ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

Project/Programme Category:	Regular
Country/ies:	Iran
Title of Project/Programme:	Reducing vulnerability to climate change in the Lake Bakhtegan Basin. (UNDP PIMS 6190)
Type of Implementing Entity:	Multilateral Implementing Entity
Implementing Entity:	United Nations Development Programme
Executing Entity/ies:	Department of Environment (DoE)
Amount of Financing Requested:	US$ 9,865,651(in U.S Dollars Equivalent)

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

National context

1. According to Iran's Second National Communication to the UNFCCC "*Iran is highly vulnerable to the adverse impacts of climate change. It is a country with arid and semi-arid areas, limited water availability, low forest cover, liable to drought and desertification, prone to floods, high urban atmospheric pollution, fragile mountainous ecosystems.*

2. It is well documented that the west of Asia region has experienced climate changes, water shortages, and disruptions to agriculture and human settlement for millenia[1]. The Middle East and North Africa (MENA) is the most water scarce region in the world. With combined effects of a predominantly arid climate, rapid population increases, increased demand for water, climate change, and transboundary water management issues, Iran, along with other MENA countries, is faced with a growing water crisis situation[2]. The rapid growth in demand for water in Iran has led to severe depletion of available water with annual renewable water availability per capita projected to be at crisis level by 2021[3]. In a recent World Resources Institute study, Iran ranks 13th out of 33 countries identified as likely to face severe water stress by 2040[4] under a Business as Usual scenario. In the mid-1960s with a population of 19 million water per capita was 7000 cubic metres per annum. By 2014, with a population of 70 million, this figure had reduced to less than 1900 cubic metres per annum, and with projected population increases is expected to be approximately 1400 cubic metres per annum by 2025[5].

3. The Islamic Republic of Iran, with an area of 1,648,195 square kilometres, is mostly a mountainous and semi-arid land. The climate is mainly influenced by a sub-tropical high-pressure belt, with three climate types according to the Koppen climate classification; arid and semi-arid; temperate-mesothermal; continental-microclimate. Approximately 97 percent of the country is arid or semi-arid with an average annual rainfall of 240mm, less than a third of the world's average precipitation[6]. Annual rainfall in the inland dry deserts of Iran can be as low as only 10mm. Rainfall is very seasonal with only 10 percent of the annual rainfall occurring during the hot and dry seasons in the central, southern and eastern areas of the country[7].Average annual rainfall over most of the country is about 200mm. Temperatures vary from -6°C to 21°C in January and 19-39°C in July[8].

[1] Kaniewski, Daniel, Van Campo, Elise, Weiss, Harvey. 2012. Drought is a recurring challenge in the Middle East. PNAS 109 (10) 3862-3867

[2]World Bank. 2017. Beyond Scarcity: Water Security in the Middle East and North Africa.

[3]Iran Second National Communication to the UNFCCC. 2010.

[4] Luo, T., R. Young, P. Reig. 2015. "Aqueduct Projected Water Stress Country Rankings." Technical Note. Washington, D.C.: World Resources Institute. Available online at: www.wri.org/publication/aqueduct-projected-water-stresscountry-rankings

[5]Garshasbi, Parviz. 2014. *Drought conditions and management strategies in Iran*. Report presented to UN Water Regional Workshop for Near East and North Africa Region on Capacity Development to support National Drought Management Policies, 17-20 November 2014.

[6]Department of Environment. 2016. Islamic Republic of Iran Revised National Biodiversity Strategies and Action Plan (NBSAP2) 2016-2030.

[7]Garshasbi, Parviz. 2014. *Drought conditions and management strategies in Iran*. Report presented to UN Water Regional Workshop for Near East and North Africa Region on Capacity Development to support National Drought Management Policies, 17-20 November 2014. http://www.ais.unwater.org/ais/pluginfile.php/605/mod_page/content/23/Iran.pdf

[8]Iran Second National Communication to the UNFCCC. 2010.

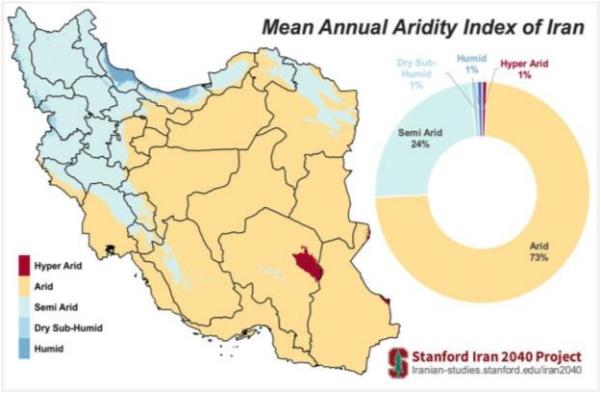

Figure 1: Mean annual aridity index for Iran

4. Mean annual temperatures have increased in Iran based on analysis of data from 1960-2010, with an increase in minimum temperatures over this period of approximately 2°C and an increase in maximum temperatures of approximately 1°C. Annual rainfall is already low throughout most of Iran and for the most part there have been no significant changes over the 1960-2010 period[9]. Projections to the 2015-30 period compared to 1982-2009 indicate average temperature increases of approximately 0.5°C, with variable and uncertain changes in precipitation. Projected temperature increases of up to 3-4°C by 2100 were identified in Iran's Second National Communication to the UNFCCC, with uncertain changes in precipitation. Continued temperature increases, combined with the already low rainfall throughout most of Iran, will increase the risk of drought over time. *"According to the long-term climate predictions, the provinces and areas south of the Zagros Mountains range will experience the greatest decline in snowfall. This will have important consequences on surface and underground water resources and thus the availability of water for irrigation in these areas."*[10]

5. With high summer temperatures and low summer rainfall, combined with low annual rainfall in most areas, the drought risk is very high. The severe drought experienced from 1999-2002 resulted in an estimated $3.5 billion worth of damage, killed 800,000 head of livestock and dried up major inland reservoirs and lakes[11]. Unlike other natural disasters, which have immediate and obvious impact, the impacts of drought are insidious. These impacts are experienced throughout the economy, society and environment with often long-lasting consequences. Based on an analysis of the economic impacts of climate change induced water scarcity the MENA region is expected to experience the greatest economic losses, estimated at 6-14 percent of GDP by 2050[12].

6. Iran's population has grown rapidly over the last sixty years, from approximately 19 million people in 1956 to approximately 80 million in 2016[13]. The increase has been notably greater in urban areas than rural. This difference reflects the rapid growth of urbanisation in Iran, with 73 percent of the population now living in urban areas compared to only 27 percent in 1950[14].Within the context of the Iran government's policy of food self-sufficiency these changes in population and its distribution have had significant impacts. Among other factors the loss of arable land to increased urbanisation and the pressure to feed a rapidly growing population has placed enormous pressure on soil and water resources.

