wheat production is planned to grow 2.9 times and cotton production – 4.9 times by 2020 as compared with 2000. A considerable proportion of irrigated agricultural lands is planned to be transferred to private sector enterprises. The private sector tenants will include joint-stock companies, daihan (farmer) cooperatives and unions. These categories of land users are expected to introduce more effective and efficient water use technologies and water saving practices. At a broader level the Strategy states that the overarching national development goal is to shift to a growth model based on innovation and sustainable development. The specific objectives are the continual and sustained development of all economic sectors, further integrating with the international community, improving the well-being of all citizens, increasing investments in human capital, enhancing the quality of public housing and utilities, and prudent use and conservation of natural resources. Key priorities include accelerating economic diversification, increasing economic competitiveness, and improving infrastructure by modernizing the energy, transport, information technology, and agriculture sectors.
- 141. Programme of Social and Economic Development of Turkmenistan, 2018-2024. This programme outlines Turkmenistan’s social and economic development objectives for the next seven years and reflects the main principles, priority directions, required actions and expected outcomes. The primary objectives of this programme are to continue implementation of market reforms and transition to a market-led economy, economic diversification, improving human capital, and improving the living conditions of the population.

142. National Action Plan on Gender Equality, 2015–2020, sets the country's strategy on achieving gender equality. Developed in partnership with the National Institute for Democracy and Human Rights and the UN Population Fund, the plan lays out 15 targets and 60 activities that include increasing women's competitiveness in labour markets, improving maternal and child health outcomes, and the creation of gender-responsive legislation.

143. Other relevant laws include:

- a. Daikhan Associations (2007)
- b. Daikhan Farm (2013)
- c. Nature Protection (2014)
- d. Ecological Assessment (2014)
- e. Sanitary Code of Turkmenistan of 2009,
- f. Fishery and Preservation of Water Biological Resources of 2011,
- g. Specially Protected Natural Areas (2012)

144. In addition, the legal acts of the President of Turkmenistan, in particular those focusing on the improvement of water legislation are relevant. These are the Regulations of the Ministry of Water Economy of 2000, the Regulation of "TurkmenGeology" State Corporation of 2012, the Regulations of the National Hydrometeorology Committee under the Cabinet of Ministers of 2011, and regulations of the Ministry of Nature Protection (2000) and other regulations dealing with the use and protection of water. These may regulate any investments in water related infrastructure undertaken by the programme.

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

145. The project envisages some level of small scale capital investment in demonstration plots for the resilient technologies for agriculture and livestock management. These sites are likely to be relatively limited and on already partially degraded land under the management of the Ministry of Agriculture and Environment Protection (involving land remediation, irrigation and water storage investments).

146. In addition, there will be some funds allocated to farmer cooperative investments associated with improved water and soil management. These are likely to be technology focused (e.g. new drip or sprinkler irrigation systems) rather than infrastructure focused. However, any capital works identified (e.g. drainage, water storage, wells) will be subject to the same safeguards.

147. All works will be subject to design and will meet local technical environmental and social laws and standards. Where relevant, local regulations will be followed. In the event that water extraction is expected, a hydrology review will be undertaken in association with the state water body Turkmengeology. In this case, an environmental impact assessment will be undertaken according to criteria indicated by the State Environmental Committee alongside an Adaptation Fund Social and Environmental Assessment. In the event of groundwater

extraction, an Environmental and Social Management Plan, based on the Environmental and Social Management Framework, provided in Annex 7, will be prepared.

148. The Environmental and Social policy of the Adaptation Fund, as well as UNDP Social and Environmental Standards, calls for consultative processes in the development of projects/programmes with “particular reference to vulnerable groups, including gender considerations.” These considerations have been outlined in the ESMF Report in Annex 7, which also includes a record of relevant stakeholder consultations.
149. During the implementation phases of any project, a person or group of people can be adversely affected, directly or indirectly due to the project activities. The grievances that may arise can be related to social issues such as eligibility criteria and entitlements of selected beneficiaries, gender norm changes, access to project benefits by marginalized groups, disruption of services, temporary or permanent loss of livelihoods and other social and cultural issues. Grievances may also be related to environmental issues such as impacts on water quality, damage to infrastructure due to construction or transportation of raw material, noise, decrease in quality or quantity of private/ public surface/ ground or surface water resources during implementation of livelihoods assets or water provision, damage to home gardens and agricultural lands etc. In order to address any grievances that may arise, in addition to any grievance mechanisms available at the local or national levels, all project stakeholders have access to the UNDP Stakeholder Response Mechanism (SRM) as well as the Adaptation Fund’s grievance mechanism. These are both noted in the ESMF (Annex 7).
150. 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 activities have 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 formulation of the project and should have no vested interest in its approval. Appraisal is based on a detailed quality programming checklist which ensures, amongst other issues, that necessary safeguards have been addressed and incorporated into the design.
151. UNDP Country Office in Turkmenistan has practical experience with implementing/piloting of all technologies proposed for the AF project and listed under Component 3 in compliance with the national technical standards and regulations. Annex 6 of the project proposal refers to the lessons and evidence from earlier UNDP implemented pilots. The following process secures compliance with the corresponding standards and regulation:
- (i) Upon identification of sub-projects/sites and prior to the investment the applicable national technical standards and regulations are defined and safeguards monitoring activities are defined and incorporated in the sub-project design;
  - (ii) Technical specifications/terms of references for the procurement and commissioning of technology installation include requirements for the sub-contractor to ensure compliance with all relevant national technical standards and regulations according to the national law. All the relevant national technical standards (including

permits, licenses, etc. for construction, hydroengineering and other physical works) are specified in detail in UNDP tender documentation along with technical specifications of works required;

(iii) At the contracting phase UNDP verifies compliance of the sub-contractor with the national regulations (e.g. availability of appropriate licenses). Contracts are awarded to vendors, that possess full compliance with national technical standards for implementation of adaptation activities.

(iv) UNDP Country Office has an internal procedure for carrying out monitoring field visits and spot checks during the implementation of site activities by sub-contractors. The monitoring visit check lists include above all monitoring of compliance to technical standards;

(v) In case of high technical complexity of works and services, external experts (e.g. engineers) and/or national government staff are engaged for site monitoring.

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

152. There are several ongoing initiatives of relevance to the proposed AF project, and efforts have been made to ensure that there is no duplication with other initiatives and that potential synergies are explored. Extensive stakeholder consultation has been undertaken with the major donors in the water and agriculture sector in Turkmenistan, including the European Union, selected bi-lateral donors (GIZ etc.). The primary activities of relevance are identified as follows:

*European Union*

153. Support to Further Sustainable Agricultural and Rural Development Phase III (2016-2020). This programme aims to support national strategic objectives in the agriculture sector. Its focus is on increasing productivity and competitiveness in agro-food production and marketing, as well as institutional development in line with Turkmenistan's diversification and export strategy. Activities are oriented towards added-value processing, investment and value chain development, rather than upstream resilience in crops and livestock. It does not have a climate change focus and the potential partners are larger more established commercial agro-industrial companies. There is little overlap, but some opportunity to partner in terms of identifying potential co-investment in demonstration sites or expansion of agricultural extension services.

*UNDP*

154. Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan (2016-2021): This SCCF funded project is supporting livelihoods in rural areas in the Lebap and Dashoguz velayats through the implementation of community-based adaptation solutions; (ii) Mainstreaming climate adaptation measures in agricultural and water sector development strategy and policy; and (iii) Strengthening national capacity for iterative climate change adaptation planning, implementation and monitoring in the country. The proposed programme has been developed to ensure that potential areas of potential overlap (e.g. legislative reform, piloting at a regional scale) are avoided and all activities are complementary. The Adaptation Fund project will focus on areas of legislation that are not currently or expected to be addressed by the SCCF project (i.e. primarily relevant to private sector farmers rather than those in the state-order crop system). It will also undertake any

regional demonstration/community-based activities in regions where the SCCF project is not active (e.g. in Mary Velayat), but will explore the opportunities to cooperate and leverage activities already undertaken.

155. Sustainable Energy and Water Management Project (2015-2021). This GEF-funded project focusses on energy efficiency and renewable energy opportunities in the agriculture and water sectors. The project has some relevance as it is piloting the demonstration of water efficiency technologies and approaches in the Ahal Province near Ashgabat. The programme will overlap in time, but not directly in scope. The Adaptation Fund project will explore the possibility of using demonstration facilities developed in the Ahal Province to provide a learning environment for extension service providers and private sector farmers and entrepreneurs on resilient water technologies.

#### *GIZ*

156. Regional programme for sustainable and climate sensitive land use for economic development in Central Asia (2016-19). This regional programme seeks to support land users, government agencies and the private sector in Central Asia adopt integrated, economically and ecologically sustainable forms of land use, taking climate change into account. The primary focus is on participatory and sustainable management and the integration of different approaches within a given area. The project is not focused on private sector resilience and there is not expected to be any significant geographic or thematic overlap.

#### *EBRD*

157. Small Business Initiative (2015-18). The European Bank for Reconstruction and Development (EBRD), in partnership with the European Union support a small Business Initiative in Turkmenistan. The Small Business Initiative provides a comprehensive set of tools to promote the growth of small and medium-sized enterprises (SMEs), including financing businesses both directly and through financial institutions, providing business advice and supporting policy dialogue. As part of this, business services support is being provided on a cost sharing basis. While this is not thematically linked to the Adaptation Fund proposal, the project will explore the potential for relevant participants in the EBRD programme to act as extension services providers.

**Table 3: Summary of Parallel Projects**

Project	Funding agency	Outputs	Areas of complementarity with Adaptation Fund	Areas of potential duplication and risk mitigation
Scaling Climate Resilience for Farmers in Turkmenistan	Adaptation Fund	Strengthened legislative and institutional capacity to deliver private sector farmer resilience  Development of climate resilient extension services platforms for private sector farmers  Development of public and private sector demonstration sites,		

Project	Funding agency	Outputs	Areas of complementarity with Adaptation Fund	Areas of potential duplication and risk mitigation
		including community led initiatives		
Support to Further Sustainable Agricultural and Rural Development Phase III (2016-2020)	EU	Advisory support to large export-oriented agro-processors and value chain development facilitating import substitution in the agriculture sector	Potential for AF project to collaborate to identify private sector partners willing to host demonstration plots to support their supply chain and communities or to act as extension service providers	None – focus is on large and financially robust companies and not small vulnerable farmers and SME entrepreneurs. Support is on downstream added value processing.
UNDP - Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan (2016-2021)	SCCF	<p>Improved climate related socio-economic outcomes in the targeted agricultural communities in Lebap and Dashoguz velayats through the implementation of community-based adaptation solutions;</p> <p>Mainstreamed climate adaptation measures in agricultural and water sector development strategy and policy (primarily Land Code); and</p> <p>Strengthened national capacity for iterative climate change adaptation planning, implementation and monitoring</p>	<p>Potential to use project sites in Lebap and Dashoguz to disseminate extension services and provide training</p> <p>Cooperation with project on institutional and legislative reform where relevant</p>	<p>SCCF is working with state order sector. AF project is private sector focused and therefore limited overlap.</p> <p>AF project is focused on scaling extension services development at national level, rather than local community resilience</p> <p>Legislative and institutional capacity building is a potential overlap. SCCF project is focused primarily on the reform of the Land Code – AF project will address legislative areas not being addressed by SCCF (e.g. Water Code, Daihan Farm Laws - i.e. those with a private sector focus) as set out in proposal</p> <p>AF project will prioritize development of demonstration plots (public and private) and community investments in different velayats (provinces) where SCCF is not present e.g. Mary Province</p>
UNDP - Sustainable Energy and Water Management Project (2015-2021).	GEF	<p>Building knowledge base for energy and resource efficient technologies (e.g. pumping, solar)</p> <p>Investments in large scale water supply</p>	Ahal province demonstration investment plot provides insight into logistics of demonstration plot development (e.g. costs, timescales).	<p>Limited – renewable energy and energy efficiency focus (e.g. large-scale pumping) in water pumping and conservation.</p> <p>Focus is primarily on supporting regional and</p>

Project	Funding agency	Outputs	Areas of complementarity with Adaptation Fund	Areas of potential duplication and risk mitigation
		management (e.g. canals, pumps)  IWRM training for regional officials and water system managers  Policy support for IWRM	Ahal site can be used as a training base for extension services on certain technologies	municipal water managers responsible for municipal and interregional water networks on IWRM
Regional programme for sustainable and climate sensitive land use for economic development in Central Asia (2016-19).	GIZ	Community level advisory support for pasture and forest management	Limited	None – programme is only implementing at a small scale in two communities (forestry and pasture management)
Small Business Initiative (2015-18).	EBRD	Generalist business advisory and consultancy support to SMEs, in Turkmenistan including in agriculture	Potential to provide access to national consultants in agriculture that might offer resilience extension services.	None

158. In summary, the project will be highly complementary to existing initiatives, whilst avoiding duplication in the few cases where this might exist. Where possible, the project will seek to build on the systems and infrastructure of past or ongoing initiatives (e.g. using existing sites for training and capacity building, engaging with existing programme participants as potential resilient extension service providers for the private sector). Where potential geographical duplication exists, the Adaptation Fund project will prioritize operations in provinces without 3<sup>rd</sup> party project activities (e.g. Mary Province). Where potential activities overlap (e.g. capacity building and policy support) the Adaptation Fund project will target thematic areas relevant to its core mandate (e.g. private sector resilience) and focusing on the implications of primarily legislation for the non-state sector. In all cases, the project team will liaise and coordinate with other projects to maximize synergies given that the reform process is a dynamic one. Ongoing discussions will be held with other stakeholders (such as the FAO and ADB) to monitor and align programming activities with potential emerging initiatives.

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

159. The knowledge management strategy forms a core element of the project. While budgets and activities are mainstreamed across the three project components, in operational terms the implementation of the knowledge strategy will be managed and coordinated centrally within the core project team by dedicated staff resources (estimated at an average of 0.5 FTE over the course of the project), with the Project manager also playing an oversight role in

coordination and delivery of the strategy. Technical inputs and products will be developed as part of the mandate of the international and national consultant teams.

160. During project implementation, the project team will work with project partners (primarily the Union of Entrepreneurs and the Ministry of Agriculture and Environment protection) in the development and dissemination of knowledge products as well as through online systems. Consultations with these partners confirm that they are both committed to building and disseminating knowledge on climate resilient practices to private sector farmers within the project framework and beyond.
161. Both partners already have good capacity to engage with knowledge development and dissemination activities on the basis of their existing mandates and institutional structures. Where necessary, UNDP will provide capacity support to knowledge partners to maximise the effectiveness of outreach and communication through their channels.
- a. The *Union of Industrialists and Entrepreneurs* has a core development mandate to support knowledge generation and dissemination to its members and the wider emerging private agriculture sector. They are already building training capacity and knowledge products in other related areas (e.g. the modernization of agriculture). Materials developed would form part of this knowledge offering and would be continued to be used and disseminated following project completion;
  - b. The *Ministry of Agriculture and Environment Protection* also maintains a mandate for standards and wider best practices in the agriculture sector, including a broad range of education and technical materials. It has been agreed that products and approaches developed by the project would form part of this body of materials and used by the Ministry as part of their broader mandate, and again would continue to be promoted after project completion.
162. Lessons learned will be captured across the three main components and will include the following:
- a. *Component 1*: Outreach and communication to private sector farmers on the implication of water and land reform and the adoption of climate resilient practices;
  - b. *Component 2*: Virtual library of best practices and best available technologies for climate resilient agriculture in Turkmenistan; dissemination through the network of the Union of Entrepreneurs and other institutional partners, mobile dissemination and training unit;
  - c. *Component 3*: Lessons learned from the development of demonstration sites and associated polygons (both public and private).
163. In addition, the project's annual reporting will create summaries of lessons learned. The project will systematically document key lessons, good practices and challenges experienced in enabling climate resilience among private sector farmers and moving towards more progressive resilience policies at national level. The Adaptation Learning Mechanism (ALM) <http://www.adaptationlearning.net> and other relevant platforms will be used for knowledge dissemination.
164. As the primary adaptation programme in Turkmenistan, the AF project envisages a process of dissemination of findings both to the Turkmenistan Government and to the wider donor and civil society community. This approach directly follows recommendations of the



final evaluation of the first Adaptation Fund project in Turkmenistan. It is expected that the GoT Steering Committee will act as the main point of dissemination for the participating Ministries together with the Parliament. The project team will hold regular briefings with the Steering Committee in this regard. Component 1 will involve close cooperation with the Steering Committee in terms of addressing institutional development and scale up of practices proven to be effective under Components 2 and 3.

165. In parallel, regular meetings will be held with relevant programmes within UNDP, the EU, GIZ, who represent the most active funders of water, agro-forestry and climate related technical assistance. This will allow for AF project findings to inform the scope and to be incorporated into the design phase of other donor initiatives where relevant.

166. Key findings will be prepared in a format for dissemination to key stakeholder audiences. These may include government officials, private sector farmers and providers of water management and agricultural support services. It is also envisaged that a number of training and consultation events will be held under the various component work-streams, and the outcomes of these events will be captured.

167. The project will maintain a website on which all relevant reports, documents and findings will be posted for access by interested parties.

168. With regards to longer term sustainability of knowledge transfer and uptake, the following strategy is envisaged:

- a. Learning materials developed to explain regulatory and legislative development will be transferred to the Ministry of Agriculture and Environment Protection as well as other partner institutions (e.g. Union of Industrialists and Entrepreneurs) for further dissemination and/or update. It has been agreed that these will be continue to be disseminated as part of the mandate of these institutions and form part of their knowledge offering;
- b. Capacity and materials developed around extension services provision and resilient agriculture within the private sector will be mainstreamed into the Union of Industrialists and Entrepreneurs and other providers of advisory support to private sector farmers. These materials and climate resilience best practice guidance notes will continue to be maintained and disseminated as part of a broader sustainable extension services offering which the Union is currently developing;
- c. Lessons learned from the development of demonstration sites and community level interventions will be transferred to the Ministry of Agriculture and Water Management where they can serve as the basis for improving the development of resilience for private sector farmers through the relevant research institutes and other Ministry structures. The Ministry has already discussed and confirmed their willingness to engage on this approach;
- d. All lessons learned will be used as input to consultative workshops and meetings with project stakeholders and disseminated to other donors and relevant agencies.

**H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups,**

**including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.**

169. This proposal has been developed in full consultation with a broad range of stakeholders in Turkmenistan over several visits and consultation events. A record of key stakeholder consultations, which occurred in the development of the proposal, has been provided in Annex 8.
170. During the project proposal development process, detailed stakeholder consultations were organized at national, provincial and local levels. The project development process included numerous local community meetings/visits, two missions of international consultants, and extensive stocktaking and validation stakeholder consultations with relevant government counterparts, and representatives of the private sector and civil society. Furthermore, during these consultations gender specific vulnerabilities and needs were identified. During these consultations the roles and responsibilities of key stakeholders and the specific mechanisms and strategies for their direct involvement in project activities were identified. Considerations of vulnerability, participation and gender empowerment in the formulation of activities will be a key focus area, while gender mainstreaming tools will be applied in the development of technical guidelines for integration of climate change adaptation into planning processes. The project will ensure that both men and women are able to participate meaningfully and equitably, have equitable access to project resources, and receive equal social and economic benefits.
171. Key institutions consulted in the development of this proposal include:
- a. Ministry of Agriculture and Environment Protection and its predecessor the Ministry of Agriculture Water Resources of Turkmenistan
  - b. State Committee for Environment Protection and Land Resources
  - c. Committee for Nature Protection of the Cabinet of Ministers of Turkmenistan
  - d. Union of Entrepreneurs of Turkmenistan (National and regional affiliates)
  - e. Ministry of Nature Protection of Turkmenistan
  - f. National institute of Deserts, Flora and Fauna
  - g. National committee for Hydrometeorology
  - h. Institute of Agriculture under MAEP
  - i. Dayhanbank
  - j. Rysgal bank
  - k. GIZ funded project: Regional programme for sustainable and climate sensitive land use for economic development in Central Asia
  - l. Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan (UNDP/SCCF)
  - m. Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan (UNDP/GEF)
  - n. EU funded Project: 'Support for further sustainable Agriculture and Rural development in Turkmenistan – Phase III'
  - o. Aarhus Centre in Turkmenistan

- p. Representatives of private sector farmers and entrepreneurs in Mary, Ahal, Dashoguz Regions
- q. Representatives of Nature Protection Society (a civil society organization)
- r. Representatives of Youth Union (a civil society organization)

**List of community consultations conducted during the project development and validation:**

<u>Date</u>	<u>Community</u>	<u>Number of people attended</u>
July 20, 2017	Nohur, Ahal Province	18 people (3 women)
August 5, 2017	Karakum, Ahal Province	20 people (9 women)
September 7, 2017	Sakarchage, Mary Province	23 people (15 women)
September 19, 2017	Watan, Lebap Province	25 people (16 women)
September 20, 2017	Parahat, Lebap Province	25 people (5 women)
October 17, 2017	Yagtylyk, Dashoguz Province	24 people (4 women)
October 18, 2017	Garagum, Dashoguz Province	26 people (5 women)
December 20, 2017	Ashgabat	30 people (5 women)
March 19, 2018	Kaahka, Ahal Province	20 people (7 women)
April 27, 2018	Geokdepe, Ahal Province	24 people (8 women)

172. The process of screening of USPs (see ESMP in Annex 8 and Section K below) will involve further stakeholder consultation with respect to individual sites and currently undefined sub-project activities. Where screening results in further work to assess impacts and identify mitigation measures, local stakeholders will be fully engaged.

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

173. The programme costs are additional to other costs associated with private sector agriculture development and the success of the intervention from an adaptation perspective is not dependent on co-financing activities by other parties. The proposal aims to build on existing platforms (public and private) to meet the additional costs of adaptation.

174. It is expected that going forward, project partners (e.g. the Ministry of Agriculture and Environment Protection, the Union of Industrialists and Entrepreneurs, and the Institute of Agriculture) will make their own investments (both financial and in kind) into the development of private sector agriculture. The project will fund the full costs of adaptation, such as legislative reform and capacity development for promoting climate resilience within wider agriculture sector development, as well as the full costs of any investments in pilot, community or demonstration sites that allow for better mainstreaming and uptake of resilience into private sector agriculture.

175. The project is structured to allow a high proportion of funds to flow into capacity building, policy development and institutional activities associated with the promotion of climate resilience for private sector farmers.
176. As such, the components are expected to result in a significantly higher adaptation benefit than would otherwise be the case under a baseline scenario. A significant component of agricultural community vulnerability remains structural in nature (lack of adequate policy, institutional frameworks, dissemination platforms), and requires investment in these enabling aspects to change behavior, and build awareness of best practice, both among policy makers and agricultural communities. Further cost of adaptation reasoning is set out below.

#### *Component 1*

177. *Baseline (Without AF funding):* The legislative basis and enabling environment for climate resilience (i.e. the land code and water code and associated sub-regulations) would continue to develop slowly but would not provide sufficient support to accelerate the adoption of climate resilience by private sector smallholder farmers. Changes in the enabling environment supporting resilience would continue to be poorly disseminated and communicated to relevant groups, resulting in a lack of understanding about potential opportunities. The Government of Turkmenistan would continue to provide limited technical resilience-oriented support for state-order crops but would not focus on the livelihoods of the emerging and rapidly growing class of smallholder private farmers operating outside the state order crop system. The system for developing resilience within private sector agriculture would remain uncoordinated from an institutional perspective and would lack an overall coordinating and resourcing strategy. Policy makers and other key stakeholders would continue to lack insight into potential resilience best practices, best available technologies and strategic opportunities to develop sector potential and productivity.
178. *AF Additionality (With AF Funding):* With the AF project, the enabling environment would be strengthened in a more coordinated and accelerated manner, with potential benefits and opportunities communicated to private farmers in ways that are easily understood and absorbed (e.g. around land rights, water rights etc.). There would be a more strategic focus on building resilience in the non-state agriculture sector, with clear focus on methods and institutional roles and responsibilities. Awareness of best practices and best available technologies, as well as potential barriers to their implementation would be increased among senior national and regional policy makers.

#### *Component 2:*

179. *Baseline (Without AF funding):* The development of climate resilient advisory and extension services in Turkmenistan would be relatively slow, with private sector farmers reliant on accessing international expertise and technologies from neighboring countries (Iran, Turkey, Israel) at high cost. Poorer, smaller scale private sector farmers would effectively be unable to access good advice due to the costs associated with establishing these services on a (semi)-commercial basis. What extension services support might be available would not incorporate climate resilience best practices. Vulnerable farmers would continue to engage in inefficient agricultural, land management and water use practices, and deploy out of date technologies, preventing them from maximizing productivity under climate stresses and shocks.
180. *AF Additionality (With AF funding):* There would be much more rapid expansion of climate resilient extension services, with significantly broader coverage of small- and medium-scale farmers. The market for the provision of climate smart agricultural services will develop more

rapidly, along with the development of local language advisory, technology distribution and financing solutions. Greater access would be provided to farmers for field-based learning, both through extension service providers and mobile units. A sustainable market and platform for the long-term provision of climate resilient extension services and advisory will develop.

*Component 3:*

181. *Baseline (Without AF funding):* Under the baseline, there would be significantly slower development of demonstration and training sites that could showcase best practice technologies. The existing research and demonstration plots managed by government tend to be poorly funded, use dated practices and technologies, and do not have an educational or peer-to-peer learning mandate. There are some facilities developed under current programmes (e.g. the SCCF project site in Ahal province), however these only provide limited local coverage. More advanced private sector agriculture companies would have no incentive to provide access to their facilities for the purposes of training or supply chain development.
182. *AF Additionality (With AF funding):* The number and quality of best practice demonstration sites would expand much more quickly, with the possibility to achieve full national coverage through a mix of state institute, private agricultural sector and farmer-led facilities. Farmers and extension service providers would have the opportunity to visit these facilities which would be made available as training sites in conjunction with extension service providers.

**J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project / programme.**

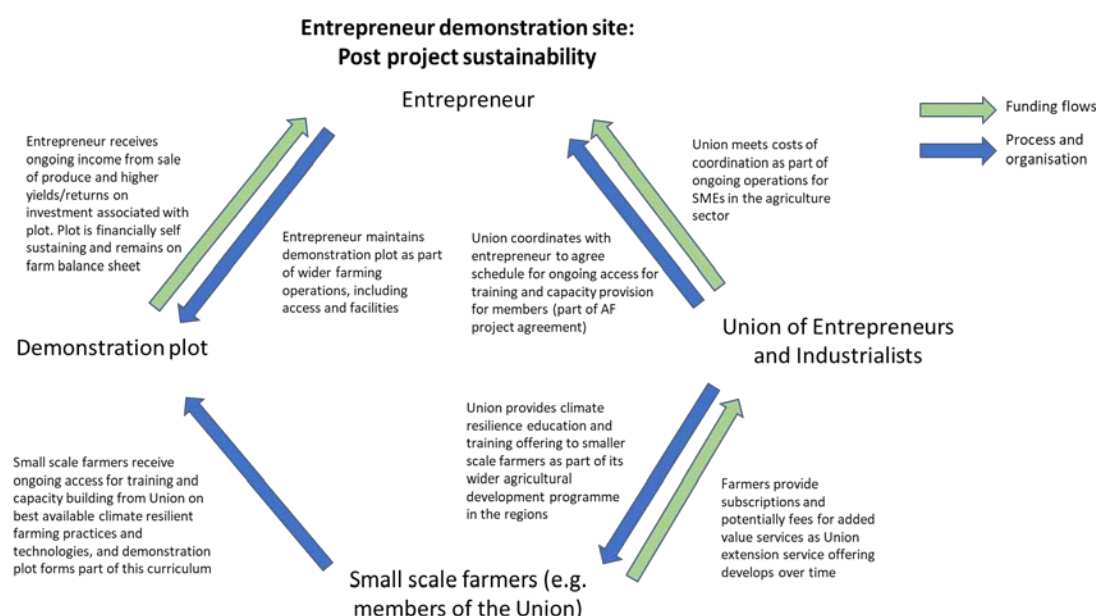
The programme has been designed to ensure sustainable outcomes in the following ways:

183. Component 1 (Policy strategy and institutional elements for climate resilience) will provide greater long-term clarity and transparency as to the pathways for development of climate resilient agriculture (e.g. through improved rights to land tenure, water access). It will also develop a long-term strategy for the dissemination of climate resilience for private sector farmers and livestock producers owned by key ministries and other stakeholders. Capacity building will allow for better long-term decision making and resource allocation.
184. Component 2 (Development of climate resilient extension services) will explore sustainable models for the development of climate resilient extension services through public and private platforms. The programme will pursue a range of options and models to deliver capacity building and sector development (e.g. through state owned technical institutes, Union of Entrepreneurs, private sector consultants) with a view to assessing the potential costs and benefits of each and promoting the models that are best suited in different geographical and sub-sector contexts. The project will seek to support those delivery models and platforms that emerge as being most competitive and cost effective in reaching and driving demand for investment in resilience in any given market sector and geography. The letter of commitment from the Union of Entrepreneurs is included in the Annex 10 to this proposal.
185. Component 3 (Demonstration plots): The demonstration sites are being designed to be sustainable and self-financing both from a public and private sector perspective. Ensuring clear institutional ownership will allow for long term planning and integration into wider operations. Sustainable financing strategies will differ depending on whether investments are made in public or private sector facilities:

186. *Public* sector demonstration plots will be set up on the basis of existing research institute facilities where there is already an operational structure and mandate to support knowledge generation and dissemination. While the project will provide capital investment support, the sustainability of the operating model will be based on maximizing the revenue associated with the sites (e.g. through crop and livestock production and sales). Similar demonstration site projects (e.g. the UNDP-managed EE/RE project in Ahal region) have implemented revenue sharing with smallholders engaged to work on the sites and their associated polygons (e.g. land lease fees, revenue sharing on sales) in return for farmer access to technology and advice from the managing institute. Early evidence indicates that these models are sufficient to meet the operating costs of such demonstration sites (excluding the capital costs of establishment). The Ministry of Agriculture and Water management will also continue to maintain budgetary support for the research institutes hosting the public sector demonstration plots following project completion research institute, thereby ensuring sustainability over time with the potential to expand capital investment where these facilities demonstrate success.
187. *Private* sector led demonstration sites will be established and located within existing private sector agricultural operations. The demonstration plots will be farmed on a fully commercial basis, and at the same time be used to train and inform farmers and the wider agricultural community on emerging resilience technologies and best practices. Private sector participation in the project will be subject to formal letter of agreement between the project, the Union and the individual agricultural business involved.
188. These proposals have been discussed with the Union of Industrialists and Entrepreneurs and a number of their leading members in both Ashgabat and Mary. Based on these discussions, it is clear that there is a broad range of incentives for entrepreneurs and Union members to engage with the project and develop demonstration sites. These include:
- a. Receipt of financial and technical support from the AF project and experts
  - b. Access to best practice technologies and approaches
  - c. Improvement in productivity and yields
  - d. Increase in economic returns
  - e. Greater understanding of resilience threats and opportunities
  - f. Corporate social responsibility benefits of community level support
  - g. Opportunity to increase the resilience of supply chains (e.g. out-growers)
  - h. Partnership with the influential Union of Industrialists and Entrepreneurs
  - i. Public relations benefits from commitment to national government strategy
  - j. Visibility and quality signals from participation in international projects
189. There have been indications of interest by several leading member firms of the Union of Industrialists and Entrepreneurs (covering agriculture, horticulture and livestock) to participate in the programme, and the Union has set out its commitment to facilitating their participation (see letter of support). It can be anticipated that there will demand in excess of the number of envisaged sites (3) and therefore selection for participation would be based on clear and transparent criteria, with a call for proposals among UoIE members. Criteria would include:
- a. Commitment to long term access provision for training and development
  - b. Level of co-investment in the facilities
  - c. Sectoral/thematic relevance of operations to regional farmers
  - d. Accessibility and geographic location (relative to poorer farming communities)
  - e. Assessment of governance and financial position.

190. In terms of post project sustainability, the Union of Industrialists and Entrepreneurs is fully committed to maintaining and expanding its overall extension service offering over time. It has been agreed that these demonstration sites, focused on the benefits of resilient agriculture, will become part of this structure. Post-project funding will be maintained from a mixture of support from the Union which is derived from a combination of government support and member fees and commercial revenues from the operation of the demonstration plots themselves. This model is set out in Figure 3 below:

**Figure 4: Post project sustainability model for private sector managed demonstration plots.**



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

191. Project Components 1.1, 1.2 and 2.1 are sufficiently formulated to enable adequate screening for potential significant direct and indirect environmental and social impacts. These aspects, do not entail significant field activities, and can be assessed at this time. Initial assessment, conducted through the check list against 15 AF ESP principles, indicates that environmental and social risks for these components are not likely to be significant, although this will be subject to ongoing review throughout the project.

192. Components 2 and 3 contain a grant facility for field-based activities and demonstration sites, and allocation of resources will be dependent on the proposed activities being assessed as being in compliance with the AF ESP. Such assessment is highly dependent on the proposed sites and the specific environmental and social context in which the proposed activities will take place. Comprehensive screening of the outputs of Component 3, therefore cannot take place until potential field sites and specific activities are identified. The activities under Components 2 and 3 are therefore categorized as Unidentified Sub-Projects (USPs), and will require screening and assessment during the project implementation.

193. The division between fully-formulated aspects and USPs, is outlined below:

Component/Output	Fully Formulated	Unidentified Sub-Project
1.1 Mainstreaming Climate Resilience into Policies, Regulations, etc	✓	
1.2 Capacity building for government ministries	✓	
2.1 Establishing network of extension service providers	✓	
2.2 Provision of advice to farmers		✓
3.1 MAEP research institute		✓
3.2 Demonstration facilities		✓
3.3 Adaptation investments in community-scale farmer-led co-ops.		✓

194. The screening of environmental and social impacts and risks for fully defined activities is provided in Annex 7 (ESMF, table 1.a) . For all un-identified individual sub-project/activities full risk screening and adequate assessments will be carried out upon the identification and formulation of proposed sites and activities as specified and described in the ESMF (Annex 7).

195. In reference to project activities, there are no direct environmental and social risks associated with capacity building, or training activities. Legislative support, particularly the introduction of tariffs for water supply services to water users, which is standard practice in managing water scarcity, and an essential instrument in regulating water use, has a risk of causing hardship to the most socio-economically vulnerable farmers. In order to mitigate this risk, in developing a tariff structure, in addition to considering cost-recovery of water infrastructure and the communication of scarcity to water users, the ability-to-pay of farmers will also be taken into account (see ESMF, table 1.a).

196. Potential investments in small-scale demonstration pilot sites or community-level infrastructure will all be subject to risk screening against AF ESP principles and adequate environmental and social assessments during the planning phase and as part of implementation. We will explicitly ensure that any investments do not create additional risks or any other form of maladaptation, including flood risks. However, this is unlikely as Turkmenistan is primarily a desert and drought-affected farming system, with flood risk only in specific regions (e.g. in mountain farming systems and along the banks of the Amu Darya river). With regards to social risk, given the introduction of new technologies, there may be a low risk of “elite capture” with the “plausible recurrent risk” of deviation and capture of the benefits accrued from the project by more influential actors. This risk is mitigable through the regularly monitoring required by the project, as well as through the project evaluation process. For the USP activities under Component 3 that are not fully defined in the proposal (e.g. although the broad types of adaptation technologies have been defined, specific locations, owners and site-specific measures can only be defined during project implementation), the project will follow the Adaptation Fund Guidance document for Implementing Entities on compliance with the Adaptation Fund Environmental and Social Policy, UNDP safeguards policy and the national laws and standards.

197. Prior to any on-site investment, the project will conduct

(a) targeted stakeholder and beneficiary consultations;



(b) detailed screening/identification of risks and applicable principles against AF 15 principles will be conducted);

(c) Impact assessment (scope of ESIA will depend on the results of risk screening); and

(d) monitoring.

198. A stakeholder and beneficiary engagement plan will be developed during the inception phase of the project and will be regularly updated upon identification of new un-specified sub-projects. The PMU with the support of the UNDP Country Office in Turkmenistan will be responsible for the implementation and monitoring of the relevant environment and social risk screening and assessments in compliance with the national law, UNDP and AF policies (see Annex 7 for ESMF). Part-time safeguards expert will be engaged by the project to support adequate implementation of the ESMF. Risk screening will be updated regularly in the course of implementation prior to the implementation of on-site activities/investments and at least annually. Annex 7 contains a preliminary risk screening checklist. The updated screening will be conducted against the Adaptation Fund 15 principles/risk elements outlined below as well as against the national laws and regulations.

199. The project will reject any project which:

- involves conversion or degradation of natural habitats;
- may cause measurable adverse impacts to critical natural habitats;
- risks the introduction of invasive alien species;
- may negatively affect endangered species;
- involves physical or economic displacement of people;
- does not comply with technical norms and standards;
- purchases, uses or stores harmful pesticides or hazardous materials;
- involves forced labor/child labour; or
- may result in reclassification of the project to risk category A<sup>17</sup>.

200. An overview of the potential impacts with regard to the 15 environmental and social principles of the Adaptation Fund is provided in the Table 4 below. The Table 4 below solely focuses on the potential risks and impacts associated with fully defined activities under Outputs 1.1, 1.2 and 2.1 and do not refer to the USPs for which the risk identification and management process is presented in ESMF (Annex 7).

---

<sup>17</sup> "Category A" is defined as a project which entails significant adverse impacts that are sensitive, diverse, or unprecedented, or that affect an area broader than the sites or facilities subject to physical works, which involve conversion/alteration of natural habitats, significant quantities of hazardous materials, or major resettlement. For further information, see

[https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=2ahUKEwj53tzp\\_bvkAhVMh1wKHfvBD\\_eUQFjABegQIChAE&url=http%3A%2F%2Fsitesources.worldbank.org%2FINTECA%2FResources%2FScreeningAndClassification.pptx&usq=AOvVaw11Cjm1yEtFSnAOcA-WZwE](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=2ahUKEwj53tzp_bvkAhVMh1wKHfvBD_eUQFjABegQIChAE&url=http%3A%2F%2Fsitesources.worldbank.org%2FINTECA%2FResources%2FScreeningAndClassification.pptx&usq=AOvVaw11Cjm1yEtFSnAOcA-WZwE)

**Table 4: Checklist of environmental and social principles of the Adaptation Fund for fully defined project activities**

AF ESP PRINCIPLES	EVIDENCE-BASED RISK ANALYSIS <sup>18</sup>	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	The project proposal and the attached ESMF (Annex 7) provide the list and description of the relevant national legislation. Fully formulated project activities related to soft assistance, regulatory and capacity building work (Outputs 1.1, 1.2, 2.1) will not trigger the risk. The project regulatory and capacity building work will be aligned with the national laws, the AF ESP and UNDP SES.	✓	
Access and Equity	<p>The project will deliver or facilitate new more effective extension services to the private farmers. It will work with the public and private extension network and will partner with the Union of Industrialists and Entrepreneurs for the delivery of these services and capacity building. There is a high demand for such services and for technical advice in Turkmenistan among both small subsistence farmers and larger well-established farms.</p> <p>There is a governance-related inherent risk of favoritism or “elite capture” of deviation and capture of the benefits accrued from the project by influential actors or wealthier farmers. Access to the benefits delivered by the project (extension services) will need to be monitored. This risk is provisionally assessed as moderate because the project strategy and implementation framework builds in a process of vulnerability assessments, a process for selection of beneficiaries to secure access to most vulnerable farmers, gender issues, participatory planning for community-level adaptation investments, as well as monitoring and reporting on the access to benefits.</p> <p>Water tariffs, and water efficiency regulations, under the legislative reform component might have some potential for restrictions of access to resources through the setting of tariffs for water supply services to water users. Also, managing the risk of water scarcity might require changing agricultural practices in a way that includes restricting or managing access to certain pasture lands, changing agricultural crops and practices that have potential to affect customary practices and/or resources.</p>		<p>✓</p> <p>Risk and vulnerability screening/assessment will be carried out for the selection of project beneficiaries, as well as regular monitoring of the level of access and participation by poorer and vulnerable communities in the extension services and other benefits delivered by the project. The Grievance Redress Mechanism is also an avenue for individuals and/or communities who feel excluded or</p>

<sup>18</sup> Please refer to ESMF, Table 1.a for further analysis.

	<p>No risk of Access and Equity is associated with the institutional capacity building work under Output 1.2. Activity targets institutional capacity building, participation in trainings will be based on functional roles, project will ensure equal participation for men and women.</p> <p>With regard to capacity building and training to the network of public and private extension services under Output 2.1., which includes education and capacity building of extension workers (both public and private sector) and training of trainers, there is a low risk that some smaller/remote providers of extension services could be excluded from capacity building.</p>		marginalized from project benefits.
Marginalized and Vulnerable Groups	<p>The project beneficiaries are small private farmers and farming enterprises. There are no marginal indigenous or tribal groups, displaced people or official refugees in the country.</p> <p>Marginalized and vulnerable groups among Turkmenistan farming communities generally include (i) population groups or farming communities that live and farm in areas where increased impacts of climate change are combined with the environmental degradation and soil pollution (ii) households with limited productive assets (e.g. very small agricultural land plots), (iii) female headed households, (iv) households with majority children and elderly members, (v) households with handicap members/individuals. These groups may have limited mobility to access the project benefits.</p> <p>The proposed project is aimed at making agricultural extension services and resilience advice more accessible to these vulnerable groups. In particular, the project includes the process of vulnerability screening for better targeting and access of the extension services under Component 2; the project will also expand the outreach of resilient extension services through mobile extension services, expanding the network of accessible demonstration plots for climate resilient technologies and on-farm consultations. The proposal also includes specific provisions for monitoring the access of vulnerable groups to the project benefits.</p> <p>Water tariffs, and water efficiency regulations, under the legislative reform component might have some potential for restrictions of access to resources of vulnerable individuals or groups through the setting of tariffs for water supply services to water users. Also, managing the risk of water scarcity might require changing agricultural practices in a way that includes restricting or managing access to certain pasture lands, changing agricultural crops and practices that have potential to affect customary practices and/or resources. The potential structure and application of water tariffs will take into account the ability and the willingness to pay for water services. Experience from other countries indicates that not all water users are able and willing to pay for the use of water. The project will therefore explore and develop a progressive approach to agriculture water pricing. This approach will seek to cover the costs associated with operating (and potentially developing) the water distribution system, encourage water saving through economic measures and be phased in such a way as to meet the social concerns of affordability, particularly for the most vulnerable.</p>		<p>✓</p> <p>Regular monitoring will be secured. A vulnerability risk screening process will be applied to identify vulnerable groups, including their needs, priorities and constraints as relevant to the project. The project will then ensure that these groups equally benefit from the project work. Priority will be given to measures for building resilience of marginalized and vulnerable groups to climate change effects, and developing ways of integrating these groups into the long-term development focus of the project. The project's monitoring tools will include a set of indicators to ensure and measure access to project benefits for marginalized and vulnerable groups as well as indicators on building resilience of these groups</p>

	<p>The project approach is to use a participatory planning and decision-making process that will ensure that any potential restrictions on the use of resources will not be imposed on the members, but defined through a collective decision-making process at the community level. Any decisions on restriction of access will not be made without identification of compensatory/alternative measures and practices that provide sufficient revenues and/or livelihoods that are equal to, or greater than revenues being generated from existing practice.</p>		to climate change. The Grievance Redress Mechanism also acts as an important additional monitoring mechanism.
Human Rights	<p>According to the OHCHR website in relation to Turkmenistan, the most recent report of the Secretary-General on the human rights situation in Turkmenistan is dated back in October 2006, and the most recent Special Procedures report is dated January 2009, focusing on freedom of religion or belief. There are currently no standing invitation under Special Procedures extended to the country. (Source: <a href="https://www.ohchr.org/EN/Countries/ENACARegion/Pages/TMIndex.aspx">https://www.ohchr.org/EN/Countries/ENACARegion/Pages/TMIndex.aspx</a>). The project does not integrate any activities contrary to custom law or traditions. Participation in all aspects of the project will be participatory, voluntary and free.</p> <p>Project activities under Outputs 1.1, 1.2 and 2.1 will not impinge on any human rights. The project will mainstream the human rights-based approach by enhancing the socio-economic rights of Turkmenistan's most climate change vulnerable population, by promoting climate adaptive policies and enabling access to resilient extension services. Equal consideration for the most vulnerable stakeholders, including testing ability-to-pay of the poorest beneficiaries in regards to policy measures such as water tariff setting, is ensured to mainstream human rights-based approach in the project. Strengthening land tenure rights, supporting the development of legal structures to facilitate collective planning and investment, and promoting the shift towards market-based pricing for water access, also mainstream the human-rights based approach. The project will increase climate resilience of 500,000 people in Turkmenistan's rural communities, representing the most vulnerable economic communities in Turkmenistan. As described in the baseline section, such farmers currently cannot effectively benefit from existing state support. They lack access to resources and know-how to invest in climate resilient practices and technologies , and in terms of how to manage water and land resources in an efficient way.</p> <p>In doing so, the project aims to promote the social and economic rights of beneficiaries, including the right to habitat and economic security, as reducing land degradation results in improved and more stable crop yields and incomes. The project also places emphasis on stakeholder engagement and capacity building at the local level, to ensure that solutions reflect specific needs and priorities, enhancing the project's social benefits.</p>	✓	

Gender Equity and Women's Empowerment	<p>Turkmenistan adopted legislation and a National Action Plan for Gender Equality for 2015-2020 that was approved by the Resolution of the President of Turkmenistan in January 2015. Turkmenistan was a member of the Executive Board of the UN Entity for Gender Equality and Empowerment of Women (UN Women) for the period of 2016-2018.  <a href="http://www.unwomen.org/en/executive-board">http://www.unwomen.org/en/executive-board</a></p> <p>In the pilot farmer associations and livestock farming sector, women account for around 51-52% of the population. They are mainly engaged in housekeeping, teaching, and administrative support services. Many more women form part of the unpaid family labour in home farming and lease of agricultural lands.</p> <p>Gender considerations will be fully mainstreamed into project implementation. The programme will provide opportunities for women to learn about climate resilience and integrate best practices into their operations, and ensure that women are also able to access the capacity building and training required to practice climate-resilient agriculture, as well as to diversify their livelihoods in more resilient ways. The project will ensure gender balance in project activities (e.g. seminars, community level events) including access to project financial assistance. Gender considerations will inform any community level vulnerability analysis linked to local infrastructure or demonstration plot development through consultation regarding needs and preferences on types of training and investment. The project will also gather gender-disaggregated data for evaluation purposes and use gender sensitive indicators (particularly around beneficiaries) to facilitate planning, implementation and monitoring. The Gender Action Plan is provided with the full proposal and will be updated regularly during the project implementation.</p> <p>Proposed activities under Output 1.1. are about policy and regulatory work and targets gender-responsive regulatory incentives, they are not likely to trigger the risk under this AF Principle. There is a risk that women may not be adequately represented in training and capacity building activities under Outputs 1.2 and 2.1 that trigger further risk monitoring through the GAP.</p>		<p>✓</p> <p>Necessary monitoring over the implementation and updates of the Gender Action Plan and gender-equity logframe indicators will be secured. Gender expert will be engaged by the project to support risk screening, updating and implementation of the Gender Action Plan. Complaints will be addressed through the Grievance redress mechanism</p>
Core Labour Rights	<p>Turkmenistan ratified all the eight ILO fundamental conventions (Source: <a href="https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103551">https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103551</a>). The information on the ILO website with regard to application of labour standards in Turkmenistan reveal no major observations and issues. There is also no record of complaint on labour related issues. The project will ensure that national working standards (Labour Code) are respected. Also, the Program will ensure that appropriate wages will be paid per assigned task and that no child labour will be employed. Security and safety standards will also be respected and enforced. The project will set up a Grievance Redress Mechanism to allow those that might have a complaint and/or grievance to be able to communicate their concerns and/or grievances through an appropriate process. The</p>	✓	

	Complaints Register and Grievance Redress Mechanism set out in the ESMF (Annex 8) are to be used as part of the project and will provide an accessible, rapid, fair and effective response to concerned stakeholders, especially any vulnerable group who often lack access to formal legal regimes. Activities under Outputs 1.1, 1.2 and 2.1 do not impinge upon labour rights.		
Indigenous Peoples	There are no indigenous people in Turkmenistan.	✓	
Involuntary Resettlement	There will be no involuntary or resettlement related to this project. Activities which entail involuntary resettlement or economic displacement will not form part of this project. Activities under Outputs 1.1, 1.2, 2.1 will not involve or trigger relocation.	✓	
Protection of Natural Habitats	Turkmenistan has four key laws in relation to habitats, namely the State Law on Nature Protection, the State Law on Protected Areas and Laws on Flora and Fauna. The latter three regulate the conservation and management of natural habitats. Turkmenistan is a party to Ramsar Convention, which entered into force in Turkmenistan on 3 July 2009. Turkmenistan currently has 1 site designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 267,124 hectares.  Outputs 1.1, 1.2, 2.1 do not include any physical activities that could impact natural habitats. Enhanced/climate resilient policies and regulations in agriculture, water and land management sectors may have positive effects on the protection of natural habitats (e.g. through reduced soil erosion and land degradation).	✓	
Conservation of Biological Diversity	Outputs 1.1, 1.2, 2.1 do not include any physical activities that could impact biological diversity. Enhanced/climate resilient policies and regulations in agriculture, water and land management sectors may have positive effects on the biological diversity and natural habitats (e.g. through reduced soil erosion and land degradation).	✓	
Climate Change	Outputs 1.1., 1.2, 2.1. do not include any activities that have potential to impact or be impacted by climate change. Enhanced policies and regulations in agriculture, water and land management sectors will result in improved climate resilience of these sectors and reduced impacts from these sectors on the level of GHG emissions (through promotion of water efficient policies). The proposed project will not result in deforestation. Improved soil management practices as a result of the project would result in reduced emissions from land use.	✓	

Pollution Prevention and Resource Efficiency	Components 1-2 are aimed at supporting efficient water management practices and techniques to mitigate and minimize potential increase in water demand. Existing systems and facilities will be utilized, their use will not result in pollution or excessive energy usage. Enhanced/climate resilient policies and regulations in agriculture, water and land management sectors will have positive effects on water resources efficiency and pollution prevention (e.g. through enhanced use of fertilizers).	✓	
Public Health	Project activities of a type which entail significant public health concerns are not envisaged. On the contrary, the project will contribute to enhancing public health, as it seeks to improve the social and economic environment as well as the physical environment. The activities under Outputs 1.1, 1.2, 2.1 are related to policy development, institutional capacity building and training and do not have health risks associated with them.	✓	
Physical and Cultural Heritage	Outputs 1.1, 1.2, 2.1 do not include any physical activities that could impact physical and cultural heritage. Proposed regulatory and institutional capacity building measures will not infringe on the management of physical and cultural heritage sites.	✓	
Lands and Soil Conservation	Outputs do not include any physical activities that could impact land and soil conservation. Enhanced/climate resilient policies and regulations in agriculture, water and land management sectors will have positive effects on land and soil conservation and reduced erosion. The project activities will not modify existing types of land use (see exclusion list).	✓	





201. It should be noted that any individual activities (USPs) which, based on the risk screening and identification process outlined in ESMF, will be likely to lead to any impact that could result in an overall high-risk rating of the project (Category A) will be excluded from the project (will not be supported) based on the exclusion list provided above. Based on this and in the context of the scope, severity and number of potential risks the project is considered Category B (moderate risk). With regard to USPs under Components 2 and 3 based on the evidence from implementation of similar types of technologies and measures in the similar climatic and ecological zones of Turkmenistan by UNDP through earlier AF-funded and GEF projects it is unlikely that risk category B would be exceeded. The PMU will be responsible for fully and comprehensive risk screening and assessment for USPs during the project implementation and for reporting on the risks identified to the NIM Partner and PSC. It will be the responsibility of the PSC to ensure that the appropriate risk mitigation measures are implemented during project implementation. Please see ESMF (Annex 7.) for the description of the AF ESP 15 Principles and management actions.

## **PART III: IMPLEMENTATION ARRANGEMENTS**

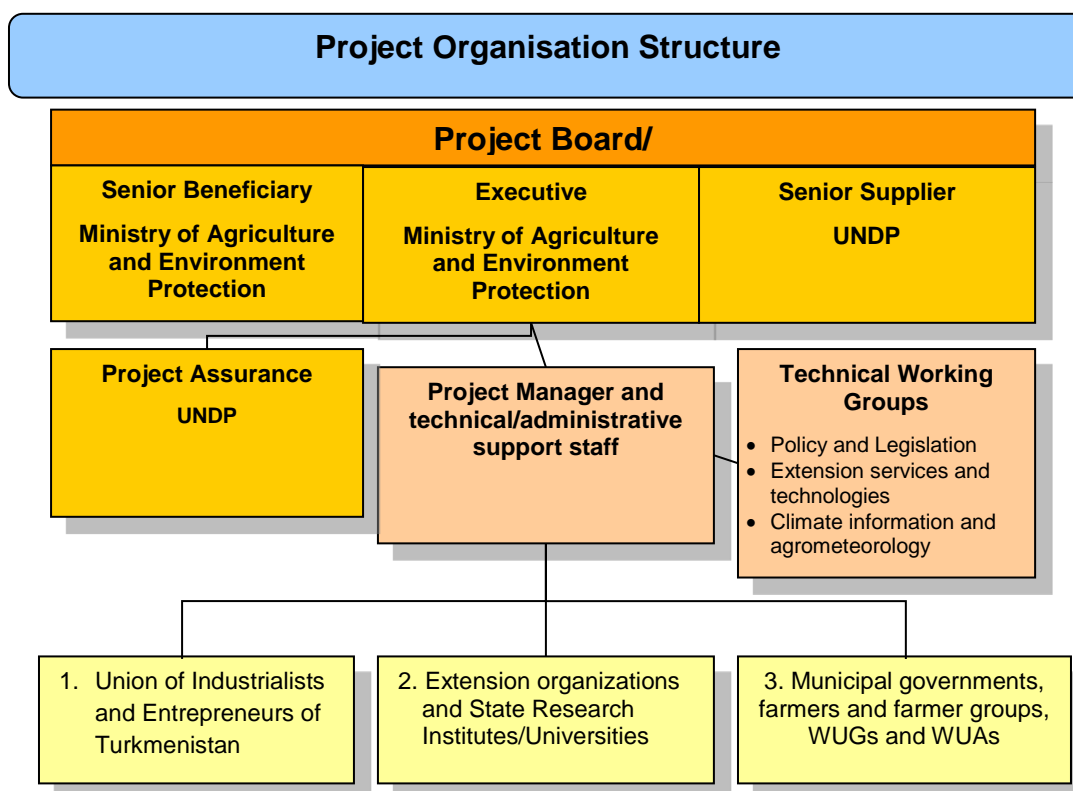
### **A. Describe the arrangements for project / programme implementation.**

202. The Ministry of Agriculture and Environment Protection (MAEP) is the government institution responsible for the implementation of the project and will act as the Executing Agency (EA). The Union of Industrialists and Entrepreneurs along with other relevant national entities will act as project partners and will become part of Project Board.
203. At the request of the Government of Turkmenistan, UNDP is the Multilateral Implementing Entity (MIE). The project is nationally executed by MAEP according to the UNDP national implementation modality (NIM), in line with the Standard Basic Assistance Agreement (SBAA, 1993) and the UN Partnership Framework for Development (UNPFD) 2016-2020 between the UN and the Government of Turkmenistan.
204. As a Multilateral Implementing Entity, UNDP is responsible for providing a number of key oversight and specialized technical support services. These services are provided through UNDP's global network of country, regional and headquarters offices and units and include assistance in: project formulation and appraisal; determination of execution modality and local capacity assessment; briefing and de-briefing of staff and consultants; general oversight and monitoring, including participation in reviews; receipt, allocation and reporting to the donor of financial resources; thematic and technical backstopping; provision of systems, IT infrastructure, branding, and knowledge transfer; research and development; participation in policy negotiations; policy advisory services; programme identification and development; identifying, accessing, combining and sequencing financing; troubleshooting; identification and consolidation of learning; and training and capacity building.
205. As outlined in UNDP's application to the Adaptation Fund Board for accreditation as a Multilateral Implementing Entity, UNDP employs a number of execution modalities determined on country demand, the specificities of an intervention, and a country context. Under the national execution modality (NIM) proposed, UNDP selects a government entity as the Executing Entity based on relevant capacity assessments performed by UNDP. Please note that UNDP uses slightly different terminology to that used by the operational policies and guidelines of the Adaptation Fund. In UNDP terminology, the "executing entity" is referred to as the "Implementing Partner" in countries which have adopted harmonized operational modalities and the "Executing Entity" in countries which have not yet done so. The Executing Entity is the institutional entity entrusted with and fully accountable to UNDP for successfully

managing and delivering project outputs. It is responsible to UNDP for activities including: the preparation and implementation of work plans and annual audit plans; preparation and operation of budgets and budget revisions; disbursement and administration of funds; recruitment of national and international consultants and personnel; financial and progress reporting; and monitoring and evaluation. As stated above, however, UNDP retains ultimate accountability for the effective implementation of the project.

206. MAEP will assume responsibility for the implementation, and the timely and verifiable attainment of project objectives and outcomes. It will provide support to the management unit, and inputs for, the implementation of all activities. MAEP will nominate a high-level official who will serve as the National Project Director (NPD) for project implementation. The NPD will chair the Project Board and be responsible for providing government oversight and guidance to the implementation. The NPD will not be paid from project funds but will represent a Government in kind contribution.

207. A **Project Board (PB)** will be convened by MAEP and will serve as the project's coordination and decision-making body. The PB meetings will be chaired by the NPD. It will meet according to necessity, but not less than once in 6 months, to review progress, approve work plans and approve major deliverables. The PB is responsible for ensuring that the project remains on course to deliver products of the required quality to meet the outcomes defined. The PB's role will include: (i) overseeing project implementation; (ii) approving all work plans and budgets, at the proposal of the Project Manager (PM), for submission to UNDP-GEF in Istanbul Regional Hub; (iii) approving any major changes in plans or programmes; (iv) providing technical input and advice; (v) approving major deliverables; (vi) ensuring commitment of resources to support implementation; (vii) arbitrating any conflicts within the project and/or negotiating solutions between the project and any other stakeholders and (viii) overall evaluation.



208. **Project Assurance:** UNDP Turkmenistan will support project implementation by assisting in monitoring project budgets and expenditures, recruiting and contracting project personnel and consultant services, subcontracting and procuring equipment. UNDP Turkmenistan will also monitor the project implementation and achievement of the project outcomes/outputs and ensure the efficient use of donor funds through an assigned UNDP Programme Manager. UNDP will act as the Senior Supplier and Project Assurance.
209. **National Project Director (NPD):** The NPD will be a member of MAEP, assigned to the project for its period of duration. The NPD's prime responsibility is to ensure that the project produces the results specified in the project document to the required standard of quality and within the specified constraints of time and cost.
210. **Mechanisms for local participation:** the project will use the existing locally established mechanisms for local consultation and participation.
211. The day-to-day administration will be carried out by a Project Manager (PM) and Project Assistant (PA), who will be located within the MAEP offices. As per Government requests, the staff will be recruited using standard UNDP recruitment procedures. The PM will, with the support of the PA, manage the implementation of all activities, including: preparation/updates of work and budget plans, record keeping, accounting and reporting; drafting of terms of reference, technical specifications and other documents as necessary; identification, proposal of consultants to be approved by the PB, coordination and supervision of consultants and suppliers; organization of duty travel, seminars, public outreach activities and other events; and maintaining working contacts with partners at the central and local levels. The Project Manager will liaise and work closely with all partner institutions to link the project with complementary national programmes and initiatives. The PM is accountable to UNDP and to the MAEP and the PB for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. The PM will produce Annual Work and Budget Plans (AWP&ABP) The PM will further produce quarterly operational reports and Project Performance Reports (PPR). These reports will summarize the progress made versus the expected results, explain any significant variances, detail the necessary adjustments and be the main reporting mechanism for monitoring activities. The PM will be technically supported by contracted national and international service providers, based on need as determined by the PM and approved by the PB. Recruitment of specialist services will be done by the PM, in consultation with the UNDP and MAEP and in accordance with UNDP's rules and regulations.
212. UNDP Direct Project Services as requested by Government: The UNDP, as the Implementing Entity for this project, will provide oversight and project cycle management services for the project as defined by the Adaptation Fund Board. In addition, the Government of Turkmenistan may request UNDP direct services for specific projects, according to its policies and convenience. The UNDP and Government of Turkmenistan acknowledge and agree that those services are not mandatory, and will be provided only upon Government request. If requested the services would follow the UNDP policies on the recovery of direct costs. These services (and their costs) are specified in the Letter of Agreement (Annex 4). As is determined by the AF Board requirements, these service costs will be assigned as Project Management Cost, duly identified in the project budget as Direct Project Costs. Eligible Direct Project Costs should not be charged as a flat percentage. They should be calculated based on estimated actual or transaction-based costs and should be charged to the direct project costs account codes: 64397 – 'Services to projects - CO staff' and 74596 – 'Services to projects - GOE for CO'.