7. Iran is the second largest economy in the Middle East and North Africa (MENA) region with a Gross Domestic Product (GDP) in 2016/17 of 13,045 trillion Iranian Rials (USD377 billion)[15].Iran's Human Development Index (HDI) value for 2013 was 0.749, which is in the 'high human development' category, positioning the country at 75 out of 187 countries and territories. Between 1980 and 2013, Iran's HDI value increased from 0.490 to 0.749, an increase of 52.9 percent. Life expectancy at birth increased by 19.9 years, mean years of schooling increased by 5.7 years and expected years of schooling increased by 6.5 years. Iran's Gross National Income (GNI) per capital increased from 5,065,499 Rials in 1996 to 7,465,317 Rials in 2012 (47.3% increase) using the base year 1997. Government investment in research increased from 0.4 percent of GDP in

[9]Iran's Third National Communication to the UNFCCC. Chapter 4: Vulnerability and Adaptation Assessment, Climate Change Modelling. DRAFT.
[10]Iran Second National Communication to the UNFCCC. 2010.
[11]http://www.un-spider.org/sites/default/files/Iran_booklet_final_web_012016.pdf
[12]World Bank. 2016. *High and Dry: Climate Change, Water, and the Economy*. Washington, DC: World Bank.
[13]Iran Census 2016
[14]Statistical Center of Iran
[15]International Monetary Fund. 2017.Islamic Republic of Iran: 2016 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for the Islamic Republic of Iran

2000 to 0.87 percent by 2009[16]. In 2011 Iran ranked first in scientific growth in the world and 17th in scientific production. The largest sector in Iran is the service sector, with agriculture ranking third behind industry (mining and manufacturing.

8. Of Iran's total land area of 165 million hectares about 37 million hectares are suitable agriculture, of which 20 million hectares are irrigated and 17 million hectares are dryland[17]. Of the total agricultural land area, currently 18.5 million hectares are devoted to field crop production and horticulture. Of this, 6.4 million hectares are under annual irrigated crops, 2 million hectares are under horticultural crops and about 6.2 million hectares are under annual dryland crops. The remaining 3.9 million hectares are fallow. Cereals (predominantly wheat, but including rice, barley and maize) are grown on 70 percent of cultivated land. Other crops include various fruits, nuts, vegetables, cotton, sugarcane, sugar beet and spices. The main development challenges faced by agriculture and the rural sector include: a harsh physical environment; constraints to food security and self-sufficiency in major staple crops; low productivity of the many small-holder farmers with issues including water shortages and outdated and inefficient irrigation systems; rural overty; limitation and application of and access to modern technologies; adverse impacts on the natural environment.

9. A consequence of the increased demand for and use of freshwater, predominantly for irrigated agriculture, has been severe impacts on natural ecosystems. Iran has a high natural biodiversity with natural habitats supporting over 8200 plants species of which 20 percent are endemic; 535 bird species; 197 mammal species, 227 reptile species, 21 amphibian species and 160 freshwater fish species[18]. Iran's wetlands, covering 1.7 percent of the total land area, provide important habitat for many species. Half of this area, amounting to 1.4 million hectares, is made up of the 24 wetland sites designated as Wetlands of International Importance (Ramsar sites) in Iran[19].From studied wetlands of the country by 2013, about one third of them are under pressure or in a critical condition[20]. Extreme drought conditions have exacerbated the dramatic shrinking of inland water bodies in Iran, including the striking examples of Lake Urmia, the Hamoun Wetlands and Lake Bakhtegan which has affected the large number of communities around the ecosystems along with severe adverse impacts on biodiversity. While drought has played a significant role there has been a combination of factors that have led to this situation. The main causes are reduced precipitation, increasing temperatures, construction of dams in the past decades and diversion of surface water for farming which has also resulted in decreased recharge of groundwater[21].

10. According to the National Biodiversity Strategies and Action Plan (NBSAP2) (page 18) *"Climate change, water shortages and the continuation of droughts are among the serious threats to biodiversity in the past and future that must be considered accurately. The location of Iran in the dry belt and building dams illogically has not been ineffective in causing water crises and desertification of large parts of the country especially in a land where its ancestors knew, from many years ago, that the most important enemy of the water in that land is the sun and learned to conduct the water into underground and roofed water storage tanks. For this reason, special attention must be paid to water management because it plays a significant role in biodiversity conservation."*

11. The importance of water management in Iran is reinforced through the recently published World Bank report on Water Security in the MENA[22] which states that *"A fundamental development challenge for the region is to take the actions necessary to navigate sustainable pathways toward water security. Sustainable pathways would anticipate and manage the inevitable increases in water scarcity and water-related risks—against a backdrop of climate change, urbanization, growing fiscal constraints, and widespread fragility and conflict. Planning and action are needed to strengthen the resilience of economies and societies to protect them from water-related disasters."*

12. This project aims to bring these issues into focus, within the context of climate change, in the Bakhtegan Basin in Fars Province in southern Iran. The Bakhtegan Basin is the heart of Persian civilization with the ruins of the ancient cities of Pasargadae and Persepolis within its boundaries. The story of the Bakhtegan Basin is in many ways the story of Iran. It encompasses a long history of wise resource management, the more recent decades of environmental mismanagement, the social, environmental and economic costs that have arisen as a result, and the unfolding impacts of climate change.

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[16] Source: https://en.wikipedia.org/wiki/Economy_of_Iran

[17]Keshavarza et al, 2005. Water Allocation and Pricing in Agriculture of Iran, Water Conservation, Reuse, and Recycling: Proceedings of an Iranian-American Workshop, page: 153-172.

[18]Department of Environment. 2016. Islamic Republic of Iran Revised National Biodiversity Strategies and Action Plan (NBSAP2) 2016-2030.

[19]http://www.ramsar.org/wetland/iran-islamic-republic-of

[20]Department of Environment. 2016. Islamic Republic of Iran Revised National Biodiversity Strategies and Action Plan (NBSAP2) 2016-2030.

[21]Nazemosadat, M.J. Amin, S., Kamgare-Haghighi, A.A., Khalili, D. 2000. Workshop on Drought-Related Issues in Fars Province, Iran: Critical Points and Resolutions. Drought Network News (1994-2001), p. 64.

[22]World Bank. 2017. Beyond Scarcity: Water Security in the Middle East and North Africa.

The Bakhtegan Basin[23]

13. The Bakhtegan Basin is located in the northeast of Fars Province in the south of Iran and is home to 854,093 people[24]. It is one to the most important natural habitats in Iran covering an area of 2,724,592 hectares.99.17 percent of the basin is in Fars province and minor parts are located in Yazd, Isfahan and Kohgiloye and Boyerahmad. It is the heart of Persian civilization and culture, with the ruins of Persepolis and other important archaeological sites located within the basin. Persian civilization undoubtedly thrived there because of water. The hydrological system of the basin has sustained life for thousands of years. The basin's hydrological system is collapsing, resulting already in a situation that is an environmental, social and economic disaster. This is the result of the combined effects of a dismantling of longstanding traditional land management systems and practices, mismanagement of land and water resources over the last forty years and hotter and drier average conditions over the last decade. The situation is very serious and one which has huge implications for Iran if unaddressed.

Climate and climate change

14. The most important meteorological systems in the region are the Sudanese low pressure system, the low pressure of the Mediterranean, the cold north high pressure, the low thermal pressure of India and the low pressure of Saudia Arabia. Local climate data have been gathered and analysed from 43 meteorological stations. Average annual precipitation varies from 139.1mm recorded at Abadeh to 853.6mm recorded at Choubkhale. Precipitation is distributed unevenly through the year with 24.5 percent in autumn, 58.3 percent in winter, 16.8 percent in spring and 0.6 percent in summer. All stations follow a similar rainfall pattern with rainfall beginning in October, peaking in November and continuing in December. The annual precipitation volume in the study area was estimated at 87.9 billion cubic meters[25]. Temperatures vary seasonally and with altitude throughout the Bakhtegan Basin. A lowest absolute minimum temperature of -28°C has been recorded at Kafter. Average minimum temperatures of 6.6°C, 11.5°C and 7.7°C have been observed at Abadeh, Doroodzan and Zarghan stations respectively with average maximum temperatures of 22.1°C, 23.9°C and 24.6°C recorded at the same sites. A daily maximum of 49°C has been recorded at Kafter station in July.

15. Iran's second national communication included an analysis of changes in runoff by 2100. Percentage changes in runoff by 2100 were calculated for 30 sub-basins using a number of different greenhouse gas emission scenarios. The Tashk-Bakhtegan and Maharloo sub-basin showed the greatest decrease in runoff, ranging from 13-15 percent across five of the six scenarios used. A separate study[26] on the relative effects of climate variability and human activities on runoff in the Bakhtegan Basin showed a trend of decreased annual runoff over the 40 year period from 1972-2011.

16. Climate change is already manifesting in the Bakhtegan Basin with evidence of increasing temperatures and below average rainfall over the last decade. The latter may only be a shorter-term variation, but is wholly consistent with what can be expected with climate change. The Bakhtegan Basin as a whole is a part of Fars Province that is classified as having extremely severe drought risk. In the past 40 years there have been four drought periods. These were:

    (1980/81 to 1985/86, 1987/88 to 1990/91, 1996/97 to 2002/03, 2007/08 to 2014/15 and continuing); The 2007/08 drought was particularly severe and the extended drier than average period since then is the worst in the last 40 years (Figure 3).

17. Various climate change assessments have been made in the basin. Recent analyses of drought in Fars Province have come to slightly different, but overall, the same conclusions. The first of these analyses, based on 2000-2008 data, showed that most of the province is vulnerable to drought[27], but with greatest susceptibility in northern and southern areas. The second study[28] concluded that the north and northwest experience the most severe droughts. However, overall, this study demonstrated that the whole province is exposed to moderate to severe drought conditions and recommended the need for effective planning and management of drought, with particular attention being paid to water resources management in order to avoid irrecoverable disasters.

[23]Relevant summary information, including maps, from a comprehensive 2007 study on the natural environment and environmental challenges in the Bakhtegan Basin is provided in Annex 1

[24]Iran Census 2016

[25] Rooyan Consulting Co. 2007. *Studies on Environmental Challenges on Bakhtegan Lake*. in Persian

[26] Hamidreza Gharechaei, Alireza Moghaddam nia, Arash Malekian, Azadeh Ahmadi (2015) Separating the effects of climate variability and human activities on runoff in Bkhtegan Basin Ecohydrology Journal. 2, 445-454 .(In Persian)

[27] Mahdi Erfanian, Nasrin Vafaei, Mehdi Rezaianzadeh. 2014. A New Method for Drought Risk Assessment by Integrating the TRMM Monthly Rainfall Data and the Terra/MODIS NDVI Data in Fars Province, Iran. *Physical Geography Research Quarterly, 46 (1).*

[28] Fatemeh Bagheri . 2016. Mapping Drought Hazard Using SPI index And GIS (A Case study: Fars province, Iran). *International Journal of Environment and Geoinformatics 3 (1), 22-28*

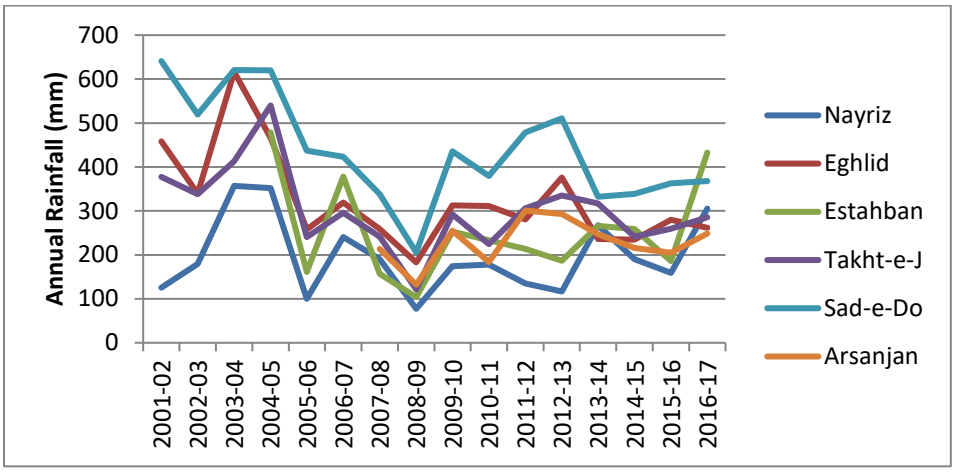


Figure 2: Annual rainfall changes in the Bakhtegan Basin showing a drier than average period since the 2007/08 drought

18. A recent analysis of the impacts of climate change on the Bakhtegan wetland[29] is somewhat inconclusive. Using 1998-2012 as a baseline period changes out to 2050 were determined using 28 different climate change scenarios. The results demonstrated that "The Bakhtegan wetland is predicted to have an area of 238–690 km2 in 2050. All scenarios predicted a decrease of 17–69.5 % in the maximum area (i.e. the maximum extent identified from the baseline period) of the Bakhtegan wetland.

19. Another recent study30 involved an assessment of the streamflows in the Kor River under historical and climate change conditions. Based on the results, hydrological behavior of the basin has significantly changed after 2006, such that despite of increases in a number of subsequent years, the streamflows have not increased. For this study, SWAT-FARS model were applied that simultaneously considers land use changes and climate variability of the basin. Furthermore, the status of basin's hydrological condition was projected for the period of 2020-2049 using the RCP climate change scenarios from the IPCC 5th Assessment Report and variety of the respected AOGCM models. The most important results are as follows:

20. It is expected that the annual river flows to the basin's main water bodies including Dorrodzan Dam, Mola Sadra Dam, Sivand Dam and Lake Tashk-Bakhtegan face up to 17%, 8%, 42% and 60% reduction, respectively.

21. Assessment of seasonal flows shows that maximum variations accrue during winters. This reduction can be up to 84% under RCP8.5 scenario. These changes are not much significant during spring. However, the autumn and summer streamflows may increase up to 43% under RCP2.6 as the most optimistic scenario. But due to the small share of these seasons in annual flows, they will not have much effect on compensating for the decline of the winter river flows.

22. As with all climate change impacts assessments the above results need to be treated with some caution due in particular to uncertainties associated with different GCM results, which increase greatly with downscaling to a local area such as the Bakhtegan Basin. Additionally they represent a somewhat fragmented and 'snapshot' assessment approach to what is a very complex interplay of issues arising from mismanagement of land and water resources, drought impacts and unfolding effects of climate change.

23. This complex interplay of issues was qualitatively examined through the Conservation of Iranian Wetlands project. As part of this project vulnerability scoping diagrams (VSDs) were developed for all Iranian Ramsar sites, including those in the Bakhtegan Basin. This involved a participatory process facilitated with managers, experts, specialists and local community representatives. A set of indices were predetermined for each of the three components of vulnerability: exposure, sensitivity and adaptive capacity. Each of these were scored by participants with results collated in the form of the VSDs. Key exposures are identified as: extraction of both surface and ground water, agricultural development, hydrological changes, precipitation changes, and failure to comply with environmental water rights. Key sensitivities are: wetland and groundwater levels, increasing cultivation, dealing with drought, and lack of water allocation. Adaptive capacity is lowest with some key biophysical and human/social indices, including: lack of management plan review, lack of knowledge among local people, stresses and pressures that are likely to arise with climate change, and lack of monitoring. Climate variability and change features strongly, but as already noted is occurring within a complex situation involving the need for local people to sustain

[29] Sanjerehei, M.M and Rundel, P.W. 2017. The future of Iranian Wetlands under climate change. *Wetlands Ecology and Management.* 22: 257-273.