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

Risk	Risk Rate	Action
Reluctance of decision makers to adopt recommendations on new legislation or regulation	Medium	Active engagement of Ministry partners at senior level. Project design phase has included close consultations with Ministries and includes elements that are considered realistic within given timescales. The project builds upon the successful implementation of the first Adaptation Fund project which was able to support revisions to the Water Code around the establishment of Water User Associations and set the legal basis for water pricing.
Institutional conflict prevents the development of a strategy for climate resilience in the private agriculture sector	Medium	Strong focus on stakeholder consultation and alignment, bringing together MAEP and the Union of Industrialists and Entrepreneurs with other stakeholders
Due to staff turnover at the target Ministries the trained staff may leave for other job opportunities undermining installed technical capacity	Medium	Special training conditions and / or training for trainers will be arranged to leave the trained staff at the target Ministries.
Market for climate resilient extension services proves to be non-sustainable in the long run, particularly for poorer smaller-scale private farmers	Medium	Explore different operating models (state, private) to understand the costs and benefits, and the level of incentive support required to ensure sustainability
Lack of willingness among public and private sector partners to engage in developing demonstration sites.	Medium	Development of incentive packages and support to technology implementation and training. Design phase indicates that there is interest for collaboration across a range of partners
Farmers may not be interested in or may not afford any new efficient water irrigation technologies or any other technologies that will be demonstrated through this project	Medium	There is an evidence of emerging interest in efficient irrigation and greenhouse development in Turkmenistan both at the national policy level and among farmers. The project will work with Union of Entrepreneurs to promote value of shift to resilient agriculture. Collaboration will be established with Daihanbank and other government subsidised programmes for efficient agriculture investment to facilitate access to finance.

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

213. Measures for environmental and social risk assessment and mitigation, complying with the Environmental and Social Principles (ESP) of the Adaptation Fund, with UNDP's Social and Environmental Standards (SES), as well as with applicable national and international policies, laws and regulations are outlined in the the Environmental and Social Management Framework (ESMF) provided in Annex 7.

214. Section K.Part II. in this document provides description of potential impacts and risks against the 15 Adaptation Fund ESP principles.
215. Based on the Environmental and Social screening process and provisions for exclusion of high risk activities, it has been determined that the proposed project has limited potential for causing adverse impacts to the environment, natural habitats and/or ecosystems and ecosystem services. Rather, the project will likely have significant benefits in regards to enhancing natural habitats and ecosystems services through improved use of water resources. Provisions for screening and identification of impacts and risks related to unspecified activities against 15 AF ESP principles are included in the ESMF. Regardless, risks will be monitored according to potential impacts noted in Section K. of the proposal. If any of the pilot demonstration activities require further assessment and management (such as e.g. groundwater abstraction) an Environmental and Social Management Framework (ESMF) has also been provided, which should be used as the basis for preparing Environmental and Social Management Plan. The project will engage a part-time safeguards expert to support adequate implementation of the ESMF. Please refer to ESMF tables 1.a and 1.b. for the indicative risk mitigation measures for the potential risks identified against 15 AF ESP principles, with the brief summary provided below:
216. **Principle 1. Compliance with the Law:** During the development of the Full Proposal, all relevant stakeholders were consulted to ensure that all legal requirements were met. The project is therefore well-aligned and complies with national and sub-national policies, laws, plans and priorities for sustainable development and climate change adaptation. See Part II: D and E for a full description of this alignment and compliance. Compliance with the national technical standards and regulatory requirements on water extraction will need to be ensured and monitored by the UNDP Country Office in Turkmenistan.
217. **Principle 2. Access and Equity:** To ensure full implementation and adherence to this principle, project activities are designed to provide equal and accessible benefits to communities. Criteria and provisions for the vulnerability screening and assessment as well as for the regular monitoring of access are included under Components 2 and 3. Stakeholder and beneficiary engagement plan will be prepared during the project inception phase. The project also establishes annual project monitoring mechanism to verify that poorer and more vulnerable farmers have access and are participating in extension services training under Component 2.
218. **Principle 3. Marginalised and Vulnerable Groups.** To avoid social exclusion of marginalised communities, vulnerability screening and assessment will be conducted at community and individual level and participatory to ensure equal participation within project activities (Components 2 and 3). The project will expand access to the extension services through expanded network of demonstration plots and centres and through the mobile services to outreach to the groups with limited mobility. Additional social impacts that may be realised will therefore not unjustly impact on marginalised and vulnerable groups.
219. However, a moderate risk remains that vulnerable and marginalised groups may have restricted access to water resources as a result of adjusted tariffs for water supply services to water users. Managing the risk of water scarcity might require changing agricultural practices in a way that includes restricting or managing access to certain pasture lands, changing agricultural crops and practices that have potential to affect customary practices and/or resources. To address this risk, the project will use a participatory planning and decision-making process, that will ensure that any potential restrictions on the use of resources will not

be imposed on the members, but defined through a collective decision-making process at the community level. Any decisions on restriction of access will not be made without identification of compensatory/alternative measures and practices that provides sufficient revenues and/or livelihoods that is equal to, or more than revenues being generated from existing practice. Finally, the project will set up Grievance Redress Mechanism to allow those that might have a complaint and/or grievance to be able to communicate their concerns and/or grievances through an appropriate process.

220. **Principle 4. Human Rights:** Project preparation and implementation phases will follow a human-rights based approach. No activities are included in project design that are not in line with established international human rights. Moreover, the project will promote the basic human rights of access to food, water and information. The project seeks to ensure that benefits of all activities are shared broadly in a non-discriminatory, equitable manner through participatory processes and transparent selection criteria. Extensive stakeholder consultations were held during project preparation. These consultations will continue throughout project implementation. Potential project-related concerns and/or grievances of local communities will be addressed through the grievance mechanism.
221. **Principle 5. Gender Equality and Women's Empowerment:** The project recognises the importance of gender equality, particularly equal rights, responsibilities, opportunities and access of women and youth in the climate change adaptation. Gender considerations will be fully mainstreamed into project implementation, including opportunities for women to learn about climate resilience, as well as to diversify their livelihoods in more resilient ways. The project will ensure that there is gender balance in project activities including access to project financial assistance and gender considerations will be used in any community level vulnerability analysis linked to local infrastructure or demonstration plot development. The project will also use gender sensitive indicators (particularly around beneficiaries) to facilitate planning, implementation and monitoring. Project activities include 30% proportionate gender consideration in all project interventions, with a specific focus on on-the-ground activities under Component 3. Gender equality and women organisations will be involved to support the project. This will ensure adherence of all project activities to the gender equality and women empowerment. The Gender Action Plan is provided with the full proposal and will be updated regularly during the project implementation. Gender expert will be engaged by the project as budgeted in the proposal budget.
222. **Principle 6. Core Labour Rights:** Turkmenistan ratified all the eight ILO fundamental conventions. The information on the ILO website with regard to application of labour standards in Turkmenistan reveal no major observations and issues. The project will ensure that national working standards (Labour Code) are respected. Also, the project will ensure that appropriate wages will be paid per assigned task and that no child labor will be employed. Security and safety standards will also be respected and enforced. The project will set up a Grievance Redress Mechanism to allow those that might have a complaint and/or grievance to be able to communicate their concerns and/or grievances through an appropriate process.
223. **Principle 7. Indigenous Peoples:** Not applicable. There are no indigenous people in Turkmenistan.
224. **Principle 8. Involuntary resettlement:** There will be no involuntary displacement or resettlement related to this project. Through the screening process, any activities involving involuntary resettlement will be excluded and will not be supported.

225. **Principle 9. Protection of Natural Habitats:** The project will not support interventions in or at the direct vicinity of critical natural habitat sites. The project sites will be selected from among the existing agricultural fields. Priority will be given to degraded and salinated lands to demonstrate and promote sustainable water and land management practices. Through the risk screening and assessment process, any activities that may pose risks to natural habitats will be excluded and will not be supported. Thus, no risks to natural habitats will be triggered by this project.
226. **Principle 10. Conservation of Biological Diversity:** The project on the ground activities are limited within relatively small demonstration plots on the converted agricultural land. The project sites will not be located in the protected areas or in the areas with significant biological diversity. Through the risk screening process, any activities that may pose risks to biodiversity will be excluded and will not be supported.
227. **Principle 11. Climate Change:** The project will contribute to climate change adaptation efforts in Turkmenistan. Energy efficiency requirements will be included in the equipment specifications. The old inefficient water pumps will be replaced with much more energy efficient equipment resulting in the reduction of energy use. In cases where the project will be purchasing new water pumps, specific energy performance requirements will be included in the procurement specifications. The project will prioritize the purchase of energy efficient equipment (solar pumps where feasible or energy efficient pumps). Experience and advice of the GEF-funded project on energy efficiency in water sector will be utilized. Energy consumption by the new equipment installed by the project will be monitored and reported. The proposed project will not result in deforestation. Improved soil management practices as a result of the project would result in reduced emissions from land use.
228. **Principle 12. Pollution prevention and Resource Efficiency:** The project's core objective is to increase efficiency of water use and reduce water losses in the farming sector. However, there is a risk that the choice of irrigation technology may lead to an increase in the use of surface water at individual sites. The overall use of water should be monitored. The design of demonstration projects featuring new water saving technologies will be based on hydrological studies in the chosen locations which would take into account the hydrographic parameters of the landscape, available water sources, their quantity and quality. Experienced local experts, drawing on international expertise as necessary, will carry out these engineering and hydrological studies. Irrigation technologies will also be monitored however for trends in water usage. In addition, Components 1-2 are aimed at supporting efficient water management practices and techniques to mitigate and minimize potential increase in water demand.
229. **Principle 13. Public Health:** The project is expected to have positive impacts on health through improved water availability, reduced land degradation and improved food security. USP activities will be screened and monitored so that in the event that any potential public health issues become apparent (e.g. risk of injury in the process of small-scale earth works), they can be flagged, managed and monitored. Health and Safety Plans will be employed for all construction activities. Regular monitoring will be conducted for compliance with national construction norms and standards.
230. **Principle 14. Physical and Cultural Heritage:** All USPs will be screened to identify whether they are located in the vicinity to the sites with physical and cultural heritage. A chance find procedure will be used, and public access to any sites of cultural importance will be assured.

231. **Principle 15. Lands and Soil Conservation:** The project activities will not modify existing types of land use and will be limited with demonstration sites within the converted agricultural land. Climate change adaptation practices and scaled up application of resilient water- and land-use technologies promoted by the project will have a positive effect on the reduction of land degradation and improvement of soil quality. Necessary monitoring is limited to compliance with related laws and addressing concerns through the grievance mechanism.
232. The proposed project has been designed to be in line with both the Environmental and Social Policy of the Adaptation Fund as well as the UNDP Social and Environmental Standards. All activities leading to significant or irreversible environmental and social risks have been eliminated, included project activities in environmentally critical areas, adverse public health or labour impacts, any physical or economic displacement and any infringement on human rights.
233. The project was developed in a participatory manner in consultation with stakeholders, and a record of relevant consultations is provided in Annex 8. Furthermore, information required to access the grievance mechanism of both the Adaptation Fund and/or UNDP (in addition to any locally available grievance mechanisms) has been provided in the ESMF (Annex 7).

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

234. Project monitoring and evaluation (M&E) will be in accordance with established UNDP procedures and will be carried out by the Project team, verified by the MAEP and the UNDP Country office in Turkmenistan. Dedicated support by the technical adaptation teams in the UNDP Istanbul Regional Hub and UNDP-GEF New York will be provided on a regular basis.
235. A comprehensive Results Framework for the project will define execution indicators for project implementation as well as the respective means of verification. A Monitoring and Evaluation system for the project will be established based on these indicators and means of verification.
236. Targeted M&E activities for the proposed project include the following:
- A Project Inception Workshop will be conducted within two months of project start up with the full project team, relevant government counterparts and UNDP. The Inception Workshop is crucial to building ownership for the project results and plan the first-year annual work plan. A fundamental objective of the Inception Workshop will be to present the modalities of project implementation and execution, document mutual agreement for the proposed executive arrangements amongst stakeholders and assist the project team to understand and take ownership of the project's goals and objectives.
  - Another key objective of the Inception Workshop is to introduce the project team which will support the project during its implementation. An Inception Report will be prepared and shared with participants to formalize various agreements decided during the meeting.
  - A UNDP risk log will be regularly updated in intervals of no less than every six months in which critical risks to the project have been identified.
  - Quarterly Progress Reports will be prepared by the Project team and verified by the Project Board.



- Project Performance Reports (PPR) will be prepared to monitor progress made since project start and for the previous reporting period. These annual reports include, but are not limited to, reporting on the following:
  - Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
  - Project outputs delivered per project Outcome (annual);
  - Lessons learned/good practices;
  - Annual expenditure reports;
- Reporting on project risk management.
- Government authorities, members of Steering Committee/Project Board and UNDP staff will conduct regular field visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress.

237. In terms of financial monitoring, the project team will provide UNDP with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted in accordance with UNDP Financial Regulations and Rules and applicable audit policies on UNDP projects by a legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

238. The project will undergo an independent Mid-Term Evaluation (MTE) at the mid-point of project implementation, which will determine progress being made toward the achievement of outcomes and identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term.

239. Final External Evaluation will be conducted no later than 3 months before project closure.

The budgeted Monitoring & Evaluation plan is as follows:

Type of M&E activity	Responsible Parties	Budget US\$	Timeframe
Inception workshop	Project Coordinator UNDP CO	\$3000	Within first two months of project start up
Inception Report	Project team UNDP CO	None	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	Project Coordinator	None	State, mid and end of project
Annual measurement of indicators	Project Coordinator	None	Annual prior to annual reports and the definition of annual work plans
Monthly/quarterly reports	Project team	None	End of each month

Annual reports	Project team CoRI UNDP CO	\$2000 (total amount for all years)	End of each year
Meetings of project Coordination Committee	Project Coordinator UNDP-CO	None	After inception workshop and thereafter at least once a year
Technical reports	Project team External consultants	None	To be determined by Project Team and UNDP CO
Mid-term external evaluation	Project team UNDP CO External consultants	\$24,000	Mid-point of project implementation
Final external evaluation	Project team UNDP CO External Consultants	\$24,000	End of project implementation
Final report	Project team UNDP CO	None	At least one month before end of project
Publication of lessons learned	Project team	\$18,000 (\$3,000 per year)	Yearly
Audit	UNDP CO Project team	\$42,000 (\$7,000 per year)	Yearly
Visits to field sites	UNDP CO CoRI Project team	\$12,000 (\$2,000 per year)	Yearly
<b>Total indicative Cost</b>		<b>\$125,000</b>	

NB: Above costs do not cover UNDP staff time. All UNDP staff costs associated with M&E are covered by the MIE Fee.

The M&E budget will be taken pro-rata from the three project component budgets, reflecting the size of the TA.

## E. Include a results framework for the project proposal, including milestones, targets and indicators.

<b>Objective:</b> To improve climate resilience among smaller private sector farmers including women through strengthening the enabling environment, expanding climate resilient extension services and creating demonstration sites to support communities across farming systems in Turkmenistan					
	<b>Indicators</b>	<b>Baseline</b>	<b>Goals Project completion</b>	<b>Means of verification</b>	<b>Risks and assumptions</b>
<b>Objective of the Project</b>  <b>To improve climate resilience among smaller private sector farmers including women through strengthening the enabling environment, expanding climate resilient extension services and creating demonstration sites to support communities across farming systems in Turkmenistan</b>	Number / % of targeted population applying appropriate adaptation responses (disaggregated by gender)	<p>Agricultural development activity in the non-state crop sector does not incorporate considerations of climate risk or resilience best practice.</p> <p>Smaller private farmers tend to be more vulnerable to climate change impacts and lack adequate resources to access climate resilient extension services on a commercial basis. Women farmers are even more vulnerable because of inequality in terms of division of labor, access to decision making and to resources</p> <p>While some larger commercial farmers have begun to incorporate climate resilience best practices in agriculture, water and soil management, these are not accessible (to smaller scale private sector farmers, with female farmers being particularly disadvantaged)</p>	By the end of the project 10,000 farming enterprises including female-headed employing 50,000 farmers able to apply appropriate adaptation responses (minimum 30% women)	Farmer survey through extension service providers	<p>Farming enterprises have access to funds to invest in or adopt new resilient agricultural technologies</p> <p>Farming enterprises are convinced of the need to invest in addressing climate risks and impacts</p> <p>Farming enterprises have access to technologies and know-how suitable for the Turkmen context</p>
	Volume of new investment in adaptation measures and technologies by private farming enterprises and entrepreneurs as % of agricultural investment	Small scale farmers lack the funds, organizing structures and incentives to invest collectively at scale to develop climate resilient agriculture.	Private farmers including women engaging with the programme increase their investment in climate smart agriculture by 50% compared to baseline.		
	Knowledge generated and transferred to other public and private stakeholders at the national level: number of institutional actors engaging with resilient farming		At least 20 national and regional institutions (public and private) participating in gender-sensitive resilience capacity building, policy development and reporting increased awareness and understanding of climate resilience	<p>Project annual reports; Mid-term evaluation, final report.</p> <p>Participation in workshops, consultations and training</p>	
<b>Outcome 1</b>  <b>Outcome 1:</b> The enabling environment developed to encourage and facilitate private sector investments into climate resilient agricultural development.	<b>Indicator 1.1:</b> Number of laws and sub-regulations in the area of water and land management that are strengthened and communicated to private sector	<p>Government has made progressive steps towards improving the legislation that underpins resilience (Water Code, Land Code). There is an opportunity to conduct gender analysis of legal acts, developed by the project.</p> <p>There is a need for secondary</p>	<b>Indicator target 1.1.</b> a). At least 3 gender sensitive laws or sub regulations amended or developed supporting climate resilience for private sector farmers by 2024. b). At least 2 gender sensitive guidance notes prepared	<p>Project annual reports; Mid-term evaluation, final report.</p> <p>National law journal</p>	Government of Turkmenistan and Parliament engage in a timely fashion to develop and implement climate resilience policy and sub-regulations

	farmers.	regulations to support implementation and incentivize farmers to invest in more climate resilience water and land management.	explaining legislative changes in the water and land code to small scale private farmers.		Government of Turkmenistan institutions become engaged on the strategic development of resilience in the non-state farming sector.
	<b>Indicator 1.2:</b> A Strategic Concept to support climate resilience in non-state agriculture sector is adopted and capacity built among key stakeholders for its implementation.	Legislation also remains poorly understood by farming communities and is not communicated in an accessible format. There are currently no strategic or implementing arrangements for promoting resilience among private sector farmers at a national or regional level.	<b>Indicator target 1.2.</b> A gender-sensitive Strategic Concept to support climate resilience among smallholder farmers is developed and agreed with MAEP and other stakeholders.		
	<b>Indicator 1.3.</b> a) % increase in institutional capacity to promote climate resilience in private sector agriculture  b) Number of staff from targeted institutions trained to respond to impacts of climate-related events	Capacity among key national and regional stakeholders to understand best practices and best available technologies remains weak	<b>Indicator target 1.3.</b> a) 50% increase in institutional capacity (measured through an institutional capacity assessment scorecard)  b) At least 50 officials and other key national/regional stakeholders trained on improving the enabling environment (including at least 30% women)	Institutional capacity assessment scorecard  Capacity review  Training test results	
<b>Outcome 2</b>  Climate resilient extension services developed to benefit 20,000 small and medium sized non-state order farming enterprises and entrepreneurs (including women) to adopt climate smart agriculture practices.	<b>Indicator 2.1:</b> Number and type of organizations providing climate resilient extension services to private sector farmers	The market for providing agricultural extension services to private sector farmers in Turkmenistan is underdeveloped with limited domestic capacity.  There is no consolidated assessment of the climate risk challenges and gender specific needs of farmers operating in the non-state crop sector.  Information materials on climate resilience best practices and best available technologies for non-state order crops and	<b>Indicator target 2.1.</b> a) At least 50 organizations or consultants agree to participate and are trained to deliver climate resilient agriculture extension and advisory services in all 5 regions of Turkmenistan. Gender sensitivity of advisory services will be ensured through engendering of the training materials  b) On-line portal / virtual library of resilient technologies operationalized	Project annual reports; Mid-term evaluation, final report;  Assessment of capacities of extension services before and after AF project intervention  Partner reporting and audit.  On-line virtual library	The non-state agriculture sector continues to grow in scale and importance to become the dominant modality with a significant market for agricultural support services.  Public and private sector institutions and consultants are willing to engage in

	<p><b>Indicator 2.2.</b> Number of beneficiaries of climate resilient extension and advisory services (split by gender and other socio-economic parameters (e.g. size of farm)).</p>	<p>livestock are limited, and are not easily accessible, particularly in local language. Gender sensitive relevant materials are even less accessible.</p> <p>Agricultural development activity in the non-state crop sector does not incorporate considerations of climate risk or resilience best practice.</p> <p>Smaller private farmers tend to be more vulnerable to climate change impacts and lack adequate resources to access climate resilient extension services on a commercial basis.</p>	<p><b>Indicator target 2.2.</b></p> <p>a) At least 20,000 private sector farmers access information on climate resilient best practices and best available technologies and change behavior or adopt new approaches (at least 30% are women)</p> <p>b) At least 2000 private sector farmers receive direct field training in climate resilient agriculture and best practices of which 80% are small-scale farmers in vulnerable regions of Turkmenistan (at least 30% women)</p>	<p>Project annual reports; Mid-term evaluation, final report;</p> <p>Community surveys</p> <p>Monitoring of visitors of the on-line virtual library</p>	<p>the supply of resilient extension services.</p> <p>Farmers are willing to engage in learning about climate resilience and adopting new practices.</p>
<p><b>Outcome 3</b></p> <p>Demonstration plots and collective investments enable scale up of climate resilience measures, support peer to peer learning and improve resilience outcomes for farmers</p>	<p><b>Indicator 3.1:</b> Number of new accessible demonstration sites on climate resilient agricultural practices established across Turkmenistan</p>	<p>There are very few demonstration plots or research sites that allow for the dissemination of climate resilient best practices or best available technologies and most existing facilities are relatively old lack equipment and know how.</p> <p>What demonstration sites exist are not accessible to private sector farmers, leaving limited opportunities for field demonstration and peer to peer learning.</p> <p>While some larger commercial farmers have begun to incorporate climate resilience best practices in agriculture, water and soil management, these are not accessible (financially, awareness) to smaller scale private sector farmers, especially female farmers.</p> <p>Small scale farmers lack the funds, organizing structures and incentives to invest collectively at scale to develop climate resilient agriculture.</p>	<p><b>Indicator target 3.1.</b></p> <p>a). At least 1 new demonstration site (min 20 ha) developed on the base of an existing Government of Turkmenistan Agricultural Institute facility showcasing best practice technologies and approaches in non-state crop sector.</p> <p>b). At least 3 accessible demonstration sites developed in partnership with larger private sector agricultural companies to showcase specific crop or livestock specific technologies</p> <p>c). At least 3 community level gender balanced cooperatives or groups of private sector farmers design and implement climate resilient best available agriculture measures with at least 30% female participation</p>	<p>Project annual reports</p> <p>Field visits</p> <p>Mid-term evaluation, final report</p> <p>Community Surveys;</p> <p>Partner reporting</p> <p>Audit</p>	<p>MAEP is willing to support the development and repositioning of a research demonstration plot.</p> <p>Private sector farmers are willing to co-invest in resilience and share best practice in their regions and along their supply chains</p> <p>Communities are interested in designing and bidding for funds for community level farming resilience projects.</p>
	<p><b>Indicator 3.2:</b> Number of climate adaptation technologies or best</p>		<p><b>Indicator target 3.2.</b> At least 15 different technologies or best practices are covered collectively by investments in</p>	<p>Project annual reports. Mid-term evaluation, final report</p>	

	practices applied/ demonstrated	One new demonstration plot on water efficient irrigation technologies was established by the UNDP/GEF project in Ahal Velayat	demonstration sides	Field visits  Demonstration site reports	
	<b>Indicator 3.3:</b> Number of farmers visiting project demonstration sites for field training and to learn about best practices and technologies (in conjunction with Component 2)		<b>Indicator target 3.3.</b> At least 1000 farmers visit project demonstration sites for field training and to learn about best practices and technologies (at least 30% women)	Project annual reports. Mid-term evaluation, final report  Demonstration site reports Community Surveys	

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

The alignment is set out below.

Project Objective(s) <sup>19</sup>	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
To improve climate resilience among smaller private sector farmers including women through strengthening the enabling environment, expanding climate resilient extension services and creating demonstration sites to support communities across farming systems in Turkmenistan	Number / % of targeted population applying appropriate adaptation responses (disaggregated by gender)  Volume of new investment in adaptation measures and technologies by private farming enterprises and entrepreneurs as % of agricultural investment	Outcome 3. Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.2. Percentage of targeted population applying appropriate adaptation responses	7,000,040
	Knowledge generated and transferred to other public and private stakeholders at the national level	Outcome 3. Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level  Outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses  4.1. Responsiveness of development sector services to evolving needs from changing and variable climate	
<b>Outcome 1:</b> The enabling environment developed to encourage and facilitate private sector investments into climate resilient agricultural development.	<b>Indicator 1.1:</b> Number of laws and sub-regulations in the area of water and land management that are further strengthened and communicated to private sector farmers	7.1 Improved integration of climate-resilience strategies into country development plans	7.1.1. No of policies introduced or adjusted to address climate change risks	744,000
	<b>Indicator 1.2:</b> A Strategic Concept to support climate resilience in non-state agriculture sector is adopted and capacity built among key stakeholders for its implementation.	7.1 Improved integration of climate-resilience strategies into country development plans	7.1.2 No of targeted development strategies with incorporated climate change priorities enforced	
	<b>Indicator 1.3.</b> <b>a)</b> % increase in institutional capacity to promote climate resilience in private sector agriculture	2.1 Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	2.1.2. No of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)  2.1.1. No of staff trained to respond to, and mitigate impacts of climate related events (by gender)	

<sup>19</sup> The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

	b) Number of staff from targeted institutions trained to respond to impacts of climate-related events			
<b>Outcome 2:</b> Climate resilient extension services developed to benefit 20,000 small and medium sized non-state order farmers to adopt climate smart agriculture practices.	<b>Indicator 2.1:</b> Number and type of organizations providing climate resilient extension services to private sector farmers	4.1 Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.1. No and type of development sector services modified to respond to new conditions resulting from climate variability and change (by sector and scale)	2,999,950
	<b>Indicator 2.2:</b> Number of beneficiaries of climate resilient extension and advisory services (split by gender and other socio-economic parameters (e.g. size of farm).	3.1 Targeted population groups participating in adaptation and risk reduction awareness activities	3.1.1 No of news outlets in the local press and media that have covered the topic	
<b>Outcome 3:</b> Demonstration plots and collective investments enable scale up of climate resilience measures, support peer to peer learning and improve resilience outcomes for farmers	<b>Indicator 3.1:</b> Number of new accessible demonstration sites on climate resilient agricultural practices established across Turkmenistan	4.1 Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale	2,581,200
	<b>Indicator 3.2:</b> Number of climate adaptation technologies or best practices applied/ demonstrated	4.1 Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale	
	<b>Indicator 3.3:</b> Number of farmers visiting project demonstration sites for field training and to learn about best practices and technologies (in conjunction with Component 2)	3.1 Targeted population groups participating in adaptation and risk reduction awareness activities		

**G.** Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.



Award ID	00097117			Project ID		00100962								
Project Title	Scaling climate resilience for farmers in Turkmenistan													
Business Unit	TKM10													
Project Title	Scaling climate resilience for farmers in Turkmenistan													
PIMS No.	6246													
Implementing Partner	Ministry of Agriculture and Environment Protection of Turkmenistan													
Outcome/ Atlas Activity	Respon sible Party/ Implem enting Agent	Fund ID	Donor Name	Atlas Budgeta ry Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Amount Year 6 (USD)	Total (USD)	Budget Notes	
Outcome 1: The enabling environment developed to encourage and facilitate private sector investments into climate resilient agricultural development.	MAEP	62040	AF	71200	International consultant	35,000	40,000	48,000	10,000	18,000	5,000	156,000	1	
				71300	Local consultant	45,000	55,000	40,000	10,000	10,000	15,000	175,000	2	
				71400	Contractual services (individual)	42,000	42,000	42,000	42,000	42,000	42,000	252,000	3	
				71600	Travel	9,000	10,500	9,000	5,500	4,000	4,000	42,000	4	
				72500	Supplies	3,000	3,000	3,000	3,000	3,000	3,000	18,000	5	
				73100	Rental & Maintenance-Premises	2,000	2,000	2,000	2,000	2,000	2,000	12,000	6	
				75700	Training, Workshops and Confer	16,000	17,000	16,500	4,000	5,500	-	59,000	7	
				74200	Audio Visual&Print Prod Costs	3,000	11,000	10,000	5,000	5,000	3,000	37,000	8	
				74500	Miscellaneous Expenses	4,000	4,000	4,000	4,000	4,000	3,000	23,000	9	
								Total Outcome 1	159,000	184,500	174,500	85,500	93,500	77,000