[30] Delaver M. and Morid S. (20016) Development of National Strategy for Adaptation to Climate Change in Iran Water Sector, Water Research Institute, Ministry of Energy (Iran)

their livelihoods in a situation of limited water resources. Key issues in the basin that are being affect by drought and climate change are discussed in the following sub-sections.

Aridification

24. A study[31] mapping drought hazards using the Standardized Precipitation Index (SPI) and GIS in Fars province, based on data compiled by weather stations in the province provide an insight of the extent of the drought overtime since 1994 to date in the Bakhtegan basin.

25. The SPI used to measure drought has the following values associated to drought category classification:

Table 4. Annual Standardized Precipitation Index (SPI) $SPI = p_i - \overline{p}/sd$

SPI value	Classification Drought Category
≥ 2	Extremely Humid
1.5 to 1.99	Very Humid
1.0 to 1.49	Moderately Humid
0.5 to 0.99	Lightly Humid
-0.49 to 0.49	Normal
-0.99 to -0.5	Lightly drought
-1.0 to -1.49	Moderate drought
-1.5 to -1.99	Severe drought
≤ -2	Extreme drought

*: pi : Annual precipitation in each station $\overline{p}$: Average precipitation in each station
sd : Standard deviation of precipitation in each station

26. Based on data from 10 weather stations from 1994-2011 and from 7 stations from 2007-2011 in Fars province, the SPI index was calculated as follows:

Table 2. Annual Standardized Precipitation Index (SPI) for 10 station from 1994-2011

Station Name	Abadeh	Fasa	.....	Sadedorodzan	Zarghan
1994	0.33	0.32	.....	0.44	0.45
1995	0.42	0.84	.....	0.19	0.63
1996	-1.06	-0.79	.....	-0.11	-0.91
.....	.....	.....	.....	.....	.....
2007	-0.85	-0.96	.....	-0.74	-0.04
2008	-1.16	-2.03	.....	-1.37	-1.58
2009	-0.21	-0.12	.....	-0.34	-0.56
2010	-0.28	-0.41	.....	-0.58	-0.91
2011	-3.46	-2.81	.....	-3.61	-3.15

Table 3. Annual Standardized Precipitation Index (SPI) for 7 stations from 2007-2011.

Station Name	Arsenjan	Izadkhast	.....	Neyriz	Noorabad
2007	0.12	0.0089		0.27	0
2008	-0.57	-0.08		-0.84	-0.39
.....	.....	.....	.....	.....	.....
2011	-2.22	-2.33	.....	-2.14	-2.02

27. Based on the results above, drought maps from Fars province have been developed using ArcGIS coupled with drought index (SPI) that clearly demonstrate the extended severe to moderate drought that Fars province has been enduring for the past decade. It important to point out that the SPI only take into account climate and hydrological variables, therefore it's clear to affirm that drought is driven by climate factors.

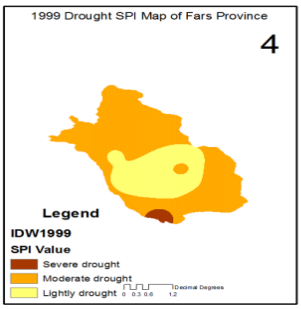


Fig 5. Hazard map of drought vulnerability in 1999.

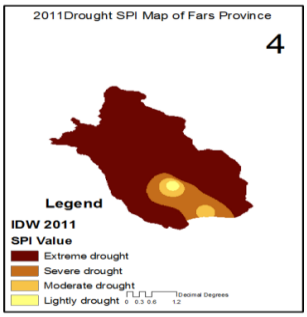


Fig 4: Hazard map of drought vulnerability in 2011

Climate zoning and future aridification trends

[31] Bagheri, Fatemeh. (2016). Mapping Drought Hazard Using SPI index And GIS (A Case study: Fars province, Iran). International Journal of Environment and Geoinformatics. 3. 22-28. 10.30897/ijegeo.304419.

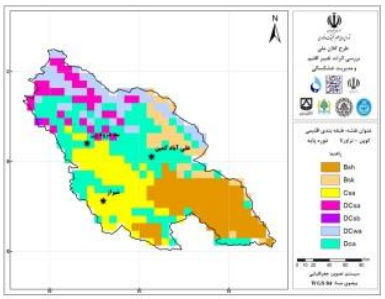
28. A study[32] commissioned by the Ministry of Energy developed a climatic zoning for the Bakhtegan Basin using the Trewartha - Koppen classification method because of high precision in determining the boundaries of temperature and precipitation. The analysis used network data from CCAFS-Climate Data Center with five-minute spatial resolution under theA2, B2 and A1B scenarios of HadCM3 model for the base time period of 1982 to 2012 the projected periods 2030s, 2050s, and 2080s (More information about the analysis on Annex 2).

29. The observation of climate change was projected based on A2, B2 and A1B climate scenarios for the seven existing climate classes. The projected results are summarized in table and figure below based on A1B scenario which clearly show the aridification over time in the province.

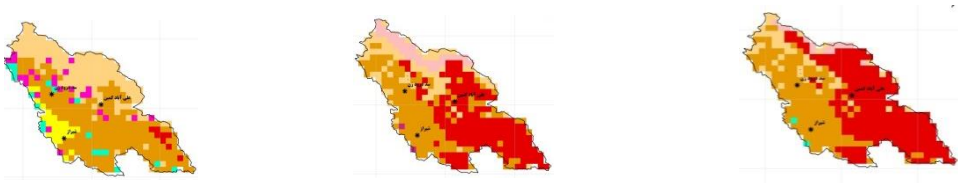
Table 1: comparing the spread changing of climate types in current period to the 2030s, 2050s and 2080s based on A1B scenario:

Climate Type	Current Period	Based on A1B scenario		
		2030s	2050s	2080s
Warm semi-arid	21.7	49.9	33.3	35.7
Cold semi-arid	8.3	31.7	17.7	11.3
Arid hot	-	1.9	40.4	49.4
Arid cold	-	-	8.0	3.1
Subtropical with dry summer	18.7	6.1	-	-
Hot dry moderate	8.5	6.1	-	-
Cold dry moderate	0.2	-	-	-
Arid-hot moderate with winter precipitation	12.5	-	-	-
Humid moderate	30	4.3	0.5	0.5

Figure 3: Comparing the spread changing of climate types in current period to the 2030s, 2050s and 2080s based on A1B scenario.



Current period (1983 – 2012)



2030s 2050s 2080s

Table 2: Comparing land-use change in 1956 to 2006 (based on image processing and aerial photo analysis).

Land-Use	1956		2006		Change(ha)
	Area(ha)	Percentage	Area(ha)	Percentage	
Barren	31,128	1.142	37,348	1.37	+6,220

[32] Ministry of Energy. Macro-National Plan "Impact of Climate Change and Drought Management". Summary of Pilot Report of Lake Bakhtegan Basin (Detection of Climate Change and Drought Identification). Prepared by Shahid Beheshti University.

Rain-fed	247,125	9.070	59,424	2.18	-187,701
Irrigated	223,593	8.206	580,063	21.29	+356,470
Forest	744,631	27.330	742,023	27.23	-2,608
Lake	173,259	6.359	138,014	5.07	-35,245
Wetland	46,150	1.694	2,609	0.10	-43,541
Rangeland	1,225,466	44.978	1,083,445	39.77	-142,021
River bed	863	0.032	863	0.03	0
Saline land	31,138	1.143	74,616	2.74	+43,478
Residual	1,239	0.045	6,187	0.23	+4,948
Total	2,724,592	100	2,724,592	100	0

The water situation

30. The combined area of Lakes Tashk and Bakhtegan makes them the second largest in the country (the largest being Lake Urmia). The area of Tashk and Bakhtegan lakes are 41,000 hectares and 85,000 hectares respectively, located at an altitude of 1525m above sea level. The maximum depth of Lake Bakhtegan is 3m and its average depth is 1.3m. The maximum depth of Lake Tashk is 1.3m and its average depth is between 0.3 and 0.5m. Both of the lakes are classified as saline wetlands.

31. The Bakhtegan Basin consists of three main sub-basins fed respectively by the Kor and Sivand rivers (Figure 4). These two rivers meet in Pol-e-Khan and then feed into the Tashk and Bakhtegan Lakes. The 10 year average volume of water entering Lake Bakhtegan is 784 million cubic meters, of which about 484 million cubic meters is supplied by the Kor-Sivand River and about 206 million cubic meters by temporary streams and the rest by precipitation. The 10 year average of water entering Tashk is estimated at 300 million cubic meters. About 47 million cubic meters is provided by Gomban spring, 218 million cubic meters by stream water, and the rest is provided by direct precipitation. Kamjan is fed by rainfall and Kor river flooding.

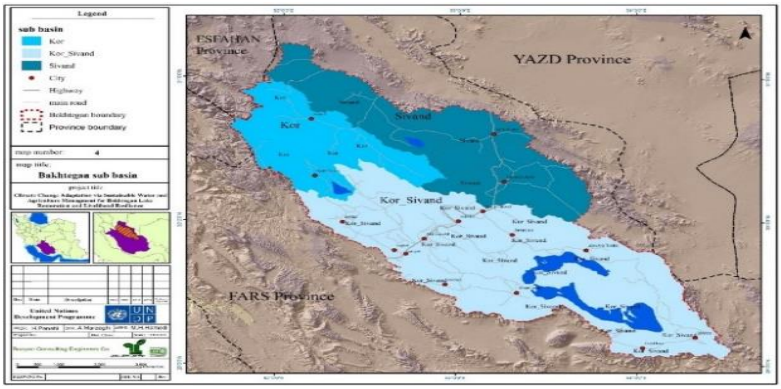
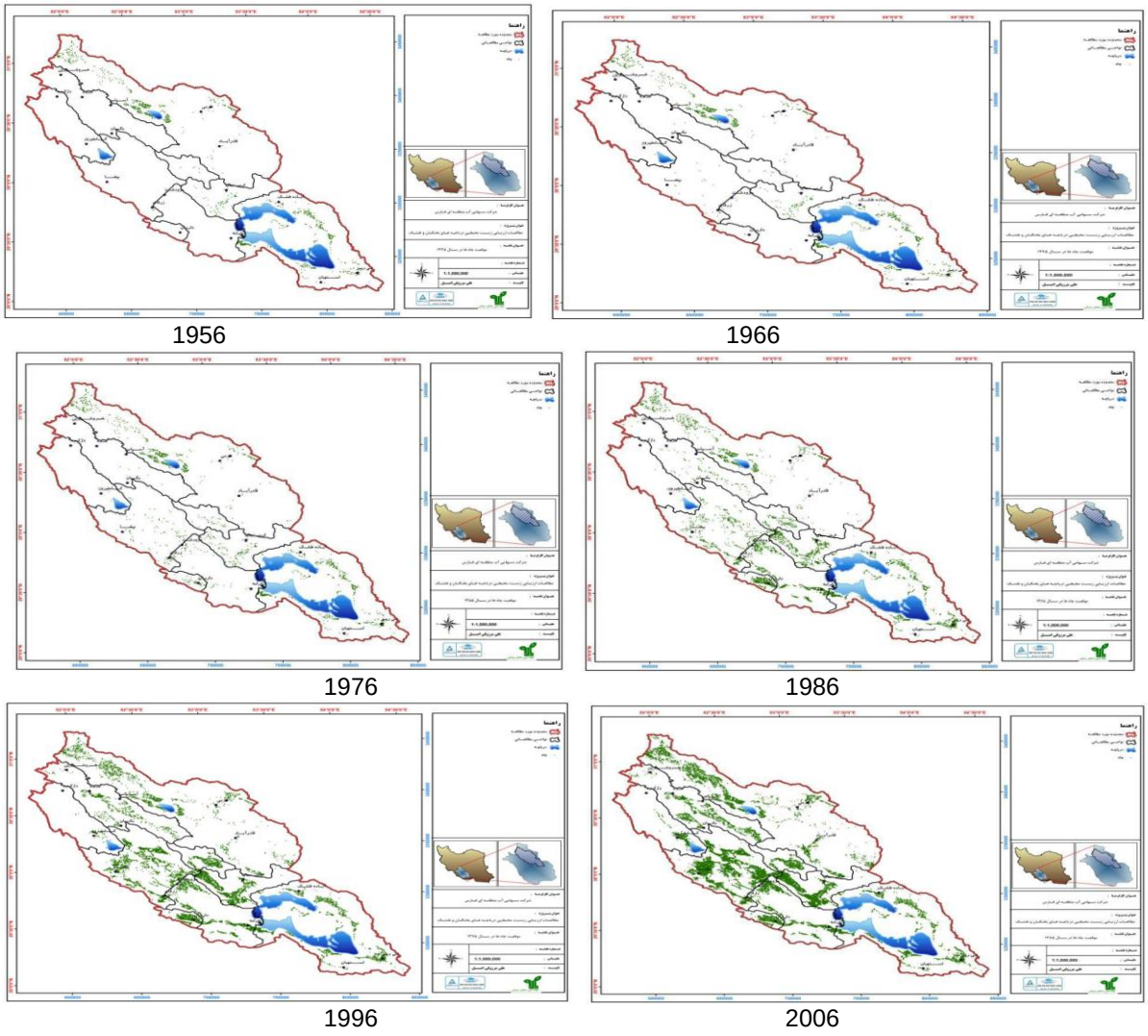


Figure 4: The three main sub-basins within the Bakhtegan Basin

32. Surface discharge of water had declined over the last decade, based on data from four selected gauges: Tang e Bolaghi, Khsrow shirin, Sad e droudzan and Pol e khan.There have been particularly dramatic declines in discharge as measured at Sad e droudzan and Pol e kan. Over the same period (2006-2016) there has been no apparent decline in ground water levels from nine plains monitoring sites in the basin (see Annex 2). However, this requires closer analysis, and over a longer time period, given the clear evidence of increasing numbers of wells (see Annex 1) and the anecdotal reports of increasing well depths and of saline water intrusion to wells around the lakes.

Number of wells in the Bakhtegan Basin from 1956 to 2006



33. Analysis of monitoring data from throughout the Bakhtegan Basin demonstrates that irrigated agriculture is the single biggest use of water[33]. While the amount used for irrigation drops significantly in dry years the percentage use is much higher (nearly 70 percent based on a 10 year return period). The amount of water received by Lake Bakhtegan varies from 225 to 1567 MCM based on return period calculations. The average input rate In Tashkh - Bakhtegan Lakes, was 616 MCM and 672 MCM in the period from 1969-1984 to 1984-1996, respectively[34].Analysis of data from 1965 to 2006 showed an almost equal division between dry and wet years, with 23 and 20 years respectively. The total water yields released to Bakhtegan Lake varied from 360.5 MCM in the driest period to 966 MCM in the wettest period. The current situation is that there is no surface water feeding into the lake. Saline intrusion into bores around the lake also suggests that there is no net inflow of ground water.