<b>Outcome 2: Climate resilient extension services developed to benefit 20,000 small and medium sized non-state order farmers to adopt climate smart agriculture practices</b>	MAEP	62040	AF	71200	International consultant	60,000	95,000	78,000	60,000	58,000	45,000	396,000	10
				71300	Local consultant	80,000	220,000	205,000	195,000	110,000	90,000	900,000	11
				71400	Contractual services (individual)	64,000	64,000	64,000	64,000	64,000	64,000	384,000	12
				71600	Travel	45,050	66,550	50,050	47,250	45,750	21,500	276,150	13
				75700	Training, Workshops and Confer	39,000	55,000	39,000	33,500	29,500	14,800	210,800	14
				74200	Audio Visual&Print Prod Costs	12,000	21,000	21,000	21,000	17,000	11,000	103,000	15
				72200	Equipment and furniture	7,000	127,000	127,000	117,000	7,000	-	385,000	16
				72100	Contractual Services - Companies	5,000	105,000	105,000	100,000	-	-	315,000	17
				74500	Miscellaneous Expenses	5,000	5,000	5,000	5,000	5,000	5,000	30,000	18
					<b>Total Outcome 2</b>	<b>317,050</b>	<b>758,550</b>	<b>694,050</b>	<b>642,750</b>	<b>336,250</b>	<b>251,300</b>	<b>2,999,950</b>	
<b>Outcome 3: Demonstration plots and collective investments enable scale up of climate resilience measures, support peer to peer learning and improve resilience outcomes for farmers</b>	MAEP	62040	AF	71200	International consultant	15,000	34,000	32,000	20,000	28,000	15,000	144,000	19
				71300	Local consultant	30,000	100,000	100,000	85,000	80,000	35,000	430,000	20
				71400	Contractual services (individual)	64,000	64,000	64,000	64,000	64,000	64,000	384,000	21
				71600	Travel	15,500	22,000	22,000	22,000	19,000	12,500	113,000	22
				75700	Training, Workshops and Confer	8,500	15,500	10,000	5,000	5,000	3,200	47,200	23
				74200	Audio Visual&Print Prod Costs	3,000	3,000	3,000	3,000	3,000	3,000	18,000	24

				72200	Equipment and furniture	10,000	253,000	363,000	315,000	120,000	3,000	1,064,000	25
				72100	Contractual Services - Companies	-	120,000	110,000	100,000	-	-	330,000	26
				72800	Information Technology Equipment	10,000	3,000	3,000	3,000	3,000	3,000	25,000	27
				74500	Miscellaneous Expenses	4,000	4,500	4,500	4,500	4,500	4,000	26,000	28
					<b>Total Outcome 3</b>	<b>160,000</b>	<b>619,000</b>	<b>711,500</b>	<b>621,500</b>	<b>326,500</b>	<b>142,700</b>	<b>2,581,200</b>	
<b>Project Execution Costs</b>	<b>UNDP</b>	62040	<b>AF</b>	74956	Direct project cost	10,000	23,000	23,000	19,000	11,000	10,500	96,500	29
					<b>Total project execution cost</b>	<b>10,000</b>	<b>23,000</b>	<b>23,000</b>	<b>19,000</b>	<b>11,000</b>	<b>10,500</b>	<b>96,500</b>	
<b>Total Project Costs</b>						<b>646,050</b>	<b>1,585,050</b>	<b>1,603,050</b>	<b>1,368,750</b>	<b>767,250</b>	<b>481,500</b>	<b>6,451,650</b>	

<b>Total components</b>	636,050	1,562,050	1,580,050	1,349,750	756,250	471,000	6,355,150
<b>Project Execution Costs</b>	10,000	23,000	23,000	19,000	11,000	10,500	96,500
<b>Total project cost</b>	646,050	1,585,050	1,603,050	1,368,750	767,250	481,500	6,451,650

Budget Notes:

Note	Atlas Code	Category	Total 6 years	Expenses Description (to be further completed at inception stage)
Outcome 1: The enabling environment to support climate resilient agricultural development to private sector farmers is strengthened. (US\$ 744,000)				
1	71200	International consultant	156,000	Recruitment of an international consultant for advisory and resilience strategy support (including costs of the expert for mid-year and termination review)
2	71300	Local consultant	175,000	Local Consultant for legal advisory, to prepare guidance note, to support adaptation resilience strategy
3	71400	Contractual services (individual)	252,000	Recruitment of project technical staff (management and administrative staff ) to implement activities under Outcome 1
4	71600	Travel	42,000	Travel of international expert to TKM, travel to capacity building events, other travel for implementation of Component 1
5	72500	Supplies	18,000	Purchase of office supplies for implementation of Component 1
6	73100	Rental & Maintenance-Premises	12,000	Rental of national office premises
7	75700	Training, Workshops and Confer	59,000	Policy discussion seminars, round table discussions on legislative activities (1 per year), round table discussions with MAEP on private agriculture resilience strategy and mandate, Capacity building events in Ashgabat and in the region
8	74200	Audio Visual&Print Prod Costs	37,000	Materials for the meetings (guides, final version of Strategy, etc.)
9	74500	Miscellaneous Expenses	23,000	Component 1 Miscellaneous costs (including bank charges, insurance)
Outcome 2: Climate resilient extension services developed to benefit 20,000 small and medium sized non-state order farmers to adopt climate smart agriculture practices. (US\$ 2,999,950)				
10	71200	International consultant	396,000	Recruitment of international consultants for analytical and consultation to farmers, engagement with international suppliers, providing materials, best practice guidance, QA and review (including expert for mid-year and termination review)
11	71300	Local consultant	900,000	Local Consultants for legal, institutional and technical advisory, to support design and establishment of gender-responsive resilience extension services (including a gender expert)
12	71400	Contractual services (individual)	384,000	Recruitment of project technical staff (management and administrative staff ) to implement activities under Outcome 2
13	71600	Travel	276,150	Travel of international experts to TKM, travel to the project sites and events in the region
14	75700	Training, Workshops and Confer	210,800	Regional workshops, consultations and trainings for service providers
15	74200	Audio Visual&Print Prod Costs	103,000	Materials for the meetings, trainings
16	72200	Equipment and furniture	385,000	Database support, webservice and database support, climate resilience equipment for extension service providers, initial capital purchase of vehicle and equipment for training purposes
17	72100	Contractual Services - Companies	315,000	Extension service providers delivering resilience training to farmers
18	74500	Miscellaneous Expenses	30,000	Component 2 Miscellaneous costs (including bank charges, insurance)
Outcome 3: Demonstration plots and collective investments enable scale up of climate resilience measures, support peer to peer learning and improve resilience outcomes for farmers (US\$ 2,581,200)				

19	71200	International consultant	144,000	Recruitment of international consultants for design and selection technologies, QA and review (including expert for mid-year and termination review)
20	71300	Local consultant	430,000	Local Consultants for investment planning, management and oversight of implementation, including a gender expert and a safeguards expert
21	71400	Contractual services (individual)	384,000	Recruitment of project technical staff (management and administrative staff) to implement activities under Outcome 3
22	71600	Travel	113,000	Travel of international experts to TKM, travel to the pilot sites, other relevant travel for implementation of Component 3
23	75700	Training, Workshops and Confer	47,200	Community level consultations (vulnerability assessment, investment planning, gender analysis)
24	74200	Audio Visual&Print Prod Costs	18,000	Printing of project materials
25	72200	Equipment and furniture	1,064,000	Capital equipment for development of private sector sites and securing access for demonstration/training. Purchase of equipment and furniture for the national project office.
26	72100	Contractual Services - Companies	330,000	Subcontracts to include design and supply costs
27	72800	Information Technology Equipment	25,000	Info-technological equipment for the national project team
28	74500	Miscellaneous Expenses	26,000	Component 3 Miscellaneous costs (including bank charges, insurance)
Project Management (US\$ 96,500)				
29	74956	Direct project cost	96,500	UNDP Direct Project Support Services – Please see Annex 4.

#### H. Include a disbursement schedule with time-bound milestones


Disbursement schedule	Upon agreement & signature (US\$)	After Year 1 (US\$)	After Year 2 (US\$)	After Year 3 (US\$)	After Year 4 (US\$)	After Year 5 (US\$)	Total disbursed (over 5 years)
Scheduled date (tentative)	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25	
<b>Project funds</b>	636,050	1,562,050	1,580,050	1,349,750	756,250	471,000	<b>6,355,150</b>
<b>Project Execution Costs</b>	10,000	23,000	23,000	19,000	11,000	10,500	96,500
<b>Implementing Entity fee (8.5%)</b>	252,305	80,838	81,756	69,806	39,130	24,557	548,390
<b>Total</b>							<b>7,000,040</b>

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

- A. Record of endorsement on behalf of the government<sup>20</sup>** 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:

<p>Berdi Berdiyev</p> <p>Head of Department for Coordination of International Environment Cooperation and Projects, Ministry of Agriculture and Environment Protection of Turkmenistan,</p> <p>Designated Authority for Adaptation Fund in Turkmenistan</p>	<p>Date: 10 April 2019</p>
---	----------------------------

- 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

<p>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 (including the National Strategy for socio-economic development up to 2030, the National Strategy of Turkmenistan on Climate Change and the first Turkmenistan NDC) and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>	
 <p>Pradeep Kurukulasuriya Executive Coordinator &amp; Director- Global Environmental Finance &amp; Lead, Natural Capital and the Environment Bureau for Policy and Programme Support (BPPS)/ Global Policy Network United Nations Development Programme</p>	
<p>Date: 2 August 2019</p>	<p>Tel. and e-mail: <a href="mailto:pradeep.kurukulasuriya@undp.org">pradeep.kurukulasuriya@undp.org</a></p>
<p>Project Contact Person: Natalia Olofinskaya</p>	
<p>Tel. And Email: +90 543 532 3046 / <a href="mailto:nataly.olofinskaya@undp.org">nataly.olofinskaya@undp.org</a></p>	

1. <sup>6.</sup> Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

## Annex 1: Letter of Endorsement

**TÜRKMENISTANYŇ  
OBA HOJALYK WE DAŞKY  
GURŞAWY GORAMAK  
MINISTRLOGI**

744036, Ashgabat şäheri, Arçabil şaýoly, 92-nji jaýy  
Telefon: (+993 12) 44-74-04, 44-76-05; Faks: 44-74-01



**TURKMENISTAN  
MINISTRY OF AGRICULTURE  
AND ENVIRONMENTAL  
PROTECTION**

92<sup>nd</sup> building, Archabil avenue, Ashgabat city, 744036  
Telephone: (+99312) 44-74-04, 44-76-05; Fax: 44-74-01

“ 10 ” 04 2019 ý.

№ 01-1104/10


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

Subject: Endorsement for the Project “Scaling climate resilience for farmers in Turkmenistan”

We, the Head of the National Designated Authority (NDA) of Turkmenistan for the Adaptation Fund and the Focal Point of the National Designated Authority (NDA) of Turkmenistan for the Adaptation Fund, confirm that the above national project proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts and risks, posed by climate change in Turkmenistan.

Accordingly, we are pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by United Nations Development Programme and executed by the Ministry of Agriculture and Environment Protection of Turkmenistan.

Sincerely,

  
Magtymguly Bayramdurdyev  
Minister of Agriculture and Environment Protection of  
Turkmenistan  
Head of the National Designated Authority (NDA) of  
Turkmenistan for the Adaptation Fund

  
Berdi Berdiyev  
Head of Department of Coordination of International  
Environment Cooperation and Projects,  
Ministry of Agriculture and Environment Protection of  
Turkmenistan  
Focal Point of the National Designated Authority (NDA)  
of Turkmenistan for the Adaptation Fund



**TÜRKMENISTANYŇ  
OBA HOJALYK WE DAŞKY  
GURŞAWY GORAMAK  
MINISTRIGI**

744036, Ashgabat şäheri, Arçabil şaýoly, 92-nji jöýý  
☎ Telefon: (+993 12) 44-74-04, 44-76-05; Faks: 44-74-01



**TURKMENISTAN  
MINISTRY OF AGRICULTURE  
AND ENVIRONMENTAL  
PROTECTION**

92<sup>nd</sup> building, Archabil avenue, Ashgabat city, 744036  
☎ Telephone: (+99312) 44-74-04, 44-76-05; Fax: 44-74-01

“ 18 ” 02 2020 ý.

№ 01-612/10.

To: Adaptation Fund Board  
c/o Adaptation Fund Board Secretariat,  
Email: [Secretariat@Adaptation-Fund.org](mailto:Secretariat@Adaptation-Fund.org)  
Fax: 202 522 3240/5


Subject: Endorsement for the Project “Scaling Climate Resilience for Farmers in Turkmenistan”

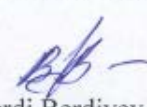
We, the Head of the National Designated Authority for the Adaptation Fund in Turkmenistan, and the Focal Point of the National Designated Authority for the Adaptation Fund in Turkmenistan, confirm that the above national project proposal is in accordance with the Government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Turkmenistan.

Accordingly, we are pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by United Nations Development Programme and executed by the Ministry of Agriculture and Environment Protection of Turkmenistan.

Taking into account that the UNDP Office in Turkmenistan has enough capacities to provide oversight and project cycle management services for the project as defined by the Adaptation Fund Board, Ministry of Agriculture and Environment Protection of Turkmenistan requests United Nations Development Programme to provide Direct Project Services, which are in detail specified in the Letter of Agreement, including their costs. Ministry of Agriculture and Environment Protection of Turkmenistan will maintain overall national ownership, leadership, supervision and accountability for the project.

Sincerely,

  
Magtymguly Bayramdurdiyev  
Minister of Agriculture and Environment Protection of  
Turkmenistan, Head of NDA for AF in Turkmenistan

  
Berdi Berdiyev  
Head of the Department on Coordination of the International  
Environment Cooperation and Projects of the Ministry of  
Agriculture and Environmental Protection of Turkmenistan,  
Focal Point of NDA for AF in Turkmenistan

04309000



## **Annex 2: UNDP Fees for Support to Adaptation Fund Project**

“Scaling Climate Resilience for Farming in Turkmenistan”

<b>Category</b>	<b>Services Provided by UNDP</b>	<b>UNDP Fee (8.5%)</b>
<b>Identification, Sourcing and Screening of Ideas</b>	Provide information on substantive issues in adaptation associated with the purpose of the Adaptation Fund (AF). Engage in upstream policy dialogue related to a potential application to the AF. Verify soundness & potential eligibility of identified idea for AF.	\$27,419
<b>Feasibility Assessment / Due Diligence Review</b>	Provide up-front guidance on converting general idea into a feasible project/programme. Source technical expertise in line with the scope of the project/programme. Verify technical reports and project conceptualization. Provide detailed screening against technical, financial, social and risk criteria and provide statement of likely eligibility against AF requirements. Determination of execution modality and local capacity assessment of the national executing entity. Assist in identifying technical partners. Validate partner technical abilities. Obtain clearances from AF.	\$82,258
<b>Development &amp; Preparation</b>	Provide technical support, backstopping and troubleshooting to convert the idea into a technically feasible and operationally viable project/programme. Source technical expertise in line with the scope of the project/programme needs. Verify technical reports and project conceptualization. Verify technical soundness, quality of preparation, and match with AF expectations. Negotiate and obtain clearances by AF. Respond to information requests, arrange revisions etc.	\$109,678
<b>Implementation</b>	Technical support in preparing TORs and verifying expertise for technical positions. Provide technical and operational guidance project teams. Verification of technical validity / match with AF expectations of inception report. Provide technical information as needed to facilitate implementation of the project activities. Provide advisory services as required. Provide technical support, participation as necessary during project activities. Provide troubleshooting support if needed. Provide support and oversight missions as necessary. Provide technical monitoring, progress monitoring, validation and quality assurance throughout. Allocate and monitor Annual Spending Limits based on agreed work plans. Receipt, allocation and reporting to the AFB of financial resources. Oversight and monitoring of AF funds. Return unspent funds to AF.	\$246,776
<b>Evaluation and Reporting</b>	Provide technical support in preparing TOR and verify expertise for technical positions involving evaluation and reporting. Participate in briefing / debriefing. Verify technical validity / match with AF expectations of all evaluation and other reports Undertake technical analysis, validate results, and compile lessons. Disseminate technical findings	\$82,259
<b>Total</b>		\$548,390

### Annex 3: Implementation schedule

	Yr-1				Yr-2				Yr-3				Yr-4				Yr-5				Yr-6				Total budget (USD)
	QR-1	QR-2	QR-3	QR-4	QR-1	QR-2	QR-3	QR-4	QR-1	QR-2	QR-3	QR-4	QR-1	QR-2	QR-3	QR-4	QR-1	QR-2	QR-3	QR-4	QR-1	QR-2	QR-3	QR-4	
<b>Outcome 1: The enabling environment to support climate resilient agricultural development to private sector farmers is strengthened.</b>																									
Output 1.1. Climate resilience is mainstreamed into policies and regulations in agriculture, water and land management sectors and communicated to farmers in an accessible way		77,000			82,000				82,000				1,000				1,000				-				243,000
Output 1.2. Capacity built for key government ministries and other relevant institutions on climate resilience in private sector agriculture		59,500			81,000				71,000				63,000				71,000				55,500				401,000
<b>SUB-TOTAL:</b>		<b>136,500</b>			<b>163,000</b>				<b>153,000</b>				<b>64,000</b>				<b>72,000</b>				<b>55,500</b>				<b>644,000</b>
<b>Outcome 2: Climate resilient extension services developed to benefit 20,000 small and medium sized non-state order farmers to adopt climate smart agriculture practices</b>																									
Output 2.1. More than 20,000 farming enterprises and entrepreneurs receive climate risk information and resilience advice through extension services support, access to best practice guidance and improved climate information services.		159,050			211,050				146,550				122,250				116,750				104,500				860,150
Output 2.2. : A public-private network of at least 50 extensions service providers are trained to deliver climate risk management and adaptation information and advice to farmers		142,500			532,000				532,000				515,000				204,000				131,300				2,056,800
<b>SUB-TOTAL:</b>		<b>301,550</b>			<b>743,050</b>				<b>678,550</b>				<b>637,250</b>				<b>320,750</b>				<b>235,800</b>				<b>2,916,950</b>
<b>Outcome 3: Demonstration plots and collective investments enable scale up of climate resilience measures, support peer to peer learning and improve resilience outcomes for farmers</b>																									
Output 3.1. State owned institute supported to develop demonstration site for best available technologies		90,250			398,500				391,000				213,000				121,000				89,750				1,303,500
Output 3.2. Larger private sector farmers invest in demonstration sites for specific technologies that form a basis for local learning and best practice dissemination		30,000			149,500				149,500				149,500				49,500				30,200				558,200
Output 3.3. Private farmer collectives or groups of small holders farmers collectively invest in community level demonstration sites					49,500				159,500				135,500				125,500				-				470,000
<b>SUB-TOTAL:</b>		<b>120,250</b>			<b>597,500</b>				<b>700,000</b>				<b>498,000</b>				<b>296,000</b>				<b>119,950</b>				<b>2,331,700</b>
<b>EXECUTION COSTS:</b>		93,000			104,000				104,000				101,000				84,000				73,000				559,000
<b>GRAND-TOTAL:</b>		<b>651,300</b>			<b>1,607,550</b>				<b>1,635,550</b>				<b>1,300,250</b>				<b>772,750</b>				<b>484,250</b>				<b>6,451,650</b>

#### Annex 4: UNDP Direct Project Support Services

### STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES

#### HOW TO USE THIS LETTER OF AGREEMENT

- This agreement is used to provide appropriate legal coverage when the UNDP country office provides support services under national execution.
- This agreement must be signed by a governmental body or official authorized to confer full legal coverage on UNDP. (This is usually the Minister of Foreign Affairs, the Prime Minister /or Head of State.) The UNDP country office must verify that the government signatory has been properly authorized to confer immunities and privileges.
- A copy of the signed standard letter will be attached to each PSD and project document requiring such support services. When doing this, the UNDP country office completes the attachment to the standard letter on the nature and scope of the services and the responsibilities of the parties involved for that specific PSD/project document.
- The UNDP country office prepares the letter of agreement and consults with the regional bureau in case either of the parties wishes to modify the standard text. After signature by the authority authorized to confer immunities and privileges to UNDP, the government keeps one original and the UNDP country office the other original. A copy of the agreement should be provided to UNDP headquarters (BOM/OLPS) and the regional bureau.

Dear Mr. Magtymguly Bayramdurdyev,

1. Reference is made to consultations between officials of the Government of *Turkmenistan* (hereinafter referred to as “the Government”) and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.
2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.
3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:
  - (a) Identification and/or recruitment of project and programme personnel;
  - (b) Identification and facilitation of training activities;
  - (a) Procurement of goods and services;
4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the programme support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a programme or project, the annex to the programme support document or project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.
5. The relevant provisions of the [*Insert title and date of the UNDP standard basic assistance agreement with the Government*] (the “SBAA”), including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.
6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.
7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.
8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be affected by mutual written agreement of the parties hereto.
10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

\_\_\_\_\_  
Signed on behalf of UNDP  
Resident Representative

\_\_\_\_\_  
For the Government

Mr. Magtymguly Bayramurdyev

Minister of Agriculture and Environmental Protection of Turkmenistan

"\_\_\_\_\_" 2019

#### Attachment

#### DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between UNDP office in Turkmenistan, the institution designated by the Government of Turkmenistan and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project "Scaling Climate Resilience for Farmers in Turkmenistan" (Project ID # 00097117), "the Project".
2. In accordance with the provisions of the letter of agreement signed on *[insert date of agreement]* and the project document, the UNDP country office shall provide support services for the Project as described below.
3. Support services to be provided:

Support services	Schedule for the provision of the support services	Cost to UNDP of providing such support services per case/person in USD	DPC Total Amount in USD
1. Human Resources			
a) TOR review and post classification + creation	Jun-19	34.35	206.10
b) Advertisement	Jun-19	119.96	719.76
c) Short-listing (including long-listing)	Jun-19	239.92	1,439.52
d) Writing test preparation (questions)	Jun-19	53.57	321.42
e) Writing test arrangement and administration	Jun-19	91.4	548.40
f) Test Evaluation	Jun-19	88.83	532.98
g) Interviewing	Jun-19	239.92	1,439.52
h) Reference check	Jun-19	40.06	240.36
i) Review recruitment case	Jun-19	25.85	155.10
j) Contract issuance	Jun-19	82.38	494.28

k) Recurrent personnel management services: staff payroll & banking administration & management (for whole contract period):			0.00
<i>Payroll validation, disbursement</i>	Annual fee per employee per year)	157.04	5,653.44
<i>Extension, promotion, entitlements</i>		134.6	4,845.60
Performance evaluation		134.6	4,845.60
<i>Leave monitoring</i>		22.43	807.48
<i>Leave monitoring</i> - Absence data management in Atlas only		5.7	205.20
l) Staff HR & Benefits Administration & Management ( <i>one time fee, per staff. Services incl. contract issuance, benefits enrollment, payroll setup - this price applies to the separation process as well</i> )	Yearly	205.66	1,233.96
Total			<b>23,688.72</b>
2. Finance			<b>23,688.72</b>
a) Payment to vendor and staff	Dayly/Monthly	38.49	27,712.80
- Urgent payments to vendor and staff (within 1 day)	Ad hoc	76.98	923.76
b) Issue check only (Atlas Agencies only)	Ad hoc	16.7	334.00
- Issue check only (Atlas Agencies only - within 3 days)	Ad hoc	25.05	601.20
c) Vendor profile only (Atlas Agencies only)	As per the working plan	20.66	826.40
AR Management Process (create/apply receivable pending item- Atlas Agencies Only)	As per the working plan	35.6	356.00
d) Journal Voucher or General Ledger Journal Entry (GLJE)	Quarterly, yearly	35.67	356.70
e) PCA reports review and certification	As per the working plan	25.8	258.00
f) F10 Settlement	As per the working plan	23.12	693.60
g) Issue/Apply Deposits Only	As per the working plan	21.74	217.40
Total			32,279.86
3. Procurement			32,279.86
a) Procurement not involving CAP - below US\$ 50,000			
- Identification and selection	As per the working plan	282.29	8,468.70
- Issue Purchase Order	As per the working plan	41.95	1,258.50
- Follow-up	As per the working plan	41.95	1,258.50
b) Procurement process involving CAP (and/or ITB, RFP, requirements) - above US\$ 50,000)			
- Identification & selection	As per the working plan	489.45	7,341.75
- Contracting/Issue Purchase Order	As per the working plan	104.07	1,561.05

- Follow-up	As per the working plan	104.07	1,561.05
c) Consultant recruitment			0.00
- Advertising	As per the working plan	36.11	722.20
- shortlisting and selection	As per the working plan	157.13	3,142.60
- Contract issuance	As per the working plan	72.22	1,444.40
d) Procurement involving RACP (goods, services & consultant > US\$150,000)			
- Identification & selection	As per the working plan	582.33	1,746.99
- Contracting	As per the working plan	60.67	182.01
- Issue PO	As per the working plan	48.01	144.03
- Follow up	As per the working plan	60.67	182.01
e) Asset disposal involving CAP	By the closure of the project	275.14	1,375.70
Total			30,389.49
4. Admin Support			
Issue/Renew IDs (UN LP, UN ID, etc.)_UPL	Yearly	38.2	1,375.20
Registration for stay in TKM	As per the working plan	71.83	1,436.60
Custom Clearance- Diplomatic cargo	As per the working plan	332.46	3,324.60
Visa request (excl. government fee)	As per the working plan	59.55	1,488.75
Ticket request (booking, purchase)	As per the working plan	71.79	2,153.70
Miscellaneous Letters	As per the working plan	12.55	363.95
			10,142.80
<b>Total DPC</b>			<b>96,500.87</b>

#### 4. Detailed breakdown of UNDP Country Office support services by the Components:

**Support to implementation of Outcome 1:** The enabling environment to support climate resilient agricultural development to private sector farmers is strengthened.

Support services	Schedule for the provision of the support services	Cost to UNDP of providing such support services per case/person in USD	DPC Total Amount in USD
1. Human Resources			
a) TOR review and post classification + creation	Jun-19	34.35	34.35
b) Advertisement	Jun-19	119.96	119.96
c) Short-listing (including long-listing)	Jun-19	239.92	239.92
d) Writing test preparation (questions)	Jun-19	53.57	53.57
e) Writing test arrangement and administration	Jun-19	91.4	91.40
f) Test Evaluation	Jun-19	88.83	88.83
g) Interviewing	Jun-19	239.92	239.92
h) Reference check	Jun-19	40.06	40.06
i) Review recruitment case	Jun-19	25.85	25.85
j) Contract issuance	Jun-19	82.38	82.38

k) Recurrent personnel management services: staff payroll & banking administration & management (for whole contract period):			0.00
<i>Payroll validation, disbursement</i>	Annual fee per employee per year)	157.04	628.16
<i>Extension, promotion, entitlements</i>		134.6	538.40
Performance evaluation		134.6	538.40
<i>Leave monitoring</i>		22.43	89.72
<i>Leave monitoring</i> - Absence data management in Atlas only		5.7	22.80
l) Staff HR & Benefits Administration & Management ( <i>one time fee, per staff. Services incl. contract issuance, benefits enrollment, payroll setup</i> - this price applies to the separation process as well)	Yearly	205.66	205.66
Total			<b>3,039.38</b>
2. Finance			
a) Payment to vendor and staff	Dayly/Monthly	38.49	2,771.28
- Urgent payments to vendor and staff (within 1 day)	Ad hoc	76.98	76.98
b) Issue check only (Atlas Agencies only)	Ad hoc	16.7	33.40
- Issue check only (Atlas Agencies only - within 3 days)	Ad hoc	25.05	60.12
c) Vendor profile only (Atlas Agencies only)	As per the working plan	20.66	82.64
AR Management Process (create/apply receivable pending item- Atlas Agencies Only)	As per the working plan	35.6	35.60
d) Journal Voucher or General Ledger Journal Entry (GLJE)	Quarterly, yearly	35.67	35.67
e) PCA reports review and certification	As per the working plan	25.8	25.80
f) F10 Settlement	As per the working plan	23.12	69.36
g) Issue/Apply Deposits Only	As per the working plan	21.74	21.74
Total			<b>3,212.59</b>
3. Procurement			
a) Procurement not involving CAP - below US\$ 50,000			
-Identification and selection	As per the working plan	282.29	846.87
- Issue Purchase Order	As per the working plan	41.95	125.85
- Follow-up	As per the working plan	41.95	125.85
b) Procurement process involving CAP (and/or ITB, RFP, requirements) - above US\$ 50,000)			
- Identification & selection	As per the working plan	489.45	734.18
- Contracting/Issue Purchase Order	As per the working plan	104.07	156.11
- Follow-up	As per the working plan	104.07	156.11
c) Consultant recruitment			0.00
- Advertising	As per the working plan	36.11	72.22
- shortlisting and selection	As per the working plan	157.13	314.26
- Contract issuance	As per the working plan	72.22	144.44

d) Procurement involving RACP (goods, services & consultant > US\$150,000)			
- Identification & selection	As per the working plan	582.33	0.00
- Contracting	As per the working plan	60.67	0.00
- Issue PO	As per the working plan	48.01	0.00
- Follow up	As per the working plan	60.67	0.00
e) Asset disposal involving CAP	By the closure of the project	275.14	0.00
Total			2,675.88
<b>4. Admin Support</b>			
Issue/Renew IDs (UN LP, UN ID, etc.)_UPL	Yearly	38.2	152.80
Registration for stay in TKM	As per the working plan	71.83	143.66
Custom Clearance- Diplomatic cargo	As per the working plan	332.46	332.46
Visa request (excl. government fee)	As per the working plan	59.55	148.88
Ticket request (booking, purchase)	As per the working plan	71.79	215.37
Miscellaneous Letters	As per the working plan	12.55	37.65
Total			1,030.82
<b>Total DPC</b>			<b>9,958.66</b>

**Support to implementation of Outcome 2:** Climate resilient extension services developed to benefit 20,000 small and medium sized non-state order farmers to adopt climate smart agriculture practices.