[33]Rooyan Consulting Co. 2007. *Studies on Environmental Challenges on Bakhtegan Lake*. in Farsi
[34]Ibid

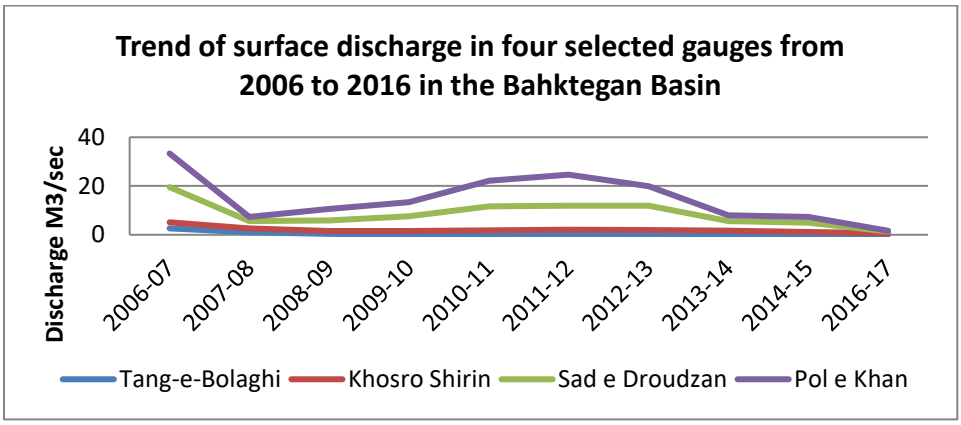


Figure 5: Changes in surface discharge in the Bakhtegan Basin from 2006 to 2016

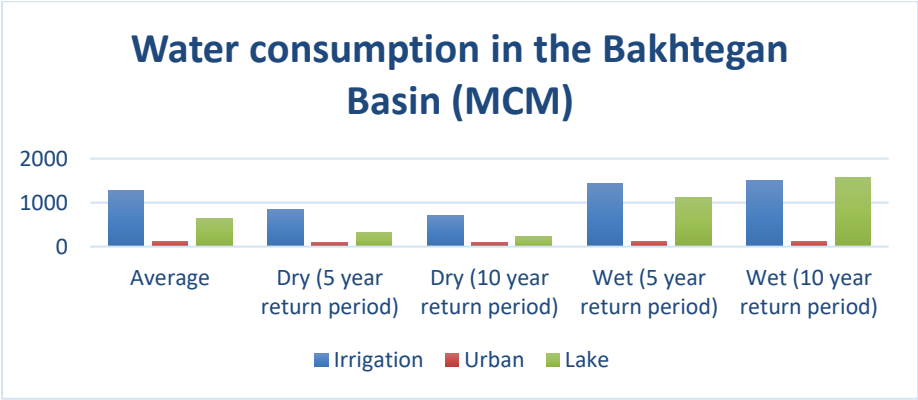


Figure 6: Water consumption in the Bakhtegan Basin based on return periods (recurrence intervals) derived from data for 1965-2006

34. Current water extraction and use, and the extent of irrigated agricultural land, is at unsustainable levels. At the same time there are bores, both legal and illegal, in the bed of the Kor river and throughout the middle and lower parts of the basin. Current agricultural land area is 482,898 ha with more than 30,000 wells spread throughout the basin but mainly concentrated in Marvdasht, which is the main arable farming area. Nearly a third of these wells are illegal and even legal wells are being over exploited. As surface water has reduced the number and depth of wells throughout the basin has increased. The average depth of wells is particularly high in Estahban County (Figure 7), which adjoins the lakes and wetland area. With increased reliance on ground water, which is becoming depleted in some areas, or is as at risk of depletion, the vulnerability of communities to drought and climate change has increased.

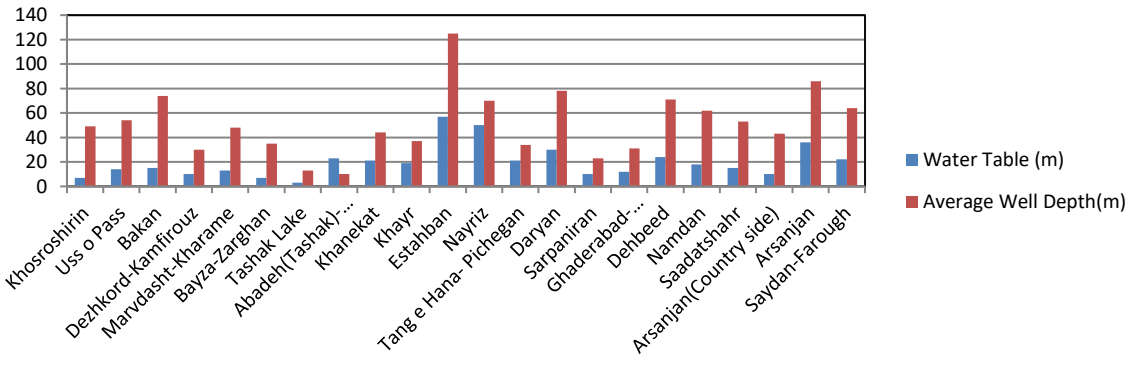


Figure 7: Comparison of average water table and well depths in the Bakhtegan Basin

35. Empirical findings reveal that Lake Bakhtegan lost almost 73 percent of its size from 1973-2013[35]. Drier than average conditions since a severe drought in 2007 are seriously exacerbating this situation. With the current extended, multi-year, dry conditions the Kor river is no longer flowing in the middle and lower parts of the basin. The significant area of agricultural land in these areas is currently wholly dependent on ground water. Near to the lakes the lack of surface and ground water inflow combined with the high level of water extraction has led to severe loss of hydrostatic pressure and backflow of saline water into freshwater wells is now happening.

36. Government is aware of the current water crisis result from the drought and has included some policy instruments to address water mismanagement. First, under Article 35 of the 6th Five-Year Development Plan enacted in 2017 guidelines were included to promote efficient water management. In addition, the Ministry of Energy's Water Strategy endorsed in May 2013 have clear standard procedures related to the promotion of integrated management of water resources and re allocation of water rights (See Annex 3). More importantly MoE has recently announced its vision for the country's water resources, were "new dam projects, which are being designed or constructed, will be reassessed based on hydrological changes, environmental impacts and economic feasibility"[36].

Agriculture and water use in the Bakhtegan Basin

37. The current total area of irrigated agriculture[37] is about 580,000 hectares (21.2 percent of the Bakhtegan Basin area). About 35 percent of irrigated farmland is upstream of the Doroodzan and Sivand dams and about 48.5 percent of irrigated farmland is located below the dams. The first area, upstream of the dams includes the Marvdasht, Zarghan, Beyza, Karbal, Kharameh, Murghab and Daryan plains. The second area, below the dams, includes Aspas, Kamfirouz, Sadeh, Khosrow -o- Shirin, Bekan, Kafter, Nemdan, Khorrami and Ghader Abad. This middle elevation plains area has a much shorter history of agriculture than the upper plains area and has experienced rapid development in recent years. The remainder of irrigated farmland, 16.5 percent of the total area, is located in Arsanjan, Farooqh, Abadeh-Tashk, Estahban and Nayriz.

38. Arable land in the Bakhtegan Basin[38] is comprised of 79.8 percent cereal, 4.7 percent industrial and 2.4 percent forage crops, and 2.4 percent in horticulture. Orchards, beans, vegetables and fruits make up the remainder, occupying 3.7 percent, 3.2 percent and 0.8 percent, respectively. The most extensive crop area is cereal, mostly wheat, covering 53.9 to 96.7 percent of the land area in different locations. The area dedicated to other crops also varies, for example with orchards covering as much as10.2 percent in some parts and 1.3 percent other areas. Water availability is one of the most important factors determining the extent of different crops. Cereals are the most commonly grown crops in water short areas. Where water is readily available high water demanding crops such as rice are grown, in areas like the Kamfirouz plain. Thus, greater diversity and more intensive cropping patterns are found in the areas where agricultural water supply is not severely restricted.

39. Agricultural practices, in particular arable farming, in the basin have been geared to a situation of abundant water over the last forty years especially in upstream areas. Rice cultivation is still widely practiced with high and unsustainable use of water in upstream areas. Most arable farming in the basin involves continual cropping of cereal. There are no fallow periods, with bare soil visible to the horizon and soil erosion from wind now widespread . The continuous cropping has also led to higher inputs of fertilisers and pesticides to sustain production, with resultant negative effects on soil organic matter and soil structure. The impacts of prolonged drought since the severe drought in 2007/08 is very noticeable in fig production statistics presented above. While the planted area has increased by 1,000 hectares since 2007/08, from just under 22,500 hectares to just over 23,500 hectares, total production over the last decade has been at least half that of the years preceding the 2007/08 drought.

[35] Arsanjani, T.J., Javidan, R., Nazemosadat, M.J., Arsanjani, J.J., Vaz, E. 2015. Spatiotemporal monitoring of Bakhtegan Lake's areal fluctuations and an exploration of its future status by applying a cellular automata model. Computers & Geosciences. 78: 37-43. https://doi.org/10.1016/j.cageo.2015.02.004

[36] https://financialtribune.com/articles/energy/75280/irans-new-energy-minister-vows-action-on-chronic-water-crisis

[37] Rooyan Consulting. 2007. *Studies on Environmental Challenges on Bakhtegan Lake*", in Persian.

[38] Ibid

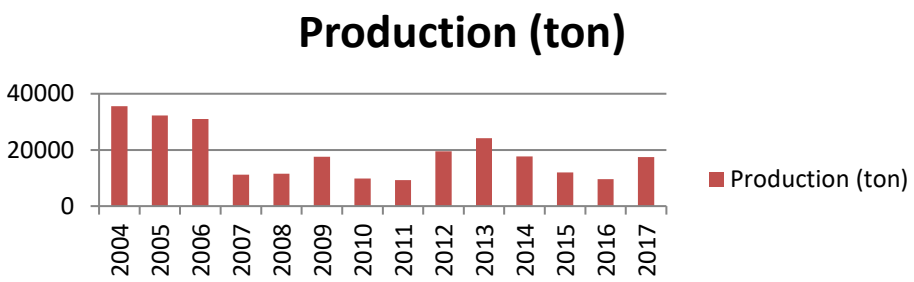


Figure 8: Changes in fig production in the Bakhtegan Basin

40. In the upper part of the basin, traditionally grazed by nomads and now a national protected area (water recharge zone), there has been encroachment into forest and rangeland areas for fruit production, river terraces are being used for rice cultivation. In recent years the local government closed 2000 wells in the upper part of the Kor river basin, but within a year the people had opened them all again. The children of these people are now returning to cultivate the land that is being exposed by the lower reservoir levels. Compensation, regulation and enforcement have therefore not been effective.

41. The local people are already being proactive in adapting autonomously through diversifying their agriculture and implementing alternative livelihoods. For example, some farmers are already switching to less water demanding crops such as safflower. In upper and lower parts of the basin some are attempting to diversify into higher value and lower water demanding crops such as pistachio and saffron. Alternative livelihoods being developed include activities such as mushroom cultivation and handicrafts. All of these initiatives present opportunities for enhancement to encourage people more widely to adapt to the changing conditions.

Social impacts[39]

42. The social costs of the drying of the Bakhtegan Basin are already manifesting with some parts of the basin more severely affected than others (see Table 2, Part II, Section A and Annex 3 for more detail). Conflicts over water are evident between different parts of the basin. Migration is an important issue. In parts of Kharameh, in the lower part of the basin, 100 percent of jobs have been destroyed leading to increased poverty and increased mental health issues.

43. While there has not been any detailed analysis of the socioeconomic consequences of drought at the household level in the Bakhtegan Basin, a recent study[40] made in Sabzevar County, Khorasan Razavi Province, in north-eastern Iran provides valuable insights. This study assessed villager responses to 29 economic variables and 28 social variables. The economic variables were grouped into seven main components covering the amount of production, quality of production, costs of natural resources (losses), production costs, costs of living, overall level of living, and investment. Similarly the social variables were grouped into seven main components covering quality of life, poverty or income, employment, psychological tensions, public safety, crime and delinquency, and social damage. Overall, the socioeconomic costs were significant and high and mirror those that have been qualitatively identified in the Bahktegan Basin.

Biodiversity impacts

44. There are also significant biodiversity costs. Currently, the lakes are in critical condition. Bakhtegan and Kamjan are completely dry and about only 10-20 percent of the area of Tashk Lake, near Gomban spring, still has some water. The drying out of wetlands has had significant impacts on biodiversity. Lakes Tashk and Bakhtegan and the Kamjan wetlands are important places for the reproduction of birds such as Egrets, Dalmation Pelican and Greater Flamingo. 95 species of birds, most of them winter migratory birds, have been identified in these wetlands. Because of their significance they were listed as Ramsar sites in 1974. Due to their critical status in recent years they have been shifted to the Montreux List of the Convention. Biodiversity impacts are not just occurring in these former wetland areas, but throughout the basin. Brown bear numbers have been affected by wildfires resulting from the prolonged dry conditions. Lack of food has forced them to areas of human occupation where some have been shot. Continued encroachment of agriculture into forest and rangeland areas also has biodiversity impacts, and wider consequences in terms of soil and water conservation. Some specific biodiversity impacts that have been observed over the last decade are:

[39] The information presented here is based on a summary of the current situation in the Bakhtegan Basin provided by the local consultant team from Fars Province (see Annex 3). It is consistent with documented evidence from elsewhere in Iran.

[40] Darban-e Astane, A. R., &Azimpour, Gh. (2017). Evaluation of Farmers' Resilience Against Socioeconomic Consequences of Drought: A Case Study on Sabzevar, Iran. *Journal of Sustainable Rural Development, 1*(1), 27-38.

- The population of plains species have severely decreased due to resource conflicts and scarcity of water resources, e.g. Zebra and Chinkara;
- Mountainous regions species are not severely affected, e.g., goats, which have been less affected by drought, but there are subsequent impacts from increased browsing pressure;
- The population of wild birds has severely reduced in Bakhtegan and Tashk lakes with the majority now migrating to other areas.
- A fairly good population of birds has been observed in Kamjan Lake.