Support services	Schedule for the provision of the support services	Cost to UNDP of providing such support services per case/person in USD	DPC Total Amount in USD
<b>1. Human Resources</b>			
a) TOR review and post classification + creation	Jun-19	34.35	103.05
b) Advertisement	Jun-19	119.96	359.88
c) Short-listing (including long-listing)	Jun-19	239.92	719.76
d) Writing test preparation (questions)	Jun-19	53.57	160.71
e) Writing test arrangement and administration	Jun-19	91.4	274.20
f) Test Evaluation	Jun-19	88.83	266.49
g) Interviewing	Jun-19	239.92	719.76
h) Reference check	Jun-19	40.06	120.18
i) Review recruitment case	Jun-19	25.85	77.55
j) Contract issuance	Jun-19	82.38	247.14
k) Recurrent personnel management services: staff payroll & banking administration & management (for whole contract period):	Annual fee per employee per year)		0.00
Payroll validation, disbursement		157.04	2,512.64
Extension, promotion, entitlements		134.6	2,153.60
Performance evaluation		134.6	2,153.60



Leave monitoring		22.43	358.88
Leave monitoring - Absence data management in Atlas only		5.7	91.20
l) Staff HR & Benefits Administration & Management (onetime fee, per staff. Services incl. contract issuance, benefits enrollment, payroll setup - this price applies to the separation process as well)	Yearly	205.66	616.98
<b>TOTAL, Human Resources</b>			<b>10,935.62</b>
<b>2. Finance</b>			
a) Payment to vendor and staff	Daily/Monthly	38.49	12,470.76
- Urgent payments to vendor and staff (within 1 day)	Ad hoc	76.98	461.88
- Urgent payments to vendor and staff (within 3 day)	Ad hoc	57.74	150.30
b) Issue check only (Atlas Agencies only)	Ad hoc	16.7	275.55
- Issue check only (Atlas Agencies only - within 1 day)	Ad hoc	33.4	371.88
- Issue check only (Atlas Agencies only - within 3 days)	Ad hoc	25.05	178.00
c) Vendor profile only (Atlas Agencies only)	As per the working plan	20.66	178.35
AR Management Process (create/apply receivable pending item- Atlas Agencies Only)	As per the working plan	35.6	129.00
d) Journal Voucher or General Ledger Journal Entry (GLJE)	Quarterly, yearly	35.67	323.68
e) PCA reports review and certification	As per the working plan	25.8	108.70
f) F10 Settlement	As per the working plan	23.12	14,648.10
g) Issue/Apply Deposits Only	As per the working plan	21.74	12,470.76
<b>TOTAL, Finance</b>			<b>461.88</b>
<b>3. Procurement</b>			
a) Procurement not involving CAP - below US\$ 50,000			
-Identification and selection	As per the working plan	282.29	3,952.06
- Issue Purchase Order	As per the working plan	41.95	587.30
- Follow-up	As per the working plan	41.95	587.30
b) Procurement process involving CAP (and/or ITB, RFP, requirements) - above US\$ 50,000)	As per the working plan		
- Identification & selection	As per the working plan	489.45	3,426.15
- Contracting/Issue Purchase Order	As per the working plan	104.07	728.49
- Follow-up	As per the working plan	104.07	728.49
c) Consultant recruitment	As per the working plan		0.00
- Advertising	As per the working plan	36.11	324.99
- shortlisting and selection	As per the working plan	157.13	1,414.17
- Contract issuance	As per the working plan	72.22	649.98
d) Procurement involving RACP (goods, services & consultant > US\$150,000)	As per the working plan		
- Identification & selection	As per the working plan	582.33	1,164.66

- Contracting	As per the working plan	60.67	121.34
- <i>Issue PO</i>	As per the working plan	48.01	96.02
- Follow up	As per the working plan	60.67	121.34
e) Asset disposal involving CAP	By the closure of the project	275.14	825.42
<b>TOTAL, Procurement</b>			14,727.71
<b>4. Admin Support</b>			
Issue/Renew IDs (UN LP, UN ID, etc.)_UPL	Yearly	38.2	611.20
Registration for stay in TKM	As per the working plan	71.83	646.47
Custom Clearance- Diplomatic cargo	As per the working plan	332.46	1,662.30
Visa request (excl. government fee)	As per the working plan	59.55	714.60
Transportation Arrangement	As per the working plan	15.9	1,005.06
Hotel Reservation	As per the working plan	17.63	163.15
Ticket request (booking, purchase)	As per the working plan	71.79	4,802.78
Travel request or authorization- Simple	As per the working plan	16.51	45,114.21
Travel cost estimates- Simple	As per the working plan	26.42	611.20
Travel cost estimates - Complex	As per the working plan	24.04	646.47
Travel request or authorization- Complex	As per the working plan	38.347	1,662.30
Miscellaneous Letters	As per the working plan	12.55	714.60
<b>TOTAL, Admin Support</b>			1,005.06
<b>Total DPC for Outcome 2:</b>			163.15

**Support to implementation of Outcome 3:** Demonstration plots and collective investments enable scale up of climate resilience measures, support peer to peer learning and improve resilience outcomes for farmers.

Support services	Schedule for the provision of the support services	Cost to UNDP of providing such support services per case/person in USD	DPC Total Amount in USD
<b>1. Human Resources</b>			
a) TOR review and post classification + creation	Jun-19	34.35	68.70
b) Advertisement	Jun-19	119.96	239.92
c) Short-listing (including long-listing)	Jun-19	239.92	479.84
d) Writing test preparation (questions)	Jun-19	53.57	107.14
e) Writing test arrangement and administration	Jun-19	91.4	182.80
f) Test Evaluation	Jun-19	88.83	177.66
g) Interviewing	Jun-19	239.92	479.84
h) Reference check	Jun-19	40.06	80.12
i) Review recruitment case	Jun-19	25.85	51.70

j) Contract issuance	Jun-19	82.38	164.76
k) Recurrent personnel management services: staff payroll & banking administration & management (for whole contract period):	Annual fee per employee per year)		0.00
Payroll validation, disbursement		157.04	2,512.64
Extension, promotion, entitlements		134.6	2,153.60
Performance evaluation		134.6	2,153.60
Leave monitoring		22.43	358.88
Leave monitoring - Absence data management in Atlas only		5.7	91.20
l) Staff HR & Benefits Administration & Management (one time fee, per staff. Services incl. contract issuance, benefits enrollment, payroll setup - this price applies to the separation process as well)	Yearly	205.66	411.32
Total			<b>9,713.72</b>
2. Finance			
a) Payment to vendor and staff	Daily/Monthly	38.49	12,470.76
- Urgent payments to vendor and staff (within 1 day)	Ad hoc	76.98	384.90
b) Issue check only (Atlas Agencies only)	Ad hoc	16.7	150.30
- Issue check only (Atlas Agencies only - within 3 days)	Ad hoc	25.05	265.53
c) Vendor profile only (Atlas Agencies only)	As per the working plan	20.66	371.88
AR Management Process (create/apply receivable pending item- Atlas Agencies Only)	As per the working plan	35.6	142.40
d) Journal Voucher or General Ledger Journal Entry (GLJE)	Quarterly, yearly	35.67	142.68
e) PCA reports review and certification	As per the working plan	25.8	103.20
f) F10 Settlement	As per the working plan	23.12	300.56
g) Issue/Apply Deposits Only	As per the working plan	21.74	86.96
Total			14,419.17
3. Procurement			
a) Procurement not involving CAP - below US\$ 50,000			
- Identification and selection	As per the working plan	282.29	3,669.77
- Issue Purchase Order	As per the working plan	41.95	545.35
- Follow-up	As per the working plan	41.95	545.35
b) Procurement process involving CAP (and/or ITB, RFP, requirements) - above US\$ 50,000)			
- Identification & selection	As per the working plan	489.45	3,181.43
- Contracting/Issue Purchase Order	As per the working plan	104.07	676.46
- Follow-up	As per the working plan	104.07	676.46
c) Consultant recruitment			0.00
- Advertising	As per the working plan	36.11	324.99
- shortlisting and selection	As per the working plan	157.13	1,414.17
- Contract issuance	As per the working plan	72.22	649.98
d) Procurement involving RACP (goods, services & consultant > US\$150,000)			

- Identification & selection	As per the working plan	582.33	582.33
- Contracting	As per the working plan	60.67	60.67
- <i>Issue PO</i>	As per the working plan	48.01	48.01
- Follow up	As per the working plan	60.67	60.67
e) Asset disposal involving CAP	By the closure of the project	275.14	550.28
Total			12,985.91
4. Admin Support			
Issue/Renew IDs (UN LP, UN ID, etc.)_UPL	Yearly	38.2	611.20
Registration for stay in TKM	As per the working plan	71.83	646.47
Custom Clearance- Diplomatic cargo	As per the working plan	332.46	1,329.84
Visa request (excl. government fee)	As per the working plan	59.55	625.28
Ticket request (booking, purchase)	As per the working plan	71.79	933.27
Miscellaneous Letters	As per the working plan	12.55	163.15
Total			4,309.21
<b>Total DPC</b>			<b>41,428.00</b>

Maximum DPC amount to be charged to AF fund is USD 96,500.

**Letter (e-mail) from NDA to UNDP Turkmenistan dated 3 September 2019 requesting UNDP support services for the project implementation:**

----- Forwarded message -----

От: **Б. Б.** <[berber1133@gmail.com](mailto:berber1133@gmail.com)>

Date: вт, 3 сент. 2019 г. в 19:35

Subject: Proposal of UNDP support services to the Project "Scaling Climate Resilience for Farmers in Turkmenistan"

To: <[natia.natsvlishvili@undp.org](mailto:natia.natsvlishvili@undp.org)>

Cc: Nataly Olofinskaya <[nataly.olofinskaya@undp.org](mailto:nataly.olofinskaya@undp.org)>, Rovshen Nurmuhamedov <[rovshen.nurmuhamedov@undp.org](mailto:rovshen.nurmuhamedov@undp.org)>

Dear Natia,

I hope this mail finds you well.

As for the proposed project planned to be implemented with UNDP with financial support from AF, I would like to request United Nations Development Programme to provide implementation support services to the Project "Scaling Climate Resilience for Farmers in Turkmenistan" in accordance with the AF policy for provision of such services and as reflected respectively on UNDP Direct Project Support Services in Part III on Implementation Arrangements of the Project Proposal and in Annex 4 to the Project Proposal on UNDP Direct Project Support Services.

Best regards,

Berdi Berdiyev  
Head of the Department on Coordination of the International Ecological Cooperation and Projects  
Ministry of Agriculture and Environment Protection of Turkmenistan  
Focal Point of the National Designated Authority (NDA) of Turkmenistan for the Adaptation Fund

744000, 92, Archabil Avenue, Ashgabat, Turkmenistan  
Tel. (+993-12) 447850  
Fax. (+993-12) 447855  
E-mail [mnptm.dcep@gmail.com](mailto:mnptm.dcep@gmail.com)

--

Best regards,

Berdi Berdiyev  
Head of the Department on Coordination of the International Ecological Cooperation and Projects  
Ministry of Agriculture and Environment Protection of Turkmenistan

## Annex 5: Turkmenistan climate outlook and vulnerability to climate change

Turkmenistan is located in the west of Central Asia between the Caspian Sea and the Amu Darya River. The territory of Turkmenistan is a part of the Aral and Caspian Sea basin. It is predominantly a flat country containing deserts and oases, with mountainous zones along its border (mainly in the south). The Karakum Desert, one of the largest deserts in the world, occupies 80% of the country's total land area. The rest of the land area is covered by mountain. Turkmenistan has a sharply continental and extremely dry and hot climate.<sup>21</sup> Despite the desert nature that is distinctive for most of Turkmenistan, there are significant differences in average temperature in the northern and southern parts of the country. The northern part, located in the Siberian anticyclone area, is characterized by severe and long winters with continuous snow cover and average yearly temperatures fluctuating between 13°C and 16°C. The southern part of the country, on the other hand, is characterized by mild winters with only occasional snow cover and average yearly temperatures ranging between 18°C and 22°C.<sup>22</sup> In the warm period of the year (from May to September), the daily air temperature often exceeds 40°C, and has occasionally even surpassed 50°C (in Repetek, southeast Karakum Desert). Meanwhile, during the coldest part of the year, temperatures are usually below zero °C and have even been recorded at levels as low as -36°C<sup>23</sup> (in Dashoguz velayat).<sup>24</sup> In terms of the historical trends related to the average mean temperature, meteorological data series show a steady increase of 1.4°C since the 1960s.<sup>25</sup>

The annual precipitation across Turkmenistan also varies greatly, ranging from 76 mm to 380 mm. In the northern part of the country, most of the precipitation occurs in the periods from March to May and from October to February, with the summer months experiencing quite low levels of precipitation, accounting for only 8.4 % of the total annual amount.<sup>26</sup> In the southern parts of Turkmenistan, much of the precipitation falls between December and April (87.8 % of the total annual amount), with quite low levels seen during the summer months (only 1.9 % of the total amount). In addition, while the desert areas experience precipitation only in the winter, the mountainous areas are characterized by a high frequency of precipitation throughout the year, often causing flash floods and mudflows.<sup>27</sup> Trends show that variability in monthly precipitation has been growing and that the amount of precipitation during recent years has slightly increased, particularly in spring months, with the lowest precipitation values being observed in summer.<sup>28</sup> With the low total annual rainfall, 96% of Turkmenistan is characterized as arid land, making it the most arid of the five Central Asian countries. Drought is a semi-permanent condition in the country. There are few rivers, the largest being Amu-Darya, with little to no surface flows across most of the desert landscapes. Water is a scarce resource and is unequally distributed across Turkmenistan, with 95% coming from the Amu Darya river, and the remaining 5% from all other rivers, streams and springs. The southern Murghab, Tedzhen and Sumbar rivers, and the smaller rivers of the foothills of the Kopet Dag, are fully exploited for irrigation. The building of the Karakum Canal has changed the distribution of water resources across the country. It has removed the imbalance in the distribution of water between the larger areas of cotton growing land in one part of the country and the water resources in the other. Water shortages are common, particularly in the south and west of the country.

Over the past 60 years, intensive warming has been observed all over the country. The highest temperature rise, 2°C, is observed in the winter period. Overall, the climate is becoming drier with increased frequency of strong heat periods; flash runoffs and mudflows as well as rainstorms. In addition, the productivity of pastures and grazing sites which is closely linked to the changing weather conditions has been severely affected, with the dry years experiencing a reduction of the volume of forage by 3 - 5 times. Since 1969, the Amu Darya River basin has been repeatedly affected by seasonal floods, causing damage to farmlands, homes, public utilities and infrastructure.

---

<sup>21</sup> Second National Communication of Turkmenistan to the United Nations Framework Convention on Climate Change (UNFCCC), 2010.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> velayat refers to province.

<sup>25</sup> Turkmenistan Climate Adaptation Profile, Climate Change Knowledge Portal.

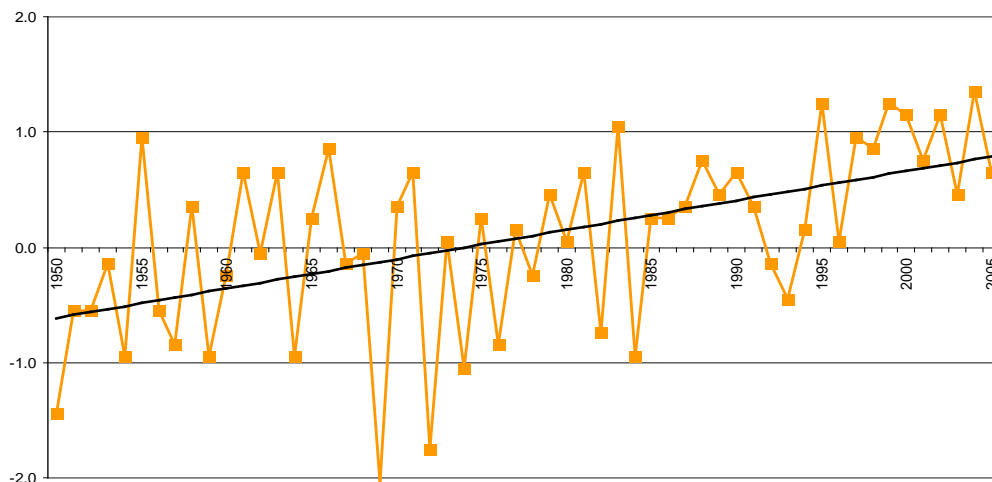
[http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile&CCCode=TKM](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCCode=TKM).

<sup>26</sup> Second National Communication of Turkmenistan to the UNFCCC.

<sup>27</sup> Ibid.

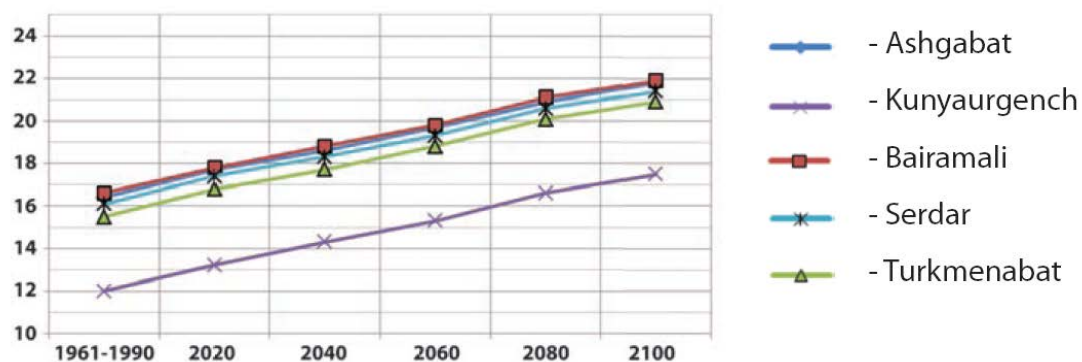
<sup>28</sup> Turkmenistan Climate Adaptation Profile, Climate Change Knowledge Portal.

[http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile&CCCode=TKM](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCCode=TKM).

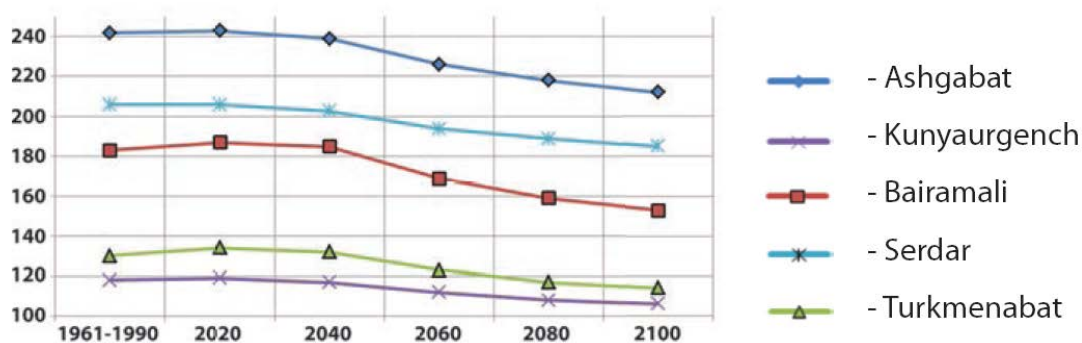


**Fig. 1: Mean annual change in air temperatures (temperature deviation from average indicators recorded 1961 – 1990). Source: Ministry of Nature Protection**

Climate change modeling indicates significant increases in temperature (Figure 2) and reductions in rainfall (Figure 3).

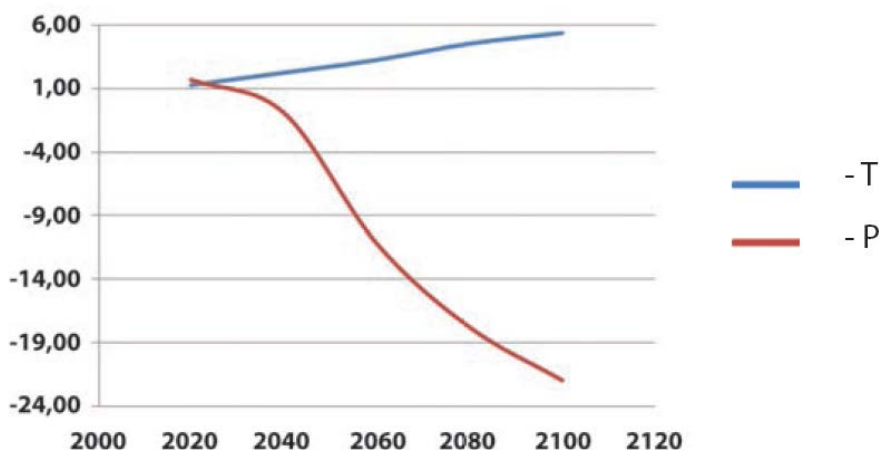


**Fig. 2: The average annual air temperature for averaging scenario, °C, TNC, 2016**



**Fig. 3: The average amount of precipitation on averaged scenario, mm, TNC, 2016**

Temperatures are expected to increase steadily in 2020-2100, and the amount of precipitation at first remains stable, fell sharply after 2030-2040 by up-to 22 mm by 2100. The air temperature on the averaged scenario will increase by 2020 by 1.23°C, 2040 – by 2.21°C, 2060 – by 3.22°C, 2080 – by 4.51°C, 2100 – by 5.35°C. The runoff of Amu Darya river (the main source of Turkmenistan's surface water) is expected to decline by 10-15 percent by 2050<sup>29</sup>.



**Fig. 4: Deviation from the normal average air temperature T (°C) and precipitation P (mm) for Turkmenistan on averaged scenarios A1FI and B1, TNC**

In summary, projected climate change impacts in Turkmenistan are project to include the following:

- An increase in average annual temperature, which will include an increase in the number of extremely hot days (i.e. days over 40°C)<sup>30</sup>;
- A reduction in annual average rainfall;
- An increase in average regional evaporation rates of 48% by 2050;
- An increase in the frequency and intensity of drought and flood spells;
- A 10-15% reduction in flow rates for the Amu Darya river<sup>31</sup>; and
- A 30% reduction in flow rates of other rivers.

According to national estimates, unless there is an improved efficiency in irrigation systems, these factors are likely to result in a water deficit for agriculture of up to 5.5 km<sup>3</sup> per annum by 2050<sup>32</sup>. This is equivalent to approximately 20% of current water use in the agriculture sector. This water deficit has the potential to result in significant economic losses to the agriculture sector. Due to unproductive land equivalencies, over the period 2015-2030, this water deficit would result in output reductions equivalent to nearly 4 million tons of wheat and more than 3 million tons of cotton. An estimated overall decrease in productivity of irrigated agriculture will be in the range of 15-50%<sup>33</sup>. The livestock productivity will drop due to dwindling areas of pasture land and a 30%

<sup>29</sup> TNC, 2016

<sup>30</sup> These estimates are based on the findings of five general atmosphere and ocean circulation models (GCM) reported in Turkmenistan's Initial Communication on Climate Change (1998). The GCM with the most plausible results on temperature predictions was the UK89 model (equilibrium model of the United Kingdom Meteorological Agency). According to this scenario, temperature is predicted to increase by 5.5°C by 2050.

<sup>31</sup> Second National Communication of Turkmenistan to the UNFCCC (2010)

<sup>32</sup> TNC

<sup>33</sup> CAREC, Gap Analysis on Adaptation to Climate Change in Central Asia



decrease in fertility of the existing pastures<sup>34</sup>. Climate change is therefore likely to reduce the volume of water availability for irrigation, and subsequently limit the number of crops produced. These trends will be accompanied by increased frequency and severity of climate induced disasters (drought, floods, strong winds).

### **Vulnerability of the Turkmenistan agricultural sector and communities**

Despite the fact that only 4.1% of the land area is arable<sup>35</sup> and the challenging conditions, agriculture remains a key strategic sector of the economy, employing approximately 50% of the workforce and contributing 19% of Gross Domestic Product (GDP)<sup>36</sup> (USD \$3.8 billion). Agriculture is the basis for the country's food security and an important supplier of raw materials for the processing industry. Livestock, wheat and cotton are the primary areas of economic activity. Pastures occupy a large territory of the country accounting for 78 percent of land reserves. Approximately 47.77% of Turkmenistan's population lives in rural areas and depend on agriculture for their livelihoods; with a significant part of rural population being particularly vulnerable due to a combination of socio-economic factors and climate change impacts. As agriculture is one of the most climate sensitive sectors, climate change will likely affect most vulnerable rural populations and have negative consequences on economic growth and their livelihoods.

During the last few decades, Turkmenistan has experienced widespread changes in land cover and land use following the socioeconomic and institutional changes in the wake of the disintegration of the Union of Soviet Socialist Republics (USSR) in 1991, and subsequently followed by a decade of drought and steadily increasing temperatures. These changes in the vegetated landscape are sufficiently broad to be detectable from orbital sensors at multiple scales. The agriculture sector in Turkmenistan is not currently at its maximum productive potential.

As a result of limited water resources, of the 17 million hectares available for irrigated agriculture, only 1.7 million are currently utilized for this purpose. Despite this, agriculture currently consumes 92% of all available surface waters in the country. Since agriculture is heavily dependent on irrigation, increasing temperature, a decrease in precipitation, and the probable reduction in surface water are all likely to potentially lead to an increase in aridity and accelerating desertification. Due to expected water scarcity, a decrease and degradation of natural grasslands is also anticipated, ultimately leading to a decline in sheep breeding production<sup>37</sup>.

The Crops subsector: The focus of the sector is largely on state mandated crops such as cotton, wheat and sugar beet. Consequently, almost all public sector investments are directed at cotton and wheat, based on government policy of self-sufficiency in grains and maintaining the export potential for cotton products. This policy has greatly affected the structure of the agricultural sector and its potential for production, since thousands of hectares of land that were under orchards, horticulture and fodder crops have been diverted to production of winter wheat. In recent years, the Government has begun to recognize the need to diversify the agricultural sector and acknowledges the inefficiencies of enforcing cotton and wheat production in all regions of the country, however, this effort has been constrained by the increasing frequency of drought in agricultural producing regions, and the associated economic losses experienced by the state. The state has in recent years, allocated some land for crops other than the government mandated crops to be grown in each of the five provinces based on soil and climatic conditions in these regions. As a result of this, each province has been allocated land on a leasehold basis for growing maize, barley, lucerne and other forage crops, a practice aimed at promoting crop rotation and thus improving soil quality. The government is also beginning to invest in high efficiency irrigation technology for water intensive crops, to include (subsoil) drip irrigation systems, mobile sprinklers and wastewater drainage and recycling.

The Livestock subsector is dominated by the private sector, with more than 80% of all products produced by private farmers following the decommissioning of Soviet state livestock farms. Private rural households operate on a lease agreement, according to which the leaseholder provides feed and veterinary services and makes sure that the livestock is kept in good condition. Based on the lease agreement the leaseholder is allocated land for growing fodder crops and receives all the livestock products produced and half of the offspring during the lease period. This lease arrangement predominantly applies to the lease of cattle, whereas sheep and goat are mainly kept by the state association themselves due to relatively easier husbandry and production conditions. Despite a lack of state investment, livestock management has managed to develop a certain degree of efficiency and

---

<sup>34</sup> CAREC, *ibid*

<sup>35</sup> World Bank, [data.worldbank.org/indicators](http://data.worldbank.org/indicators)

<sup>36</sup> FAO, Turkmenistan Agriculture Sector Review (2012)

<sup>37</sup> Second national communication of Turkmenistan to the UNFCCC

productivity, and this subsector now provides a good model for further private sector development within the agricultural sector.

A special attention in the context of climate change should be paid to the vulnerability of natural pastures. The natural pastures have a large diversity of vegetation species and low-cost maintenance with a high nutritional value. However, the pastures are of low productivity and increasingly vulnerable to a sharp seasonal and annual variability. The natural pastures as a reserve base for forage and its nutritional value vary considerably throughout the year. From summer to winter the feed volumes of the pastures are decreasing by 2.0-2.5 times. Assessment of climate change and its impact on the grasslands have shown that productivity is likely to decline in the future. Despite a sufficient resistance of plants to drought and heat, it has been observed that when drought occurs over an extended period that there is a decline in grassland productivity. Soil drought caused by decrease in the water reserve in the soil up to 4 mm. An assessment of accumulated annual precipitation and moisture deficit show that climate change-induced grassland productivity may decline to 10–15% reflecting a moisture stock decrease in the soil in the 0-20 cm layer. The reduction in pasture productivity would likely result in decreased livestock productivity resulting in reduction in meat and wool production<sup>38</sup>.

The Fruit and Vegetable subsector is the most independent of the agricultural sector in Turkmenistan with almost 100% of production is generated privately both by independent farmers and leaseholders. The total land area that is used for production of small-scale farming is negligible compared to the grain, cotton or livestock subsectors, but nevertheless it is highly productive and the most economically viable within the country's agricultural sector. Climatic conditions have historically allowed the country to produce high quality fruit and vegetable products and prior to collapse of the Soviet Union, Turkmenistan was a major exporter of fruit and vegetables to northern parts of the Soviet Union. Over recent years, land allocated to produce winter wheat was increased almost five times largely at the expense of areas dedicated to feed, fruit and vegetable crops. Prices and availability fluctuate between seasons, reflecting an undeveloped processing sector and lack of appropriate technology, facilities and infrastructure for cool storage. Despite the emergence of some private sector activity, this remains a key area for development, and demand for locally sourced product in the markets remains strong.

At present, favorable climatic conditions of Turkmenistan enable it to grow cotton, cereals, vegetable, fruits, grapes, forage crops almost over all the territory of Turkmenistan, and subtropical crops such as olives, pomegranates, persimmons, etc., in the south-west. Projected climate change in Turkmenistan is expected to directly affect the following: (i) Irrigation water demand due to transpiration intensity; (ii) Irrigated land reclamation; (iii) Agricultural crop yields; and (iv) Growing period of plants. In order to determine climate change impact on key agricultural production indicators in the main agricultural regions of Turkmenistan, three natural climatic zones – the Kopetdag and Murgab, the downstream Amudarya and the middle-stream Amudarya were studied. The calculations have been made for major agricultural crops – cotton, wheat, lucerne, and vegetables taking into account their yield capacity. Data analysis showed that crop water demand is likely to increase by 2020 by 13%<sup>39</sup>. This is further compounded by the fact that Turkmenistan is a water-stressed country and has one of the harshest climates in the Central Asian region. The main causes of baseline water stress are: periodic low water flows in rivers, low efficiency of irrigation system, low performing irrigation techniques, limited effective water conservation mechanisms, and limited available water resources for the further economic development of irrigated agriculture.

One of the key underlying causes for baseline vulnerability of the agricultural sector in Turkmenistan is the inefficient water consumption due to outdated approaches to managing water, deteriorating irrigation infrastructure and subsidized water prices. The water subsidies make the current water system financially unsustainable, and dampen the private sector to invest in the absence of conducive financial mechanisms and economic instruments. As a result, incentives for efficient use of water are largely absent, thus large farmers use water inefficiently, and the quality of local service delivery for smaller farmers suffers. Despite inherent water scarcity, Turkmenistan has among the highest water consumption per capita in the world. However, the high-water consumption levels are largely related to the inefficient irrigation systems in the country, as opposed to high household consumption. Farmers in Turkmenistan are not well prepared for climate change, particularly in relation to the efficient use of water. They are often unaware of water saving options. The vulnerability of the water sector to climate change processes directly affects water runoffs, alters rivers hydrographs, and reduces the overall quality of water. Thus, the intensive development of irrigated agriculture with the background decrease of water availability requires taking specific actions for sustainable and rational use of water resources.

---

<sup>38</sup> Second National Communication of Turkmenistan under UNFCCC, 2010

<sup>39</sup> Second National Communication of Turkmenistan under UNFCCC, 2010

To conclude, agriculture in Turkmenistan is extremely vulnerable to climate change, mainly connected to availability and quality of water and land resources. Given that agriculture is almost entirely based on irrigated agriculture practices, any reduction of the volume of available water resources would mainly take its toll on this sector. Effects could be the following: (i) less cultivable land as a result of less available water resources; (ii) increased demand for irrigation water (due to the increase of transpiration); (iii) declining quality of water resources as a result of growing salinity level; (iv) decreasing ameliorative conditions of irrigated lands; (v) decreasing agricultural crops productivity; and (vi) fluctuations in the vegetation periods for plants, etc.

## Annex 6: Socio Economic Impacts of Climate Change and Analysis of Adaptation Options<sup>40</sup>

### Climate impacts

Climate variability and change are likely to significantly impact the water, agriculture sectors in numerous ways with severe socio-economic consequences for Turkmenistan. Average temperature, number of extreme heat days and water availability are the key factors that are likely to determine agricultural productivity. Climate change will alter both of them and therefore the conditions for growing crops in Turkmenistan.

**Table 4: Future impacts of climate change on agriculture**

Climate-related root causes	Impacts
Increase in temperature and evaporation rate	Decrease in water supply; Changes in glacial fed river flows; Decrease in soil moisture; Increase in land degradation; Decrease in agricultural productivity; Increase in salination; Decrease in livestock productivity and pasture yield; Decrease in biodiversity <sup>41</sup> ;
Changing precipitation patterns	Increase in drought frequency; Increase in flood frequency; Decrease in agricultural productivity.
Extreme events a) Heat waves b) Prolonged droughts	Increase in heat waves resulting in: - Decrease in water supply and quality; - Decrease in crop and livestock productivity <sup>42</sup> ; - Decrease in desert pasture productivity; Increase in number of prolonged droughts resulting in: - Decrease in water supply and quality; - Decrease in crop and livestock productivity; Decrease in vegetation cover resulting in an increase in land degradation and desertification.

As can be seen above, reductions in agricultural productivity are expected. Soils in Turkmenistan are soft and sandy and a considerable amount of irrigation water is lost to infiltration into deep soil layers inaccessible to crop roots. Further drying of soils as a result of climate change impacts is likely to significantly affect the main cotton

<sup>40</sup> Based on the final report by the Adaptation Fund/UNDP project "Addressing climate change risks to farming systems in Turkmenistan at national and community level" (2012-2017)

<sup>41</sup> Loss of biodiversity is a cause of degradation of habitats due to deforestation, soil erosion and water pollution.

<sup>42</sup> Sheep breeding will be adversely affected by frequent heat waves and longer hot periods due to its dependence on the productivity of natural grasslands.

and grain cultivating areas<sup>43</sup>, with adverse economic and food security consequences. Episodes of rainfall are predicted to become more sporadic, which will exacerbate the frequency and intensity of both flood and drought periods<sup>44</sup>. At present, agriculture and the agricultural practices adopted are adapted to specific latitudinal climatic zones. However, any shift in these zones as a result of climate change is likely to place pressure on existing practices and systems, which will consequently adversely impact on agricultural productivity<sup>45</sup>.

International analysis indicates significant declines in wheat and cotton yields under higher temperatures and more variable precipitation. Recent work by the World Bank in Uzbekistan (World Bank 2013a) indicates that the direct temperature and precipitation effects of climate change will be a reduction in yields for most crops (although an increase in yields for grasslands). Direct effects on irrigated crops (including cotton, wheat, apples, tomatoes and potatoes by 1-13 percent by 2050 across all agro-ecological zones.

Elsewhere, Anwar et al (2007) found that median wheat yield may decrease by about 29% according to different global warming scenarios. When elevated atmospheric CO<sub>2</sub> is considered, median wheat yield decreases 25% since CO<sub>2</sub> reduces the severity of the warmer air temperatures and lower rainfall. These impacts can, however be offset to some extent by introducing different varieties and deploying better agricultural practices, such as stubble retention and reduced tillage.

Pastoralism is also likely to be adversely affected by climate variability and change. As a result of the predicted climate change-induced increase in temperature and decrease in rainfall, grassland productivity is expected to be reduced by 10-15% by 2050.<sup>46 47</sup> Indeed, as a result of the increasing aridity in Turkmenistan, the yield of desert pastures has already decreased over the past decade. This is likely to have a considerable effect on sheep and goat productivity, unless adaptation measures centered on improving and protecting grassland productivity are implemented. Climate variability and change will also directly influence sheep productivity by causing an increase in average temperature. The predicted increase in annual average temperature and in the number of extremely hot days is expected to reduce wool production and livestock reproductive rates by 10-20% and 5-25%, respectively<sup>48</sup>.

Increases in temperature will reduce yields and improve conditions for pests and diseases. Changes in precipitation patterns will lead to crop failures and diminished productivity. Some gains could be expected, depending on crops and regions, however, the overall impacts on agriculture are expected to be negative. In the case of Turkmenistan most studies point to negative effects on cotton, wheat and other strategic crops.

Increased frequency of droughts and more aridity will result in more likelihood of poor harvests. Shortages in irrigation will also increase the degradation of valuable arable land in the form of intense salination, soil erosion, degradation and reduction of natural grasslands, decrease the productivity of pastures, and will lead to a less efficient livestock industry.

Of particular concern are the increase in water demand and the reduction in water availability which taken together, may result in a significant deficit of agricultural irrigation water. The higher evaporation rate predicted as a result of climate change is likely to increase the water requirements for irrigating crops by 30-40%, thereby aggravating existing water scarcity and irrigation concerns<sup>49</sup>. Increased water demand of up to 60% is expected for vegetables, a growing subsector. In the case of cotton and wheat, the two most important crops in the country, water demand is expected to increase by close to 20% and 10% per unit of area by 2040, respectively. By 2100 these figures will be close to 40% and 20%.

**Figure 5. Expected water demand increases for A1F1 scenario for key crops.**

---

<sup>43</sup> Initial National Communication of Turkmenistan under the United Nations Framework Convention on Climate Change. Phase 2: Capacity building in priority areas of the economy in response to climate change. 2006.

<sup>44</sup> Turkmenistan Country Analysis. United Nations, 2008.

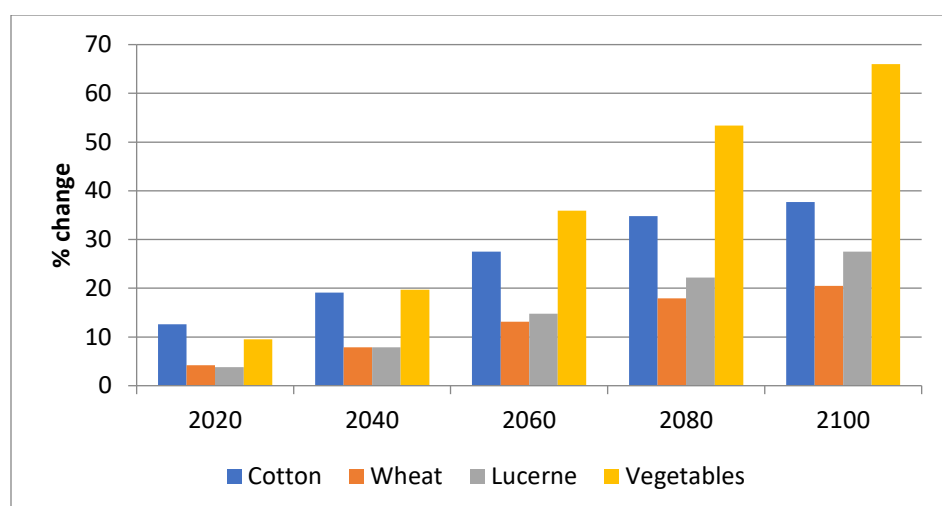
<sup>45</sup> Initial National Communication of Turkmenistan under the United Nations Framework Convention on Climate Change. Phase 2: Capacity building in priority areas of the economy in response to climate change. 2006.

<sup>46</sup> This is the prediction under the scenario of the UK89 GCM (Turkmenistan's Initial National Communication, 1998).

<sup>47</sup> Note recent work by the World Bank in Uzbekistan indicated a net benefit to the productivity of grasslands by 12-43% by 2050 under climate change scenarios

<sup>48</sup> Turkmenistan: Initial National Communication on Climate Change, 1998.

<sup>49</sup> Turkmenistan Country Analysis. United Nations, 2008.



Source: Second National Communication

**Table 5. Water requirement of crops: changes in irrigation rates in m3/ha/year.**

Period	Current irrigation rate	Projected irrigation rate	Difference
Vegetation	5,552	5,977	425
Non-vegetation	1,795	2,294	499
TOTAL	7,347	8,271	924

Source: Second National Communication

On the supply side, river flows are expected to reduce drastically. An increase in the evaporation rates will also contribute to a significant reduction of water available for irrigation. According to Uzbekistan estimates, the flow of the Amy Darya will drop by 15%. Flow rates of other rivers are expected to decline at even faster rates (up to 30% reduction). Turkmenistan is anticipated to be heavily impacted by changes in the glacier systems in the Pamir Alai in the long term<sup>50</sup>. The average reduction in run off rates in terms of surface water collected in national storage and distribution systems is expected to be 10%, whereas during vegetation periods the reduction in run off rates will reach 30-40%.

With increasing demand as a result of higher temperatures and lower water availability, we estimate that by 2030 the total deficit could amount to 5.5 km<sup>3</sup>. This does not take into account planned increases in the land area under cultivation.

**Table 6. Climate Change Water Impacts 2030-2040**

Impact Description	Expected water losses
Decreased river flows including: Amu Darya -15% Murghab Tejen and Etrek rivers by 5-8%	2,400 million m3
Increased evaporation rates from reservoirs due to increased temperature	150 million m3
Increased irrigation demands of 13% due to increased temperature	3,000 million m3
TOTAL	5,500 million m3

Source: Author's calculations

<sup>50</sup> The First National Communication to UNFCCC, Turkmenistan, 1998

These findings mirror similar studies in Uzbekistan, where the primary impact on agricultural yields resulted from shortage of irrigation water, rather than direct temperature or precipitation effects on crop growth (World Bank 2013a).

Prolonged exposure to extreme temperatures (35°C in spring and 40°C in summer) can have a significant negative effect on the productivity of agricultural sector. However, the Second National Communication of Turkmenistan indicates that neither the cumulative temperature effect nor the potential increase in extreme heat days are likely to impact significantly on agricultural productivity. Even under climate change scenarios, there is a probability of less than 1% of extreme heat days across all regions of Turkmenistan. Adjustments, such as earlier planting for winter wheat, may effectively compensate. The reduction in water availability is likely to be the major factor in reducing agricultural production.

## ***Adaptation options***

### ***Summary of technical options***

This section sets out some of the key adaptation options for the water and agriculture sector identified in the early policy and strategy documents. Documents reviewed include Turkmenistan's UNFCCC First and Second National Communications, the Turkmenistan National Strategy for Climate Change and the UNDP Investment and Financial Flows for Climate Change report, among others. Some are related to water infrastructure while others address agricultural and land management practices. Examples identified in these strategies include

- Storage infrastructure
  - Construction of water reservoirs and water storage capacity;
- Off farm distribution networks
  - Reconstruction and lining of distribution to reduce losses;
  - Repair and development of the water drainage systems
- Water recovery and reuse
  - Saline drainage water
  - Ground water
  - Waste water
- On farm technologies
  - Introduction of more efficient irrigation techniques
  - Introduction of drought tolerant crops
- On farm land management
  - Improvement in on-farm efficiency
  - Introduction of agricultural optimization models
  - Reconstruction of irrigated lands (ILCR)
  - Reclaiming
- Pasture management
  - Planting of new forage plants (e.g. kany, saxaul)
  - Introduction of grassland rotation techniques
- Economic incentives
  - Reform of economic relationship between the state and water consumers
  - Gradual introduction of water pricing
- Water management
  - Moving towards integrated water management (IWRM)
  - Introduction of Water User Associations (WUA)
  - Awareness raising on water efficiency
  - Introduction of water measurement

Each of the above-mentioned adaptation options is capable of “recovering”, or “producing” a certain amount of water, or improving agricultural productivity in the face of a more hostile climatic baseline.

## **Water pricing – the role of economic instruments in water adaptation**

### ***Role of water pricing as an adaptation option***

A key strategy to improve water efficiency relates to the economic pricing of water (or irrigation service fee – ISF). Water pricing is one of four integrated water management principles, known as the Dublin principles. This principle recognizes that all human beings have the basic right to have access to clean water and sanitation at a reasonable price. However, considering it an economic good promotes efficient and equitable use, encourages conservation and protection of water resources. When water is collected from a source, it has a price as an economic and social good. In many instances failure to effectively manage water resources is associated with failure to recognize the economic value of water. Water pricing can encourage the introduction of more efficient water technologies, switching to more water efficient crop varieties, and more productive use of available land.

#### *Current situation in Turkmenistan*

The principle of water efficiency and water pricing are not new concepts in Turkmenistan. The Water Code sets out enabling legislation. Although water is provided free to the domestic sector, charges are applied for special uses (Article 110). Measures that support ‘the rational use and protection of water’ are supported (Article 34). The delivery of water to water users are carried out on a ‘paid for’ basis (Article 111).

Currently, water service charges depend on the crops to be irrigated, as reflected in the contract on the lease of land. For example, if the tenant will grow wheat the service of water delivery is 40 manats per hectare, for cotton 20.6 manat/ha, while for other crops (vegetables, potatoes, orchards, vineyards) the rate is from 120 to 180 manat/ha. Tariffs are differentiated on the basis of pumped irrigation vs. gravity fed systems.

In addition, 9% of a tenant's total income goes to the Fund of a peasant (Dayhan) Association. These funds are spent on infrastructure associated with the on-farm irrigation and collector-drainage networks based on local priorities as determined by the Board of the Dayhan Association.

Despite this, the current level and structure of tariffs for irrigation water in Turkmenistan do not fully reflect the intrinsic costs and value of the provision of water. As explained above, at present Turkmen farmers pay for irrigation water a percentage of their income from the crop, plus a nominal charge for the area of land. The cost of irrigation water provision is relatively low. In economic terms this acts as a small income tax. However, there is no connection between the actual cost of water delivery or the intrinsic value of the water and the tariff. In practice the Government pays for the bulk of cost of delivery of the water through the national budget and the farmers pay a percentage of their income to cover a proportion of the costs.

Water payment is made on the basis of norms per hectare (differentiated by crop type), rather than on the basis of actual volumes of water delivered. At the farm level, there is little or no measurement infrastructure that might serve as the basis for a proper volumetric system. In reality, farmers may receive more or less than the norm, but this will not feed through into the fee charged.

Since there is no correlation between the cost of the delivery and the actual payment by the farmer – there is no incentive to reduce water use. The payment for the water will not change, whether the farmer uses more than he needs or whether there are losses due to poor infrastructure maintenance. There is no incentive to save.

#### *Options for tariff setting*

The following represent the broad options for charging for the provision of irrigation water supply, based on international best practice:

- *By volume of water supplied (e.g. per 1000m<sup>3</sup>):* Volumetric methods are often used in countries with developed hydrometric networks, and where there is strong measurement infrastructure. In some cases, they are based on irrigation time which equates to a flow rate and therefore volume. This can be
  - Fixed: Single tariff for the country as a whole in cases where the unit cost of operation and maintenance (O & M) are approximately equal for different irrigation systems or where there is no central mechanism for collection and redistribution of funds;
  - Differentiated: Different regions or crop types have different tariffs, taking into account differences in the cost of O&M for each irrigation system
  - Variable and increasing: Prices would reflect only on the volume of water consumed, with increasing unit costs by volume to discourage over use.
- *Per unit of area of irrigated land (price per hectare of irrigated area):* This kind of rate can be fixed or flexible, depending on the cost of services for each of the irrigation systems, and the composition of crops

with different irrigation rates. Tariff by area is more often used in countries with underdeveloped hydrometric networks, or in areas traditionally dominated by monoculture (rice, melons, corn) where there is a good normative evidence base for volume requirements and delivery.

- *Combined rate:* This is a combination of the above, where there is a fixed fee (usually reflecting the irrigated area) plus a variable rate for water consumption.

In addition, differentiation may be used to reflect a range of attributes, including water quality, seasonality, crop type, soil fertility, gravity fed vs. pumped systems etc. There may be punitive charges for users who exceed certain pre-defined norms. In general, the complexity of water tariffs is usually a reflection of the level of economic development, and the sophistication of the monitoring infrastructure.

### *Regional best practice*

Moving from the current tariff structure to a volumetric-based Irrigation Service Fee (ISF) system would encourage a reduction in water consumption by the agricultural sector. The move towards volumetric-based ISFs has taken place in other FSU countries. Details are provided below:

In the *Kyrgyz Republic*, most on-farm irrigation is managed by Water User Associations. The Department of Water Resources and Land Improvement at the Ministry of Agriculture and Land Improvement, through the RayVodKhozes, operate the off-farm system. The WUAs collect ISF from the users to cover the operating expenses of the WUAs as well as to pay (part) of the costs of the Government in operating the off-farm systems. In the Kyrgyz Republic there is no charge for the intrinsic use of the water but merely a contribution towards the actual costs of delivery, however whereas the overall costs of the WUAs are covered (they have to as the WUAs cannot really operate under a deficit) the operating costs of the off-farm-systems are not covered by the ISF and depend on Government subsidies, to the extent available.

The notion of volumetric ISFs was introduced in Kyrgyz Republic in the mid-1990s but the authorities did not immediately set charges or collect them. The reason for the introduction of the ISF in the 1990s was, as in many other countries in the FSU, the inability of the Government to pay for the upkeep of the irrigation system and the hope that the transfer of the on-farm irrigation system to WUAs would both improve maintenance of the on-farm systems and release the Government from the need to pay for the on-farm-systems altogether and to collect ISF also for the off-farm systems.

In accordance with Article 7 of the Kyrgyz Water Code of 2005, the power to determine water charges<sup>51</sup> is vested in the Jogurku Kenesh, the Kyrgyz Parliament. The authors are unaware of a water charge for the Agency Managed Irrigation Systems (AMIS) having been set by Parliament and the charges are in fact determined by Government only. Reportedly, the 2010 average ISF rates was 6.65Tyn/m<sup>3</sup>. In practice the rates ranged from 2.8-9.28 Tyn/m<sup>3</sup> depending on regions<sup>52</sup>.

In Tajikistan, in accordance with the Tajik water Code of 2000, payment for water is only due for Special Water Use whereas General Water Use is free of charge<sup>53</sup>. The Water Code defines <sup>54</sup> General Water Use as a use of water without applying constructions or technical devices that influence the condition of water and Special Water Use as a use of the water with the application of constructions or technical devices that influence the condition of water and may include in some cases also the use of water without devices but in a manner that negatively impacts the condition of the water.

In accordance with Article 31 of the Tajik Water Code fees are payable for Special Water Use<sup>55</sup> both for water use that is within the established limits, i.e. in accordance with the allocation, as well as for the overuse of water, i.e. exceeding the norm. Fees are also payable for various other uses of water. ISF is to be set by legislation, although the Consultant is unaware of a Parliamentary Act that sets the ISF rates.

---

<sup>51</sup> The term "water charges" is not defined and could be interpreted either as an ISF or as payment for the intrinsic value of water. The authors believe that the term was intended to be an ISF.

<sup>52</sup> Data from Kyrgyz Republic Proposal for Funding for Agriculture Productivity and Nutrition Improvements under the Global Agriculture and Food Security Program (GAFSP), March 2012

<sup>53</sup> Tajik Water Code, 2000, Article 31

<sup>54</sup> Tajik Water Code, 2000, Article 23.

<sup>55</sup> Water Code, Article 31



ISFs are paid both directly to the District offices of the Ministry of Land Reclamation and Water Resources or through the WUAs where existing. The authors have no data as to the current ISF collection but are aware of the fact that the ISF does not cover the actual expenditures of the MLRWR in supplying the water.

In international terms, the costs associated with the provision of water can vary significantly. Volumetric rates range from between \$1 USD per 1000 m<sup>3</sup> (Colombia, Canada, Romania) to \$290 USD (Israel). Area based tariffs range from \$0.3 USD per hectare (Pakistan) to \$538 USD in Tunisia and \$800 USD in Malta during periods of low water availability. According to the FAO, the average tariff levels in 2004 were in the region of \$20 USD per 1000m<sup>3</sup> and \$40-50 USD. The current rate in Kyrgyzstan and Tajikistan are approximately \$0.75 and \$2 USD per 1000 m<sup>3</sup> (significantly lower than the world average).

A number of lessons can be learned

- The main objectives of the introduction of tariffs for agriculture water in most countries are to cover the costs of services for the supply of water and to encourage the introduction of more efficient technologies for water resources.
- On average, the level of payment for irrigation services must be at least 20 % of the net income before it begins to have a behavioral impact on water efficiency and use.
- Where there is sufficiently robust monitoring infrastructure, the use of a combined rate (using a fixed component for infrastructure costs plus a variable volumetric component) is generally desirable.

#### *Challenges and potential benefits of various options (incl. social protection)*

The potential structure and application of water tariffs must take into account the ability and the willingness to pay for water services. Experience from other countries indicates that not all water users are able and willing to pay for the use of water. In Turkmenistan, where state orders form the mainstay of the agricultural system, a purely volumetric ISF “punishes” those farmers that require large quantities of water for the state ordered crops without providing them with an alternative crop choice that would enable them to reduce their ISF. There would therefore have to be some reform in the structure and pricing of state crops.

#### *Recommended approach*

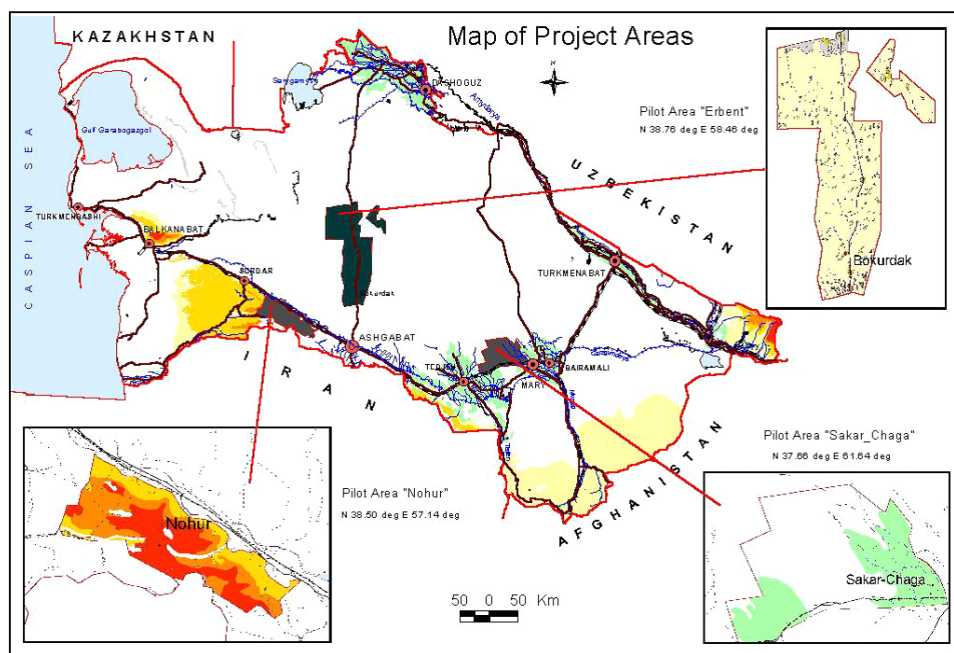
On the basis of the above analysis, the report recommends that Turkmenistan explore and develop a progressive approach to agriculture water pricing. This approach should seek to cover the costs associated with operating (and potentially developing) the water distribution system (and potentially the drainage system), encourage water saving through economic measures and be phased in such a way as to meet the social concerns set out above.

Further work on tariff reform will be undertaken as part of the project, with the authors recommending that the Government of Turkmenistan move towards a hybrid ISF system, where both area and volume are used to determine fees and where end users can benefit from reduction in water use. This process must be phased in slowly (reflecting the current system of state prices, land leasing and funding structures), and be accompanied by a wider process of reform of agricultural crop markets and pricing.

#### ***Community level adaptation technologies and practices***

A climate risk assessment and investment appraisal undertaken under the project ‘Addressing climate change risks to farming systems in Turkmenistan at national and community level’ provides an indicative range of costs associated with community level adaptation measures.

**Figure 6: Map of Project Area: Addressing Climate Change Risks to Farming Systems in Turkmenistan at National and Community Level.**



Detailed assessments have been undertaken for three typical level agro-ecological communities (irrigated land, livestock and mountain agriculture) covering a total population of approximately 50,000 people.

As part of this study, analysis has been undertaken to scale up on farm project activities to a national level, based on relative population and geographic coverage.

**Table 7: Community level adaptation measures scaled up to National Level**

	Potential Area Under Cultivation (ha)	Potential population receiving benefits	Equivalent national investment costs
Drip Irrigation for vegetables	36,000	360,000	\$90,000,000
Clearance of drainage canals	1,440,000	2,000,000	\$430,000,000
New wells for desert pasture	3,000,000	20,000	\$4,200,000
Efficient irrigation for wheat & cotton	1,440,000	2,000,000	\$720,000,000
		<b>TOTAL</b>	<b>\$1,244,000,000</b>

Source: UNDP, MoNP - Scale up of pilot project data to national level

It should be noted that these costs reflect on-farm and inter-farm costs, rather than the costs of regional or district level infrastructure, and as such do not provide a full picture of national costs. Nonetheless, the analysis provides an indicative estimate of \$1.25 billion USD to upscale a typical set of on farm adaptation project practices to a national level.

### **Economic analysis of on-farm adaptation options**

The following section sets out the cost benefit analysis of potential community level adaptation options. The analysis was undertaken as part of the earlier Adaptation Fund project to assess the impact of a range of typical adaptation measures in different types of agro-ecological zones. Adaptation options piloted in the project included the following:

**Table 8: Types of adaptation measures by agro-ecological zone**

<b>Nohur</b> Mountainous agriculture (fruit and vegetables)	<b>Karakum</b> Desert pasture (livestock)	<b>Sakar Chaga</b> Irrigated oasis (cotton and wheat)
<ul style="list-style-type: none"> <li>✓ Water storage construction</li> <li>✓ Creation and repair of dams</li> <li>✓ Protection of springs</li> <li>✓ Lining of water basins</li> <li>✓ Introducing drip irrigation</li> <li>✓ Drilling of wells</li> <li>✓ Tree planting</li> <li>✓ Composting techniques</li> <li>✓ Planting of native species</li> </ul>	<ul style="list-style-type: none"> <li>✓ Construction of new wells</li> <li>✓ Repairing existing wells</li> <li>✓ Reconstruction of sardobs</li> <li>✓ Cleaning of rain pits (Takir)</li> <li>✓ Sand dune fixation</li> <li>✓ Drip irrigation systems</li> <li>✓ Planting of native species</li> </ul>	<ul style="list-style-type: none"> <li>✓ Installing hydraulic sluice</li> <li>✓ Repairing water regulation</li> <li>✓ Repair of drainage collectors</li> <li>✓ Construction of new collector</li> <li>✓ Recovery of previously used the wastelands</li> <li>✓ Planning of irrigation land</li> <li>✓ Laser levelling</li> <li>✓ Introduction of drip irrigation</li> <li>✓ Field boundary planting</li> <li>✓ Nursery for native species</li> </ul>

Source: Project investment plans

Cost benefit analysis was undertaken for several of the above measures with a view to assessing their economic returns and prioritizing their implementation. This approach provides a socio-economic basis for agricultural planners to prioritize investments where there are limited adaptation funds. The analysis indicates that all of the typical measures under implementation have strong benefit cost ratios and relatively quick payback periods. These benefits include rapid improvements in yields and productivity that can support the development of rural livelihoods under current climate baselines and in the absence of further climate change. This information can be used by policy makers to help prioritize investments within the national agriculture and water strategies, and to support on farm development activities.

The following sets out an initial ex-ante analysis for selected measures.

**Table 9: Cost benefit analysis for selected community level adaptation measures**

<b>Measure</b>	<b>Benefits assessed</b>	<b>Internal Rate of Return (IRR)</b>	<b>Benefit cost ratio (BCR)</b>	<b>Payback period (years)</b>
<b>Construction of drip irrigation systems in Nohur (37 ha)</b>	40-50% increase in fruit and vegetable yield/ha	19.4%	6.2:1	7
<b>Construction of dams with water reservoirs in Nohur</b>	Increase in water availability leading to expanded livestock cultivation	37.8%	6.5:1	5
<b>Construction of 8 new wells for sheep pasture in Karakum</b>	Increase in pasture availability supporting 200 head per well	80%	13.1:1	2

<b>Repair of water regulation sluice gates</b>	More effective use of water	30%	16.4:1	4
<b>Reconstruction of the on-and inter-farm drainage collectors in Sakar Chaga</b>	30% increase in cotton yield/ha	15.5%	1.65:1	7
<b>Laser levelling and planning of cotton and wheat fields in Sakar Chaga (150 ha)</b>	Reduction in water use and increase in productivity	24.7%	4.4:1	5

More detailed analysis of individual adaptation measures that might be prioritized under community level planning (Component 3) are set out below:

**(i) Construction of drainage/water collector: Pilot area: oasis – irrigated territory of “Zakhmet” farmers’ association, Sakarchage etrap of Mary velayat**

The calculation was performed under the following conditions:

- cost of construction of the new collector with the length of 5km – 186.2 thousand manats; in addition, 20.3 thousand manats – the cost of performing topographical survey, total - 206.5 thousand manats;
- area, which will be impacted by the collector - 300 hectares;
- operating expenses - 5% of the cost (186.2 thousand manats  $\times$  0.05 = 9,3 thousand manats);
- at cotton cost of 1040 manats/ton and profitability of 30%, the prime cost will be 800 manats/ton, and revenue – 240 manats/ton;
- at cotton yield of 3 tons/ha, the value of income per 1 ha will amount to 720 manats;
- loss of crop at mid-saline lands is 30%; proceeding from this, the effect of the construction of collector is rated to 30% of the total revenue value;

$$720 \text{ Manats / ha} \times 300 \text{ ha} \times 0.30 = 64800 \text{ manats}$$

Based on the above, the following assessment has been made:

The total amount of capital investments required for the implementation of the planned measures is 206.5 thousand manats.

Income related to the effect (30% of the value of total revenue) on the lands attributed to the planned collector (300 hectares) will be 64.8 thousand manats (in mildly saline lands the yield losses are up to 30%). In addition, by elimination of washings, more than 120 hectares of additional land can be put into cultivation. And the revenue from this area can be attributed to the effect of this activity (86.4 thousand manats).

The calculation showed, that the net present value (NPV) at a discount rate of 10% will be 228 thousand manats, Internal Rate of Return (IRR) - 15.49%, the ratio of discounted revenues to costs - 1.65 and the payback period of capital investment in the implementation of this activity will be 7 years, which leads to the conclusion about the economic feasibility of the project (table 3.1).



Assuming that 1 family possesses 1-3 hectares of land, 140÷420 families will benefit, and with the family coefficient of 5  $700 \div 2$ , 100 persons will benefit from the activity.

**Table 10: Cost effectiveness of drainage collector construction**

Indices	Unit of measure	YEARS											
		1	2	3	4	5	6	7	8	9	18	19	20
Capital investments, total	Th.manats	206,5	0	0	0	0	0	0	0	0	0	0	0
Collector construction	Th.manats	186,2	0	0	0	0	0	0	0	0	0	0	0
Topographic survey	Th.manats	20,3	0	0	0	0	0	0	0	0	0	0	0
Operating costs (5% of the construction cost)	Th.manats	0,0	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3
Total expenditures	Th.manats	413,0	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3
Revenue from agricultural production (30%)	Th.manats	-129,6	38,9	30,2	45,9	64,8	64,8	64,8	64,8	64,8	64,8	64,8	64,8
Revenue from saved water (120 ha)	Th.manats	-172,8	51,8	40,3	61,2	86,4	86,4	86,4	86,4	86,4	86,4	86,4	86,4
Net profit	Th.manats	-715,4	81,4	61,2	97,8	141,9	141,9	141,9	141,9	141,9	141,9	141,9	141,9
Discount factor	0,10	0,909	0,826	0,751	0,683	0,621	0,564	0,513	0,467	0,424	0,180	0,164	0,149
Discounted value of costs	Th.manats	375,5	7,7	7,0	6,4	5,8	5,3	4,8	4,3	3,9	1,7	1,5	1,4
Discounted profit value	Th.manats	-274,9	75,0	53,0	73,2	93,9	85,3	77,6	70,5	64,1	27,2	24,7	22,5

Discount rate, %	5	10	20	30
NPV (Net Present Value), thousand manats	791	288	-133	-277
IRR (Internal Rate of Return)	15,49%			
Ratio of discounted income to expenses	1,65			

**(ii) Construction of water regulating structures: Pilot area: oasis – irrigated territory of “Zakhmet” Farmers association, Sakarchage district of Mary province.**

The calculation was performed under the following conditions:

- cost of construction of water regulating facilities - 8900 manats;
- linked area - 180 hectares;
- operating expenses (annual repair of facility, cleaning, lubrication, etc.) - 5% of the price;
- crop yield - 3.0 t/ha;
- cost of 1 ton of cotton – 1040 manats/t;
- prime cost of 1 ton of cotton with profitability of 30% - 800 manats/ton.

Water savings will be about 10%, i.e. savings on water can additionally engage in agricultural use for at least 18 hectares.

**Table 11: Cost effectiveness of construction of water regulating facilities**

Indices	UOM	YEARS										
		1	2	3	4	5	6	7	8	18	19	20
Capital investments, total	th. manats	8,9	0	0	0	0	0	0	0	0	0	0
Operating costs (5% of the construction cost)	th. manats	0	0,445	0,445	0,445	0,445	0,445	0,445	0,445	0,445	0,445	0,445
Total expences	th. manats	8,9	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
Revenue from agricultural production (15%)	th. manats	-38,9	11,7	9,1	13,8	19,4	19,4	19,4	19,4	19,4	19,4	19,4
Revenue from water savings	th. manats	-25,9	7,8	6,0	9,2	13,0	13,0	13,0	13,0	13,0	13,0	13,0
Net profit	th. manats	-47,8	11,2	8,6	13,3	19,0	19,0	19,0	19,0	19,0	19,0	19,0
Discount factor	0,10	0,909	0,826	0,751	0,683	0,621	0,564	0,513	0,467	0,180	0,164	0,149
Discounted value of costs	th. manats	8,1	0,4	0,3	0,3	0,3	0,3	0,2	0,2	0,1	0,1	0,1
Discounted profit value	th. manats	-70,7	19,3	13,6	18,8	24,1	21,9	20,0	18,1	7,0	6,4	5,8
Discount rate, %						5	10	20	30			
NPV (Net Present Value), thousand manats						152	83	23	0			
IRR (Internal Rate of Return)						30,22%						
Ratio of discounted income to expenses						16,45						
Capital investments payback period, years						4						

These results show the high economic efficiency of the project. The calculation showed that the net present value (NPV) at a discount rate of 10% will be 83 thousand manats, Internal Rate of Return (IRR) - 30.22%, the ratio of discounted revenues to costs - 16.45, and the payback period of capital investments in the implementation of the activity will be 4 years, that leads to the conclusion about the economic feasibility of the project.

The projects of this kind are considered economically viable at a payback period of 8-10 years.

Besides, in relation to the similar projects it is advisable to estimate the number of people that will benefit from the project. Assuming that 1 tenant has from 1 to 3 hectares of land, and the total area of 180 hectares,  $60 \div 180$  families will be beneficiaries, and with the Family coefficient of 5,  $300 \div 900$  persons will benefit from the activity.





(iii) **Laser land leveling: Pilot area: oasis – irrigated territory of “Zahmet” farmers’ association, Sakarchaga district of Mary province.**

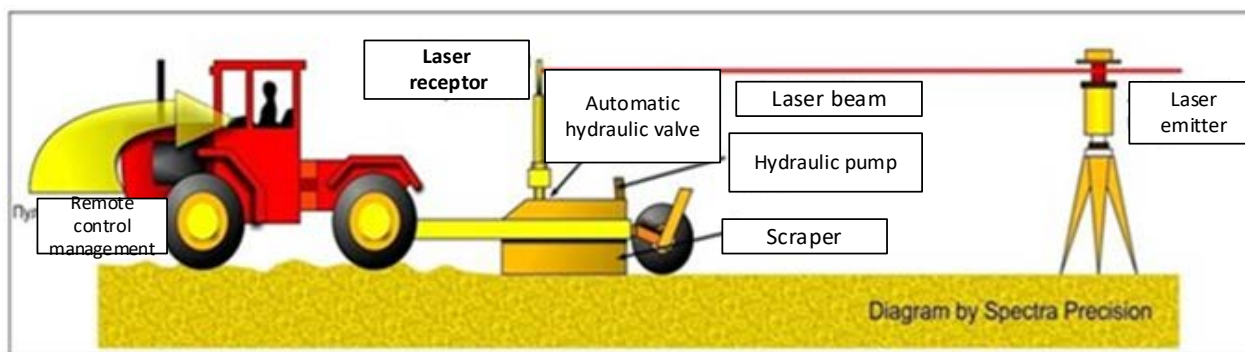
The calculation was performed under the following conditions:

1. Field area – 10 hectares (cotton);
2. Cost of equipment - 8050 manats;
3. Other costs: work on rough planning, topographic survey of the field, etc. – in the calculation it is taken for 1000 manats;
4. Operating costs - 5% of the cost of equipment ( $9050 \text{ manats} \times 0.05 = 453 \text{ manats}$ );
5. Extra income is the difference of income without project and with the project.
  - without the project – existing income at 18 center/ha from 10 ha – 2,9 thousand manats;
  - with the project – the income at 30 cent/ha from 10 ha – 7,2 thousand manats;
  - difference – 4,3 thousand manats.
6. The amount of saved water (30%), additional area due to the saved water – 4,3 hectares;
7. Additional revenue due to the saved water - 3,1 thousand manats.

**12: Cost-effectiveness of laser land leveling**

Indices	UOM	YEAR											
		1	2	3	4	5	6	7	8	18	19	20	
Capital investment, total	th.manats	9,1	0	0	0	0	0	0	0	0	0	0	
Operational costs, (5% of construction costs )	th.manats	0	0,453	0,453	0,453	0,453	0,453	0,453	0,453	0,453	0,453	0,453	
Total costs	th.manats	9,1	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	
Income from agricultural production	th.manats	0,0	0,0	1,2	2,6	4,3	4,3	4,3	4,3	4,3	4,3	4,3	
Net profit	th.manats	-9,1	-0,5	0,7	2,2	3,9	3,9	3,9	3,9	3,9	3,9	3,9	
Discount ratio	0,10	0,909	0,826	0,751	0,683	0,621	0,564	0,513	0,467	0,180	0,164	0,149	
Discounted value of costs	th.manats	8,2	0,4	0,3	0,3	0,3	0,3	0,2	0,2	0,1	0,1	0,1	
Discounted value of profit	th.manats	0,0	0,0	1,7	3,6	5,4	4,9	4,4	4,0	1,6	1,4	1,3	
Discount rate, %						5	10	20	30				
NPV (Net Present Value), thous.manats						27,8	14,1	2,4	-1,7				
IRR (Internal Rate of Return)						24,70%							
Ratio of discounted profit to expenses						4,41							
Capital investments payback period, years						5							

This result shows high economic efficiency of the project. The calculation showed that the net present value (NPV) at a discount rate of 10% will be 14,1 thousand manats, Internal Rate of Return (IRR) – 24.70%, the ratio of discounted revenues to costs – 4.41, and the payback period of capital investments in the implementation of this activity will be 6 years, that leads to the conclusion about the economic feasibility of the project (Table 3.3).



The projects of this kind are considered economically viable at a payback period of 8-10 years.

In addition, in relation to similar projects it is advisable to estimate the number of people that will benefit from the project. Assuming that 1 tenant possesses from 1 to 3 hectares, and the total area of 14.3 hectares, 14 families will receive benefit of 14 families; and with a Family coefficient of 5 - 24÷70 persons. The actual economic effectiveness of this adaptation measure is even higher due to the fact that the same equipment can be utilized on the other areas in the same year and in the following years.

**(iv) Drip Irrigation: Pilot area: mountainous area – “Konegumbez” site of “Yenish” Farmers Association, Baharly district of Ahal province.**

The calculation was performed under the following terms:

1. The field area – 10 ha (gardens);
2. The cost of the drip irrigation system – 7160 manat/ha, while the total amount of costs is 71.6 thousand manats.
3. Operational costs - 5% of the total price, one time every 5 years ( $71.6 \text{ thousand manats} \times 0.05 = 3.6 \text{ thousand manats}$ );
4. The price of fruits – 3000 manats/ton. At the profitability of 30%, the annual amount of income will be at least 9.7 thousand manats/ha.
5. The amount of saved water is 40%.

**Table 13: Cost effectiveness of drip irrigation**





Indices	Unit of measure	YEARS									
		1	2	3	4	5	6	7	8	19	20
Irrigated area	ha	10	10	10	10	10	10	10	10	10	10
Capital investments, total (construction of drip irrigation system)	th. manats	71.6									
Operating costs	th. manats						3.6				
Total costs	th. manats	71.6	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0
Income from agricultural production	th. manats	-193.8	-193.8	32.3	53.3	64.6	72.7	96.9	96.9	96.9	96.9
Additional income from saved water (40%)	th. manats	0.0	0.0	12.9	21.3	25.8	29.1	38.8	38.8	38.8	38.8
Net profit	th. manats	-265.4	-193.8	45.2	74.6	90.5	98.2	135.7	135.7	135.7	135.7
Discount factor	0.10	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.164	0.149
Discounted value of costs	th. manats	65.1	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Discounted profit value	th. manats	-176.2	-160.2	34.0	51.0	56.2	57.4	69.6	63.3	22.2	20.2

Discount rate, %	5	10	20	30
NPV (Net Present Value), thous.manats	815	357.2	-16	-136
IRR (Internal Rate of Return)	19.24%			
Ratio of discounted incomes to expenses	6.17			
Capital investments payback period, years	7			

This result shows high economic efficiency of the project. The calculation showed that the amount of the net present value (NPV) at a discount rate of 10% will be 357.2 thousand manats, Internal Rate of Return (IRR) – 19.24%, the ratio of discounted revenues to costs – 6.17, and the payback period of capital investments in the implementation of this activity will be 7 years, that leads to the conclusion about the economic feasibility of the project.

The projects of this kind are considered economically viable at a payback period of 8-10 years.

In addition, in relation to similar projects it is advisable to estimate the number of people that will benefit from the project. Due to the specifics of mountain territories, 1 leasee/farmer possesses from 0.08 to 0.09 hectares and the total area of 10 hectares. So, the beneficiaries will be  $110 \div 125$  families, and taking into account the Family coefficient (5) benefits will be received by  $550 \div 625$  people.



## (v) Construction of water dams and reservoirs in mountainous regions

The calculation was performed under the following terms:

1. The additional number of sheep for 7 reservoirs – 700 heads;
2. The costs of the construction of dams and reservoirs – 67.371 thousand manats;
3. Every 5 years - 6% of the cost – operating expenses;  
 $67.371 \text{ thousand manats} \times 0.06 = 4.042 \text{ thousand manats}$
4. The price of 1 sheep is 400 manats/head, the prime cost is 120 manats/head;
5. Due to the fact that the reservoirs cannot be filled each year and are not used all year long (4-8 months), only 50% of the revenue is attributed to the effect.



The calculation showed that the amount of the net present value (NPV) at a discount rate of 10% will be 359 thousand manats, Internal Rate of Return (IRR) – 37.75%, the ratio of discounted revenues to costs – 6.48, and the payback period of capital investments in the implementation of this activity will be 5 years, that leads to the conclusion about the economic feasibility of the project (Table 3.5). Provided that there are 10 sheep per 1 family, 70 families will receive benefit, or 350 people (Family coefficient – 5).

Extremely important is the fact that this adaptation measure will increase the flow of water in springs used by local population for drinking purposes (more than 5000 persons). Income from this is not defined in terms of value.

**Table 14: Cost effectiveness of construction of water dams and reservoirs**

Indicators	UOM	YEAR											
		1	2	3	4	5	6	7	8	9	18	19	20
Capital Investments, total	th.mana ts	67.4											
Operational expenses	th.mana ts						4.04				4.04		
Total expenses	th.mana ts	67.4	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	4.0	0.0	0.0
Additional income	th.mana ts	0.0	0.0	9.8	14.0	28.0	42.0	56.0	70.0	84.0	98.0	98.0	98.0
Net profit	th.mana ts	-67.4	0.0	9.8	14.0	28.0	38.0	56.0	70.0	84.0	94.0	98.0	98.0
Discount factor	0.10	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.424	0.180	0.164	0.149
Discount value of costs	th.mana ts	61.2	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.7	0.0	0.0
Discount value of profit	th.mana ts	0.0	0.0	7.4	9.6	17.4	23.7	28.7	32.7	35.6	17.6	16.0	14.6
Discount rate, %						5	10	20	30				
NPV (Net Present Value), in th. Manats						668	359	110	27				
IRR (Internal Rate of Return)						37.75%							
Ratio of discounted incomes to expenses						6.48							
Capital investments payback period, years						5							

#### (vi) Construction of water storage in Desert regions (*sardobas*)

Estimation of economic efficiency of capital investments and feasibility of *sardoba* (dew mound) construction is performed using the method of comparative cost-benefit analysis. In this case, comparison of the costs for two options is made:

- I option – construction of the 60 m<sup>3</sup> capacity *sardoba* (underground reservoir);
- II option – delivery of the same amount of water by auto water carriers.



The following should be considered for the I option:

- the service life of the facility (50 years). Provided *sardoba* operating for 50 years, the total volume of water will be 3000 m<sup>3</sup>;
- acquisition costs of building materials, tools, handling operations;
- the cost of transportation of materials and people to the construction site;
- annual operating costs (cleaning of dew mound, fencing repair, etc.)

The following should be considered for the II option:

- cost of delivery of the same volume of water, for example, from Yerbent to Bori. According to local residents' assessment, today water delivery by water carrier (8 m<sup>3</sup>) costs 500 manats, therefore delivery of 60 m<sup>3</sup> of water to the village is estimated at 3750 manats.

The calculation shows that the total value of construction costs of *sardoba* and its operation during 50 years will amount to 47,56 thousand manats (including capital repair costs – one time every 10 years), whereas the delivery costs of water by trucks for the same period amount to 187,5 thousand manats (3,75 thousand manats × 50 years = 187,5 thousand manats). That is, the construction costs of *sardoba* are 4 times less than the cost to transport the same amount of water by trucks. On this basis, it is possible to make an unambiguous conclusion about the economic practicability of building dew mounds.

It should be noted that the construction of *sardoba* brings benefit to all residents of the village, as the water from the dew mound is delivered to them as needed, directly to the house.

In accordance with the norms, a person of average weight should drink 2 liters of clean water per day<sup>56</sup>. Hence, the work of the project on construction of 5 new *sardobas* and reconstruction of 4 existing dew mounds with the capacity of 60 m<sup>3</sup>, implemented in 2015, will provide an annual demand for drinking water for about 1000 people.

**Table 15: Cost effectiveness of construction of *sardoba* (dew mound) with capacity of 60 m<sup>3</sup>**

---

<sup>56</sup> <http://www.watermap.ru/articles/sutochnaja-norma-vody-dlja-cheloveka>

Indices	Unit of measure	YE A R S						Total for 50 years
		1	2	3	4	49	50	
I option - construction of the 60 m <sup>3</sup> capacity dew mound (service life of <i>sardoba</i> is 50 years)								
Total expenditures	thous. manats	13.09	0.50	0.50	0.50	0.50	1.50	47.56
including construction materials and their delivery to the construction site	thous. manats	9.99	0	0	0	0	0	9.99
payment to workers	thous. manats	3.1	0	0	0	0	0	3.10
Annual operating expenditures (cleaning, fencing repair, etc) - 5%.	thous. manats	0	0.5	0.5	0.5	0.5	0.5	24.48
Costs of capital repair (once in 5 years - 10%)	thous. manats	0	0	0	0	0	1.0	9.99
II option - delivery of the same amount of water by water tank trucks								
Cost of delivery of 8 m <sup>3</sup> of water from Yerbent to Bori is 500 manats. Transportation of 60 m <sup>3</sup> of water - 3,75 thousand manats	thous. manats	3.75	3.75	3.75	3.75	3.75	3.75	187.50

#### (vii) Construction of new wells for sheep watering in desert conditions

The calculation was performed under the following terms:

1. Additional number of sheep for 1 well – 250 heads;
2. Cost of the well construction – 30.0 thousand manats;
3. After each 5 years – 8% of the cost – repair and cleaning;  
 $30.0 \text{ thousand manats} \times 0.08 = 2.40 \text{ thousand manats}$
4. Price of 1 sheep – 400 manats/head;
5. Product prime cost – 30% of the price, or 120 manats/head.

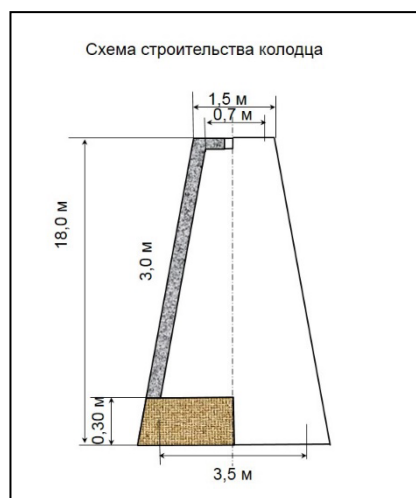
The calculation showed that the amount of the net present value (NPV) at a discount rate of 10% will be 363 thousand manats, Internal Rate of Return (IRR) – 79,92, the ratio of discounted revenues to costs – 13.11, and the payback period of capital investments in the implementation of this activity will be 2 years, that leads to the conclusion about the economic feasibility of the project (Table 3.7). Assuming that 25 families are using 1 well and will benefit – 10 sheep per family (Family coefficient - 5), or 125 people.

Taking into account the fact that 1 well serves for the area of about 7-10 thousand hectares of the pasture territory, construction of such wells can be done at the area of 2-3 million hectares – this is approximately 400 wells. In this case, 20,000 people will benefit, total costs will amount to 12 million manats (4.2 million USD). Importance of the implementation of this adaptation measure is even more enhanced by the fact that supplying additional area with water prevents further degradation of 2,5÷7,5 thousand hectares of pasture per 1 well.

**Table 16: Cost effectiveness of building a well for sheep watering**

Indices	Unit of measure	YEARS									
		1	2	3	4	5	6	7	8	19	20
Expenses, total	th. manats	30					2.4				
Additional income	th. manats	0.0	14.0	19.6	28.0	40.6	56.0	70.0	70.0	70.0	70.0
Net profit	th. manats	-30.0	14.0	19.6	28.0	40.6	53.6	70.0	70.0	70.0	70.0
Discount factor	0.10	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.164	0.149
Discounted value of costs	th. manats	27.3	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0
Discounted profit value	th. manats	0.0	11.6	14.7	19.1	25.2	31.6	35.9	32.7	11.4	10.4

Discount rate, %	5	10	20	30
NPV (Net Present Value), thous. manats	610	363	151	73
IRR (Internal Rate of Return)	79.92%			
Ratio of discounted incomes to expenses	13.11			
Capital investments payback period, years	2			



## Conclusions and recommendations

This section sets out conclusions of the study and recommendations going forward.

*The Agriculture sector has significant socio-economic importance*

Agriculture remains a key strategic sector of the economy, employing approximately 50% of the workforce and contributing 10% of GDP (USD \$3.8 billion). Livestock, wheat and cotton are the primary areas of economic sector activity. Agriculture is among the most climate sensitive sectors. The rural population in Turkmenistan is



dependent upon agriculture for their livelihoods. Potential impacts will disproportionately affect poorer rural populations, and reduce potential growth and development patterns;

*The extent of climate change impacts is expected to be significant*

Climate change modelling indicates significant increases in temperature and reductions in rainfall. Temperatures are expected to increase by 2C by 2040 with precipitation declining across all agro-ecological zones after 2020. These trends will be accompanied by increased frequency and severity of climate induced disasters (drought, floods, and strong winds).

*And agriculture will suffer, particularly due to lack of irrigation water*

The agriculture sector will suffer a range of negative impacts as a result. In the short-medium term, direct impacts on agricultural yields resulting from changes in temperature and precipitation are likely to be partially offset by increased CO<sub>2</sub> fertilization and longer growing seasons. However, more significant indirect impacts will occur as a result of reduced water availability within the irrigation network. Projected changes in climate are likely to result in reduced river flows, increased network distribution losses and higher evaporation rates. These factors are likely to result in a water deficit of up to 5.5 km<sup>3</sup> per annum by 2030-40. This is the equivalent of approximately 20% of current water use in the agriculture sector, resulting in a significant impact on yields. These findings are consistent with other recent studies in Central Asia (e.g. World Bank 2013a);

*This has the potential to result in significant economic losses.*

This water deficit has the potential to result in significant economic losses to the agriculture sector. In terms of productive land equivalent, this water deficit would result in a reduction of output over the period 2015-2030 equivalent to nearly 4 million tons of wheat and more than 3 million tons of cotton. In the absence of new policies and measures, the economic costs associated with such a decline could reach \$2.5bn per annum by 2030 or a cumulative \$20bn (discounted) for the period 2015-2030. These are the 'costs of inaction';

*The costs of adaptation are large*

The national level costs associated with adaptation to climate change are significant. National level estimates indicate that investments of \$600m per annum by 2030 would be sufficient to reduce the water deficit. A number of on-farm adaptation activities are being supported by the project 'Addressing climate change risks to farming systems in Turkmenistan at national and community level'. These measures include drip irrigation, improvement of drainage systems and development of desert pasture wells. Up-scaling these activities to a national level would require investment of approximately \$1.25bn and would deliver benefits to more than 2.3 million people.

*But they are lower than the costs of inaction and adaptation delivers positive returns*

At a national level, the costs of adaptation are significantly lower than the benefits envisaged in terms of economic losses (benefit cost ratio of 4:1). At a farm level, cost-benefit analysis of specific adaptation measures being undertaken across three agro-ecological zones indicates positive socio-economic returns, with some adaptation measures delivering high benefit cost ratios (>10:1) on the basis of water saving and yield improvements, with short payback periods of less than 5 years.

*Mainstreaming adaptation in sector legislation will be important*

The government of Turkmenistan has made good progress in setting out its climate change strategy and continues to build its research capacity through the development of the Third National Communication on Climate Change to the UNFCCC. Work is also on-going in the development of a National Adaptation Plan, led by the Ministry of Economic Development. As part of this process, it is recommended that the Government now focus on supporting the mainstreaming of climate change resilience and adaptation planning into the relevant sector policies and strategies as they are reviewed (e.g. Water Code, Dayhan Association Law) to ensure that the climate resilience strategies are operationalized in an effective manner. The Adaptation Fund financed project 'Addressing climate change risks to farming systems in Turkmenistan at national and community level' has made a set of recommendations to the Ministry of Water Economy in regard to the Water Code and will continue to support this reform process for other relevant legislation.

*There are a range of opportunities to build adaptive capacity at the on-farm level*

The Government of Turkmenistan should continue to build on farm capacity to strengthen the resilience of the agricultural network. This might include developing a more robust system of extension services (focusing on agronomic best practices, efficient irrigation techniques, land preparation and fertilizer use, drought resistant seed use and pest control). Consideration should also be given to the potential consolidation of Dayhan land into larger holdings to support more efficient investments in irrigation technology, and the encouragement of more flexible

and commercial approaches to agricultural production and crop choice. At an institutional level, potential adaptation approaches could include support for the development and identification of drought resistant seed varieties and livestock breeds.

*The Government of Turkmenistan should continue to develop water infrastructure*

The Government of Turkmenistan has a significant on-going programme of capital investment in water saving technologies and supply infrastructure to ensure the sustainability of the agricultural network. The main focus of these programmes at present is in large scale water storage, transport and drainage systems, although the strategy also indicates significant investment in efficient on-farm irrigation systems. The Government of Turkmenistan should review the scope and scale of these investments in the light of projected climate change to ensure that the availability of irrigation water is sufficient to address projected losses.

*Water pricing will be central to improving end use efficiency*

The lack of effective water pricing remains a significant challenge to improving end user water efficiency. Currently, there is limited use of volumetric measurement, with pricing based on norms derived from the area under cultivation. As such, there is no incentive by end users to improve the efficiency of their on-field irrigation techniques. We recommend that the Government of Turkmenistan investigate the potential to introduce a more robust system of water pricing. The process of developing more progressive tariff structures can be supported by the Adaptation Fund financed project 'Addressing climate change risks to farming systems in Turkmenistan at national and community level'.

*Financing demands are large and it is important to leverage non-state investment*

Under the current system of water management, the Government of Turkmenistan takes primary responsibility for financing water supply and drainage infrastructure (both on and off farm) in irrigated areas. The Government is also responsible for water infrastructure in desert pasture areas. Mountainous and piedmont areas are largely self-financing and operated by private farmers. The costs of financing a robust and efficiency agricultural water supply and drainage system for Turkmenistan over the next 10-15 years are significant (potentially up to USD \$16 billion). While the Government of Turkmenistan will continue to cross-subsidize these investments from the national budget, opportunities should be explored to incentivize investments at the farm level by Dayhan Associations and individual small holders. This will require some reform of land tenure arrangements and state pricing of crops to create incentives to improve water efficiency.

*Research and data and modelling capacity should be strengthened.*

This assessment forms an initial view of the socio-economics of climate change in relation to water and agriculture. Going forward, we recommend that the Government of Turkmenistan seek to engage in more detailed modelling of its major agro-ecological zones potentially as part of preparations for the Third National Communication process. This could be done through local research institutions using national data and by applying a combination of climate, crop, water and economic models. These outputs would provide a higher resolution understanding of the potential impacts, economic costs and benefits of action. This process would help inform government investment policy in the sector.

**(vii) Preliminary Cost Benefit Analysis associated with installing solar panels for water pumping in remote villages of the Karakum desert**

The UNDP/GEF project "Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan" implemented jointly by UNDP, GEF and the Ministry of Agriculture and Water Resources of Turkmenistan have been piloting the use of renewable energy (solar panels) to replace diesel generators for water pumping in three villages of the Karakum Desert. To this end, it is planned to install solar panels that will generate energy to power the submersible pumps, which are used to pump water from wells (about 20 m deep). Also, the solar energy will be used for the operation of a desalination electrodialysis unit in one of the villages and low-power household appliances.

The analysis was based on the use of four electricity generators in three villages. According to experts, the approximate average annual cost for the production of electricity in three villages is almost 45,000 manat (almost USD 13,000, see table below). Since the generators are powered by diesel, it is not surprising that over 90% of the total cost is diesel and engine oil, which is necessary for the operation of a diesel generator for 5-6 hours a day. The remaining costs are the cost of the generators themselves and their current repairs. The

service life of each generator is not more than 2 years. According to approximate estimates, the amount of installation of the solar panel system in these localities will be about \$ 50,000. Thus, it can be calculated that **the payback of such a system will be less than 4 years, while the average service life of modern solar panels is at least 20 years.**

In addition to economic benefits, there are also **environmental benefits**. Oil and gas spills around wells and fuel storage areas are excluded. Smoke and odor on the work places of generators decrease. When the generators are turned off, the greenhouse gas emissions to the environment are zero. There are also **social and other benefits**. The elimination of fire danger, as well as noise from working generators, which is of great importance for the calm watering of animals. In addition, low-power household appliances (lighting, chargers, TV, satellite antenna, radio, electric kettle, etc.) can be powered from the uninterrupted solar system, which will allow residents of remote desert villages to enjoy the basic amenities available to date.

**Table 17. Savings from replacement of diesel-powered water pumps with solar PV powered pumps in 3 villages (Turkmen manats)**

Economic benefits due to the exclusion of diesel electric generators						
No	Item	Quantity	Unit	Cost (TMT)	Total cost per year (TMT)	Note
1	Diesel generators	4.00	piece	600.00	2,400.00	Solar panels will turn off 4 electric generators in 3 villages in the Karakum Desert
2	Fuel for operation of 4 generators	24,000.00	litre	1.50	36,000.00	about 300 days a year, shepherds have to use about 20 liters of diesel fuel per day every day to ensure the operation of submersible pumps and for household needs
3	Fuel delivery for 4 generators	4.00	tank (5 tons each)	800.00	3,200.00	delivery of diesel fuel from the nearest gas station to the village
4	Engine oil for operation of 4 generators	54.00	litre	30.00	1,620.00	the electric generator also needs engine oil for smooth operation
5	Maintenance of 4 generators	4.00	piece	400.00	1,600.00	it is often necessary to repair low-quality cheap electric generators all over the year
	TOTAL costs per year for 3 villages				<b>44,820.00</b>	



## Annex 7.

### **ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK: SCALING CLIMATE RESILIENCE FOR FARMERS IN TURKMENISTAN**

Submitted in a separate file

## Annex 8.

### **Record of Stakeholder Consultations for Development of Project Proposal to Adaptation Fund**

The preparation of the AF proposal “**Scaling climate resilience for farmers in Turkmenistan**” was carried out in consultation with stakeholders, drawing on the expertise of International and National experts, National government stakeholders, as well as a variety of other actors including state-level unions, private sector representative and community members in targeted project areas.

Two missions of the international consultant on climate change project development, Matthew Savage, took place to Turkmenistan with the participation of UNDP Regional Technical Advisor, and UNDP Environment Portfolio staff, Rovshen Nurmuhammedov (UNDP Programme Specialist) and Rahman Hanekov (Programme Management Officer) to meet with key stakeholders. A record of the stakeholder consultations, with dates and participants is provided below. During these missions there were intensive consultations with variety of stakeholders to get insights for project activities and outputs. During the second mission a visit was arranged to one of the agricultural regions of the country Mary Province, where in-depth consultations occurred with farmers and agri-entrepreneurs. Furthermore, research sites of agricultural research institutes were visited to see their potential and possibility upgrade their capacity in the framework of the future project.

In addition, in order to maximize synergies, share lessons learned and to avoid consultation fatigue with stakeholders involved in complementarity climate change resilience initiatives, the AF project idea was widely discussed on a local community level during numerous field visits to pilot sites of existing UNDP SCCF project “Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan” in Dashoguz and Lebap Provinces and UNDP/GEF project “Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan” in Ahal province.

Finally, in order to validate the technical aspects of the project design, hydrological experts undertook a mission to Turkmenistan to:

- Carry out field investigations to generate new data in support of the project; [L] [SEP]
- Identify and meet with project stakeholders to acquire site specific data; [L] [SEP]
- Acquire existing current and historical data from institutions; [L] [SEP]
- Identify gaps from local stakeholders in the information required to deliver the project.

Towards this purpose a series of workshops were hosted at the UNDP/Energy Efficiency and Renewable Energy for Sustainable Water Management project office, site meetings with stakeholders and site investigations in the catchment of the Layinsuw river and Kaakhka town. [L] [SEP]

**Stakeholder Consultations during Mission to develop project proposal to Adaptation Fund  
International Climate Change Project Development Specialist  
And Regional Technical Specialist, UNDP-GEF  
Ashgabat, Turkmenistan, December 04-07, 2017**

**Monday, December 04, 2017**

10.00 – 12.00	Meeting with UNDP Environment Portfolio staff (Rovshen Nurmuhammedov, UNDP Programme Specialist, Rahman Hanekov, Programme Management Officer)
14.30 – 16.30	Meeting with representatives of the State Committee of Turkmenistan on Environment Protection and Land Resources and National Institute of Deserts, Flora and Fauna
17.00 – 18.00	Meeting with UNDP Management (Vitalie Vremis, UNDP Deputy Resident Representative in Turkmenistan)

***Tuesday, December 05, 2017***

09.00 – 10.30	Meeting with representatives of the Ministry of Agriculture and Water Economy
11.00 – 13.00	Meeting with project staff and local experts of the UNDP project “Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan”
14.30 – 16.30	Meeting with representatives of the Union of Industrialists and Entrepreneurs of Turkmenistan and Bank “Rysgal”
16.30 – 17.30	Meeting with GIZ Regional Project “Sustainable and Climate Sensitive Land Use for Economic Development in Central Asia”

***Wednesday, December 06, 2017***

10.00 – 11.00	Meeting with Kepbanov Y., Legal expert
11.00 – 12.30	Meeting with project staff and local experts of the UNDP GEF project “Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan”
14.30 – 16.00	Meeting with representatives of the National Committee for Hydrometeorology
16.30 – 17.30	Meeting with EuropeAid Project “Support to further sustainable agriculture and rural development in Turkmenistan - III Phase”

***Thursday, December 07, 2017***

16.00 – 18.00	Debriefing UNDP Management regarding the mission results (Elena Panova, UNDP Resident Representative in Turkmenistan and Vitalie Vremis, UNDP Deputy Resident Representative in Turkmenistan, Rovshen Nurmuhammedov, UNDP Programme Specialist)
---------------	---

**Stakeholder Consultations during Mission of International Climate Change Project Development Specialist**

**Ashgabat, Turkmenistan April 16-20, 2018**

***Monday, April 16, 2018***

10.30 – 11.00	Meeting with UNDP Environment Portfolio staff (Rovshen Nurmuhammedov, UNDP Programme Specialist, Rahman Hanekov, Programme Management Officer) and International Climate Change Project Development Specialist
11.00 – 12.00	Meeting with UNDP Management (Elena Panova, UNDP Resident Representative in Turkmenistan and Vitalie Vremis, UNDP Deputy Resident Representative in Turkmenistan, Rovshen Nurmuhammedov, UNDP Programme Specialist) and International Climate Change Project Development Specialist

***Tuesday, April 17, 2018***

09.30 – 10.30	Meeting with project staff and local experts of the UNDP project “Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan”
11.00 – 12.00	Meeting with representatives of the State Committee of Turkmenistan on Environment Protection and Land Resources

12.00 – 13.00	Meeting with representatives of the Ministry of Agriculture and Water Economy
15.00 – 17.00	Meeting with representatives of the Union of Industrialists and Entrepreneurs of Turkmenistan and Bank “Rysgal”

**Wednesday, April 18, 2018 - Field visit to Mary Velayat**

09.00 –10.00	Meeting with representative office of the Union of Industrialists and Entrepreneurs of Turkmenistan in Mary velayat
11.00 –13.00	Visit and meeting with representatives of the lolotan research-production pilot center of the agricultural research institute
15.00 –16.00	Visit and meeting with representatives of the Mary research-production pilot center of the agricultural research institute (in Bayramali)

**Thursday, April 19, 2018**

09.30 –11:00	Meeting with representatives of the State commercial bank “Daihanbank”
11.00 –12.30	Meeting with representatives of the National Committee for Hydrometeorology
14.30 –16.30	Meeting with representatives of the Institute of Desert, Flora and Fauna

**Friday, April 20, 2018**

09.30 – 12.30	Meeting with project staff and local experts of the UNDP GEF project “Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan” and visiting Geokdepe polygon
14.00 – 15.00	Debriefing UNDP Management regarding stakeholder consultation results (Elena Panova, UNDP Resident Representative in Turkmenistan and Vitalie Vremis, UNDP Deputy Resident Representative in Turkmenistan, Rovshen Nurmuhammedov, UNDP Programme Specialist)

**Minutes of the Round table to discuss project proposal to Adaptation Fund Project Scaling  
climate resilience for farmers in Turkmenistan**

**Ashgabat, Turkmenistan April 16-20, 2018**

**Participants:**

- State Committee for Environmental Protection and Land Resources of Turkmenistan (2 people)
- Ministry of agriculture and water resources (3 people)
- Parliament (Mejlis) of Turkmenistan
- Union of Entrepreneurs and Industrialist of Turkmenistan
- State Committee on hydrometeorology under Cabinet of Ministers of Turkmenistan (2 people)
- State Commercial Bank “Daikhanbank”
- Commercial Bank “Rysgal”
- Livestock Institute of the Academy of Sciences of Turkmenistan
- Turkmen State agricultural University named after S. Niyazov
- Turkmen agricultural Institute in Dashoguz city
- UNDP (6 people)

**Agenda:**

1. Presentation of the goals and objectives of the project proposal to the Adaptation Fund
2. Discussion of inputs/suggestions/remarks of representatives of ministries and departments to the project proposal
3. Discussion of the procedure and deadlines for submitting a project proposal to the Adaptation Fund

### Summary of Discussion:

- UNDP presented the goals and objectives of the project proposal to the Adaptation Fund. Also, all 3 components of the project proposal developed as a result of consultations with national partners were described.
- Participating representatives of government agencies, after listening to the presentation, noted the feasibility and timeliness of this project. Recommendations from key stakeholders were as follows:
  - On the 2nd component, to maintain continuity in the ongoing UNDP project "Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan", and to include the issue of the introduction of international experience in curricula and scientific topics for agricultural institutions and research institutes of the country;
  - Along with the crop sector, include the development of the livestock sector;
  - Pay attention to the organizational structure of the extension services for the sustainability of the results of this project;
  - Demonstration plots in the velayats should be oriented towards the search and implementation of practical solutions to the Aral Sea basin problems;
  - Co-financing is not required.
- The participants of the meeting confirmed their willingness to cooperate and support the project at all levels if the project proposal was approved by the Adaptation Fund and also agreed that the main national partner and coordinating body should be the State Committee for Environmental Protection and Land Resources with the operational and administrative support of the UNDP office in Turkmenistan

### Conclusions:

1. To recommend starting the procedure for submitting a project proposal to the Adaptation Fund after incorporating comments and suggestions from representatives of ministries and departments to the project proposal;
2. To recommend the appointment of the State Committee for Environmental Protection and Land Resources of Turkmenistan as the main national partner and coordinating body for this project proposal.

### Minutes of the Round table to discuss project proposal to Adaptation Fund

Project Name: *Scaling climate resilience for farmers in Turkmenistan*

Date: July 4, 2018

Participants:

- State Committee for Environmental Protection and Land Resources of Turkmenistan (2 people)
- Ministry of agriculture and water resources (3 people)
- Parliament (Mejlis) of Turkmenistan
- Union of Entrepreneurs and Industrialist of Turkmenistan
- State Committee on hydrometeorology under Cabinet of Ministers of Turkmenistan (2 people)
- State Commercial Bank "Daikhanbank"
- Commercial Bank "Rysgal"
- Livestock Institute of the Academy of Sciences of Turkmenistan
- Turkmen State agricultural University named after S.Niyazov
- Turkmen agricultural Institute in Dashoguz city
- UNDP (6 people)

#### Agenda:

1. Presentation of the goals and objectives of the project proposal to the Adaptation Fund
2. Discussion of inputs/suggestions/remarks of representatives of ministries and departments to the project proposal
3. Discussion of the procedure and deadlines for submitting a project proposal to the Adaptation Fund

#### Discussion:

- UNDP presented the goals and objectives of the project proposal to the Adaptation Fund. Also, all 3 components of the project proposal developed as a result of consultations with national partners were described.
- Participating representatives of government agencies, after listening to the presentation, noted the feasibility and timeliness of this project. They recommended:
  - on the 2nd component, to maintain continuity in the ongoing UNDP project "Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan", and to include the issue of the introduction of international experience in curricula and scientific topics for agricultural institutions and research institutes of the country;
  - along with the crop sector, include the development of the livestock sector;
  - pay attention to the organizational structure of the extension services for the sustainability of the results of this project;
  - Demonstration plots in the velayats should be oriented towards the search and implementation of practical solutions to the Aral Sea basin problems;
  - co-financing is not required.
- The participants of the meeting confirmed their willingness to cooperate and support the project at all levels if the project proposal was approved by the Adaptation Fund and also agreed that the main national partner and coordinating body should be the State Committee for Environmental Protection and Land Resources with the operational and administrative support of the UNDP office in Turkmenistan

#### Conclusion:



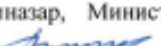
1. To recommend starting the procedure for submitting a project proposal to the Adaptation Fund after incorporating comments and suggestions from representatives of ministries and departments to the project proposal;
2. To recommend the appointment of the State Committee for Environmental Protection and Land Resources of Turkmenistan as the main national partner and coordinating body for this project proposal.

#### Протокол круглого стола по обсуждению проектного предложения для подачи в Адаптационный Фонд

Название проекта: *Повышение устойчивости для частных фермеров в Туркменистане*

Дата: 4 июля 2018 года

Участовали:

- Берди Бердиев, Государственный комитет Туркменистана по охране окружающей среды и земельным ресурсам 
- Атамуратов Нуры, Государственный комитет Туркменистана по охране окружающей среды и земельным ресурсам 
- Мамметгулов Керимназар, Министерство сельского и водного хозяйства 

сообществ в засушливых регионах Туркменистана»

- Джумадурдыев Овездурды, специалист проекта
- Ханеков Рахман, ПРООН
- Сарыева Джемал, ПРООН



**Повестка:**

1. Представление целей и задач проектного предложения в Адаптационный Фонд
2. Обсуждение замечаний и предложений по проектному предложению представителей министерств и ведомств
3. Обсуждение процедуры и сроков подачи проектного предложения в Адаптационный Фонд

**Обсуждение:**

- ПРООН были представлены цели и задачи проектного предложения в Адаптационный Фонд. Также были описаны все 3 компонента проектного предложения, разработанные в результате консультаций с национальными партнерами.
- Участвующие представители государственных ведомств, выступав презентацию, отметили целесообразность и своевременность данного проекта. Они рекомендовали:
  - по 2му компоненту сохранить преемственность по реализуемому проекту ПРООН «Поддержка климатически устойчивой экономической жизнедеятельности сельскохозяйственных сообществ в засушливых регионах Туркменистана», а также включить вопрос о внедрении международного опыта в учебные программы и научные темы для с/х учебных заведений и НИИ страны;
  - наряду с сектором растениеводства, включить вопросы развития сектора животноводства;
  - обратить внимание на организационную структуру с/х консалтинговых услуг для устойчивости результатов данного проекта;
  - демонстрационные участки в велятах должны быть ориентированы на поиск и реализацию практических решений проблем бассейна Аральского моря;
  - со-финансирование не требуется.
- Участники встречи подтвердили свою готовность сотрудничать и поддерживать деятельность проекта на всех уровнях в случае одобрения данного проектного предложения Адаптационным Фондом, а также согласились с тем, что главным национальным партнером и координирующим органом должен быть Государственный комитет Туркменистана по охране окружающей среды и земельным ресурсам при операционной и административной поддержке офиса ПРООН в Туркменистане.

**Заключение:**

1. Рекомендовать начать процедуру подачи проектного предложения в Адаптационный Фонд после внесения замечаний и предложений представителей министерства и ведомств в проектный документ;
2. Рекомендовать назначение Государственного комитета Туркменистана по охране окружающей среды и земельным ресурсам в качестве главного национального партнера и координирующего органа по данному проектному предложению.

## Annex 9. Typical profile of Daikhan Associations

Vatan Daikhan Association, Lebap Province (Agriculture-oriented Daikhan)

Indicators:	2016
Total population	9864
Of which men	4861
Of which women	5003
Of which children	3677
Population at working age (women 16-55 years old, men 16-62 years old)	5331
Number of brigades in the daihan association	16
Number of tenants in the daikhan association	1650
including of women	55%
Number of daihan farms within a daihan association	3
<b>Plant growing</b>	
Total area of irrigated land, ha	
including wheat, ha	1968
tons	3295
cotton, ha	1540
tons	4774
rice, ha	250
tons	803
tomatoes, ha	9
tons	242
cabbage, ha	3
tons	60
cucumbers, ha	five
tons	166.5
carrot, ha	6
tons	116,6
onion, ha	five
tons	306
potato ha	17
tons	522,6
melon, watermelon / melon	thirty
tons	104.2
Barley ha	6
Gardens, ha	18
Forest belts, ha	12
Mulberry plantations, ha	86
Length of irrigation network, km	56
Length of the collector-drainage network, km	72

<b>ANIMAL BREEDING</b>	
Number of sheep, including in the private sector	6200
Number of cattle, in total, incl. in the private sector	5420
<b>Assessment of land reclamation state:</b>	
- area of moderately saline land, ha	971.3
- area of strongly saline land, ha	208
Technical equipment of daihan associations and farms, as well as farmers:	
- excavator	one
- wheeled tractors	25
Number of tenants (farmers) who received a loan	one

Livestock: Example Garagum Daikhan Association, Dashaouz Province

<b>Indicators:</b>	2016 Data
Total population	924
Of which men	448
Of which women	476
Of which children	337
Population at working age (women 16-55 years old, men 16-62 years old)	557
<b>Agriculture</b>	
Total area of irrigated land, ha	99
other crops, ha	99
<b>Livestock</b>	
Total area of pastures, ha; thousand hectares	880,661
including area of flooded pastures, ha; thousand hectares	265,000
Number of wells, watering points	119
Total number of sheep	32024
Total number of camels	1713
Technical equipment of daihan associations and farms, as well as farmers:	
- wheat crusher	1
- water carrier	1
- car "Ural"	1
- baler	1
- Tractors "Class"	1



**Annex 10. Letter of support from the Union of Industrialists and Entrepreneurs of Turkmenistan**



**Постоянному Представителю  
ПРООН в Туркменистане**

**Уважаемая госпожа Панова!**

Союз Промышленников и предпринимателей Туркменистана рассмотрел проектное предложение ПРООН в Адаптационный Фонд «Повышение устойчивости фермеров Туркменистана к последствиям изменения климата» и отмечает важность реализации этого проекта, который приведет к содействию развития сельского хозяйства Туркменистана на новый качественный уровень и повышению устойчивости фермеров к последствиям изменения климата.

В этой связи, мы считаем выполнение вышеупомянутого проекта очень своевременным и актуальным.

Члены Союза, включая велаятские подразделения, будут играть одну из ключевых ролей в создании системы информационно-консультативных услуг для фермеров-предпринимателей. Показательные участки в каждом велаяте будут демонстрировать и практиковать инновационные методы и технологии, направленные на адаптацию сельскохозяйственной деятельности к условиям изменения климата.

Со своей стороны хотим подтвердить готовность Союза Промышленников и предпринимателей Туркменистана к сотрудничеству и поддержать реализацию проекта на всех уровнях, во всех регионах через свои велаятские подразделения в случае одобрения данного проектного предложения Адаптационным Фондом.

**С уважением,  
Председатель**

**А. Дадаев**

**UNION OF INDUSTRIALISTS AND ENTREPRENEURS OF TURKMENISTAN**

**30.11.2018**

**No 01-12/10025**

**UNDP Resident Representative in Turkmenistan**

Dear Ms Panova,

The Union of Industrialists and Entrepreneurs in Turkmenistan has considered the UNDP project proposal to the Adaptation Fund on 'Scaling Climate Resilience for Farmers in Turkmenistan' and highlights the importance of the implementation of the said project, that will lead to facilitating agricultural development in Turkmenistan at a new quality level and enhancing the resilience of Turkmenistan farmers to climate change consequences.

In this regard, we believe the implementation of the project will be timely and relevant.

The Union members, including velayats' subsidiaries will play one of the key roles in setting up the extension services for private farmers. Pilot areas in each velayat will show and apply hand-on innovation techniques and technologies aimed at the adaptation of agricultural activities to climate change impact.

From our side, we would like to confirm the readiness of the Union of Industrialists and Entrepreneurs in Turkmenistan to cooperate and support the implementation of the project at all levels, in all regions through our velayats' subsidiaries should this project proposal be adopted by the Adaptation Fund.

Yours sincerely,

A.Dadayev

## Annex 11. Gender Action Plan

Project Outputs	Gender mainstreaming actions	Indicators and targets	Timeline	Responsibilities
	<b>Component 1. Policy and institutional development to mainstream resilience</b>			
<b>Output 1.1. Climate resilience is mainstreamed into policies and regulations in agriculture, water and land management sectors; new regulatory incentives for farmers are in place</b>	<p>Review of the new policies and guidance documents by the gender advisor to identify gender gaps and mainstreaming opportunities</p> <p>Gender expertise will be engaged for the development of the new laws, regulations and guidance documents to ensure that gender considerations are taken into account in the design.</p> <p>Gender expert will provide inputs to the TORs and will screen all policy and guidance documents</p> <p>Gender sensitive considerations will be integrated into the design of new laws, regulations and associated explanatory materials relating to agricultural sector strategy development</p>	<p>Level of integration of gender concerns in the new policy and guidance documents</p> <p>Gender analysis and gender mainstreaming objectives are included in the new/updated laws or sub regulations, guidance notes and the Strategic Concept to support climate resilience among smallholder farmers.</p>	Years 1-4	Project Management Unit (PMU), Gender Expert, short-term gender consultants, MAEP
<b>Output 1.2. Capacity built for key government ministries and other relevant institutions to promote climate resilience in private sector agriculture</b>	<p>Capacity building activities will target both men and women</p> <p>Gender mainstreaming objectives will be reflected in the agenda of capacity building and training events</p>	<p>Ratio of women among institutional stakeholders engaged and trained</p> <p>At least 30% of national/regional stakeholders trained are women</p>	Years 1-4	PMU, Gender Expert
	<b>Component 2: Climate resilient extension services</b>			
<b>Output 2.1. A public-private network of extension service providers is trained to deliver climate risk management and adaptation information and advice to farmers</b>	<p>Gender expert provides inputs to training agendas</p> <p>A series of training workshops focussed on gender mainstreaming for extension workers, practitioners, UIE</p>	<p>Gender considerations are reflected in training materials and technical guidance to extension workers (review by gender advisor)</p> <p>Extension workers are trained on gender mainstreaming in climate change adaptation</p> <p>Number of women trained among the extension workers (at least 30%)</p>	Year 1-5 (continuously)	PMU, Gender Expert

<b>Output 2.2: More than 20,000 farming enterprises and entrepreneurs receive climate risk information and resilience advice through improved and accessible extension services, best practice guidance and improved climate information services.</b>	<p>Extension service providers will screen to ensure that at least 30% of those receiving support (either heads of enterprises or individual entrepreneurs) are women.</p> <p>PMU and Project Gender expert will monitor implementation of gender targets and reporting</p> <p>Gender expert will provide inputs to the outreach strategy of the project and extension centres to ensure that extension services are reaching out men and women</p>	<p>Ratio of women among beneficiaries of extension support</p> <p>At least 30% of 20,000 private sector farmers who access information on climate resilient best practices and best available technologies are women</p> <p>At least 30% of 2000 private sector farmers who receive direct field training in climate resilient agriculture are women</p>	<p>Year 2-5</p>	<p>PMU, Gender Expert, Extension workers</p>
	<b>Component 3: Regional demonstration plots and community level investment into adaptation technologies</b>			
<b>Output 3.1. At least 1 MAEP research institute site developed providing access to best available technologies and practices for non-state order crops and supporting improved research links</b>	<p>Achieve 30 percent representation of women-farmers in training courses</p> <p>Tailor information and awareness campaigns for the needs of men and women</p> <p>Taylor the outreach campaign to ensure equal reach out to male and female farmers</p>	<p>At least 30% of farmers visiting project demonstration sites for field training and to learn about best practices and technologies are women</p> <p>Women and men demonstrate positive feedback on the training materials and delivery methods (verified through training reports)</p> <p>Women comprise 30% of trainees</p>	<p>Year 2-5</p>	<p>PMU, Gender Expert, MAEP</p>
<b>Output 3.2. Private sector-led best practice demonstration facilities:</b>	<p>The siting of demonstration plots will be informed by the potential for access by vulnerable groups, including women. This will include both location as well as access arrangements. The access of vulnerable farmers, including women to these demonstration plots will be monitored on an annual basis through a formal review mechanism, with corrective action undertaken where such access is not being prioritized.</p> <p>Gender balanced approach to selection of participating private sector partnerships (female led enterprises)</p> <p>Achieve 30 percent representation of women in training courses</p> <p>Tailor information and awareness campaigns for the needs of men and women</p>	<p>At least 30% of farmers visiting project demonstration sites for field training and to learn about best practices and technologies are women</p> <p>Information tailored to the needs of men and women</p> <p>Private sector partners hosting demonstration plots include both men and women-led farming enterprises</p>	<p>Year 2-5</p>	<p>PMU, Gender Expert, extension workers, Union of Entrepreneurs, private farmers hosting the demonstration plots</p>

<b>Output 3.3. Adaptation investments in community scale farmer-led cooperatives:</b>	<p>Conduct detailed gender assessments as part of socio-economic vulnerability assessments</p> <p>Gender expert will be engaged since the project Inception Phase to support selection of the pilot sites, detailed gender assessments and adaptation plans</p> <p>Make sure that women and vulnerable groups are adequately represented in the stakeholder consultations and design of adaptation investment plans</p> <p>Local NGOs with experience and track record in gender mainstreaming work at local level will be engaged in the community based outreach and capacity building activities</p>	<p>Gender assessment conducted for each project location</p> <p>Ratio of women in stakeholder consultations and community adaptation planning work</p> <p>Community consultation groups with at least 30% representation of women</p> <p>At least 30% of those receiving field training and support will be women</p>	Year 1-5	PMU, Gender Expert, extension workers
<b>Effective project management</b>				
Governance	Ensure that project Steering Committee and other supervisory bodies are composed of at least 30% of women	30% percent of women in the project governance and supervisory bodies	Year 1-5	UNDP, PMU, Gender Expert
Capacity building and training	Training of staff members of the project on gender mainstreaming and social vulnerability approach	Staff members completed training in gender mainstreaming and social vulnerability approach	Year 1-5	UNDP Gender Focal Point, PMU, Gender Expert
M&E	<p>Gender mainstreaming targets in the logical framework will be specified based on the detailed gender analysis and gender mainstreaming action plans for each site</p> <p>Gender-disaggregated data for evaluation purposes will be collected</p>	Logframe gender targets updated based on detailed gender assessment. Reporting includes gender-disaggregated data.	Year 1	PMU, Gender Expert
Stakeholder consultations, access to information and participatory decision making	<p>Secure participation of the project Gender Advisor in all project working groups.</p> <p>Ensure that women are adequately represented in all project stakeholder consultations and capacity building events.</p> <p>Ensure that women have equal access to grievance reporting mechanism.</p>	<p>Gender Advisor is a member of all working groups.</p> <p>Ratio of women in stakeholder consultations Community consultation groups with at least 30% representation of women</p>	Years 1-5	UNDP, PMU, Gender Expert

## Annex 12. Acronyms

ADB	Asian Development Bank
AF	Adaptation Fund
BCR	Benefit Cost Ratio
CO	Country Office
COP	Conference of the Parties
DRR	Disaster risk reduction
EBRD	European Bank for Reconstruction and Development
EECCA	Eastern Europe, the Caucasus and Central Asia
ESP	Environmental and Social Principles
EU	European Union
FAO	Food and Agriculture Organisation
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GoT	Government of Turkmenistan
Ha	Hectare
IRR	Internal Rate of Return
M&E	Monitoring and Evaluation
MAEP	Ministry of Agriculture and Environment Protection of Turkmenistan
MOAWR	Ministry of Agriculture and Water Resources
MTE	Mid-term evaluation
NAP	National Adaptation Plan
NCCS	National Climate Change Strategy
NDC	Nationally Determined Contribution
NEPAAM	National Economic Program of Action on Adaptation and Mitigation
NPD	National Project Director
OECD	Organisation for Economic Cooperation and Development
PA	Project Assistant
PAC	Project Appraisal Committee
PB	Project Board
PM	Project Manager
POPP	Programme and Operational Policies and Procedures
PPR	Project Performance Reports
PSC	Project Steering Committee
SCCF	Special Climate Change Fund
SES	Social and Environmental Standards
SME	Small and Medium Enterprise
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
SCEPLR	State Committee for Environmental Protection and Land Resources of Turkmenistan
VCA	Vulnerability and Capacity Assessment
WUG	Water User Group
WUA	Water Users Association
IMC	Inter-Ministerial Climate Change Council
UNECE	United Nations Economic Commission for Europe