The problem and the proposed solution

45. The situation in the Bakhtegan Basin is complex, involving the interplay of multi-decadal mismanagement of water, inappropriate land use, drought and climate change. As the heart of the Persian Empire, Fars Province has a very long history of water use for agriculture and other purposes. In an arid country such as Iran water has very high symbolic and utility value. This has been recognised throughout Iran's long history. However, the value of water and its balanced use has come under increasing pressure over the last four decades. It is clearly evident that the hydrological system of the Bakhtegan Basin is in a state of collapse, with no surface water currently flowing to the middle and lower parts of the basin and extraction of ground water that is far in excess of recharge rates. The evidence of this state of collapse is apparent with significant water shortages in lower parts of the basin, degraded agricultural environments, social upheaval and detrimental and potentially long-lasting impacts on the natural environment. There is now a serious threat of an irreversible situation that will lead to loss of livelihoods, environmental and human health and biodiversity. Without active intervention a worse case situation could develop where the basin becomes much less habitable leading to mass migration of people and permanent loss of natural ecosystems and the many plant and animal species they support.
46. With a long history of water dependence accompanied by times of prolonged drought, it would be a wise to assume that climate change will not be beneficial to the Bakhtegan Basin. Based on research in the basin using the Standardized Precipitation Index (SPI) to measure drought and extrapolating weather stations' data collected in the province, analysis shows over time (2030s, 2050s and 2080s based on A1B scenario) that aridification of the Bakhtegan basin will become more severe with expected drier conditions in the area (See Annex 2).
47. The current development situation in the basin can be described as one of maladaptation with the past construction of the Doroodzan and Mulla Sadra dams. There are clearly strong underlying development issues and challenges that require major interventions. However, at the same time, there are very clear climate risk and climate change related vulnerabilities that are magnifying these issues however present a clear opportunity for this project.
48. Four key limitations and barriers have been identified which are affecting the ability of the Fars provincial government, natural ecosystems and Bakhtegan Basin communities to cope with drought and climate change:
    - Limited information and data about the impacts of drought and climate change to make more informed decisions at the provincial and local level;
    - Current water-intensive agricultural practices undermine the capacity of the hydrological system to cope with the effects of drought/climate change;
    - Locally proven water-saving agricultural practices lack financial resources to be promoted across the province/basin;
    - Current governance structure in the Bakhtegan Basin is not conducive to promote adaptation approaches at the regional and local levels.
49. Within this very complex and challenging situation the project has an aspirational goal to restore the Bakhtegan Wetland, which encompasses Lakes Bakhtegan and Tashk and the Kamjan Marshes towards achieving this long-term goal the proposed project will provide a foundation for building resilience to climate change in the basin through a holistic, integrated landscape management approach. To achieve this will require a completely different way of thinking and acting, with a shift in thinking from the current mind-set of high water dependency and use to the already new reality of a dryland environment with water scarcity. This can only be achieved through a process of participatory engagement with all parties aimed at shifting approaches to the development pathway in the Bakhtegan Basin. In particular, this requires project targeting and a governance mechanism that ensures full involvement of both the immediately affected vulnerable communities and those who are less vulnerable but are practising unsustainable water and land use and management practices to the detriment of all.
50. As participation of all stakeholders in the project was a key issues the proposal development process was designed through a participatory approach at different level. Establishing a technical committee consisting of main related government entities provided a very good opportunity for their engagement during the whole process. Other important aspect was local community participation in the process for which one of the active NGOs (consisting of local environmental activist and

some university professors) in the basin was involved in the project to facilitate local community and local authority participation in proposal development. This local NGO was part of a team consisting of an international consultant and a national consultancy company to develop the proposal. The local team main objectives was to raise awareness about the project in the early stages of the process and they had more than 10 introductory meeting with villagers and local authorities all around the basin to inform them about the proposal development process and setting the stage for further participatory workshops in later stages. After joining national and international consultants at the field for a two-week assignment 3 district level workshops were held in the chosen pilots in both downstream and upstream of the basin. Kherame and Estahban are located downstream and Marvdasht is located upstream. In these participatory workshops, the stakeholder's points of view on their livelihood issues, the impacts of drought on their lives and the challenges that the authorities are facing in Bakhtegan basin management. At the same period the consulting team were visiting selected villages all around the basin to visit and discuss the project with local communities in their farm and villages. Consultation with the local communities/authorities was not limited to a two-month period and the local consultant (NGO) was in touch with both communities and local authorities during proposal development to fill the gaps through field visit at village level and meetings at provincial and district level. The summary report which was prepared by the NGO is in annex 12 for further detail.

PROJECT / PROGRAMME OBJECTIVES:

51. The objective of the project is increase the resilience of communities and the natural environment of the Bakhtegan Basin to climate variability and change through integrated landscape management.

The project objective will be achieved by the following components:

1. Knowledge of climate risk, climate change and the environmental situation is strengthened to support development of long-term climate resilience in the Bakhtegan Basin using a decision support system;
2. The resilience of communities in the Bakhtegan Basin is strengthened through community empowerment and implementation of climate smart agriculture and alternative livelihoods;
3. The resilience of the natural environment of the Bakhtegan Basin is strengthened through targeted interventions in key locations;
4. Capacity at the local, regional and national level is strengthened for improved governance and decision making in relation to climate risk management and effective implementation of adaptation measures.

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
1. A data and information management system for decision support and communications is developed and implemented to support development of long-term climate resilience in the Bakhtegan basin.	1.1 An integrated model for climate risk and climate change assessment supports medium and long term decision making. ($179,962) 1.2 A land and water use planning framework is developed and implemented to support decision making. ($347,645) 1.3 Community engagement, empowerment and ownership in decision making is supported through local community monitoring. ($427,670) 1.4 A GIS based data and information management system and an information portal system are developed to facilitate more informed, effective and timely decision making. ($125,000)	A decision support system is in place and facilitates strengthened knowledge of climate risk and climate change towards the development of long-term resilience in the Bakhtegan Basin	1,080,277

2. The environmental, social and economic resilience of the Bakhtegan Basin is strengthened through implementation of sustainable agro-ecological practices and alternative livelihoods	2.1 Climate smart agriculture practices are adopted in target areas. ($1,414,130) 2.2 Alternative livelihoods are adopted by women/women's cooperatives in target villages. ($1,635,170)	Strengthened climate resilience of local communities enables them to sustain and enhance their livelihoods	3,049,300
3. The resilience of the natural environment of the Bakhtegan Basin is strengthened	3.1 A range of watershed management measures are implemented in target areas aimed at increasing resilience to drought risks. ($1,594,010) 3.2 Landscape rehabilitation to restore functionality of ecosystem services to increase climate resilience. ($1,978,620)	Increased resilience of the natural environment through rehabilitation and conservation work reduces vulnerability of communities to the impacts of climate change	3,572,630
4. Institutional Capacity at the local, regional and national level is strengthened for improved governance and decision making in relation to climate risk management and effective implementation of adaptation measures	4.1 A comprehensive communications, education and capacity building programme on climate resilience is implemented. ($311,020) 4.2 A Bakhtegan Basin Council is formed to facilitate the long-term sustainable and climate resilient management of the Bakhtegan Basin. ($249,700)	Strengthened governance and decision making capacity at local, regional and national level for implementing and sustaining relevant climate change adaptation measures	560,720
5. Project/Programme Execution cost			829,839
6. Total Project/Programme Cost			9,092,766
7. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			772,885
Amount of Financing Requested			9,865,651

PROJECTED CALENDAR:

Milestones	Expected Dates
Start of Project/Programme Implementation	May 2019
Mid-term Review (if planned)	July 2021
Project/Programme Closing	February 2023
Terminal Evaluation	December 2022

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Project Components

52. There are four Components to the project:
    1. Knowledge of climate risk, climate change and the environment strengthened
    2. Sustainable livelihoods supported
    3. A resilient natural environment sustained
    4. Capacity for improved governance and decision making strengthened

The relationship between these four components is illustrated in Figure 9 below. Component 1, focused on strengthening knowledge of climate risk, climate change and the environment to support better decision making forms the foundation of the project. Components 2 and 3, focused on sustainable livelihoods and a resilient natural environment form the two pillars. Component 4, focused on strengthened capacity for improved governance, provides overarching support for improved decision making and actions towards the goal of a climate resilient Bakhtegan Basin. All four Components are inter-dependent. Outputs from Component 1, will directly contribute to improved governance and decision making at all levels through Component 4. Component 4 will then contribute to refinement and wider adoption of activities under Components 2 and 3. Components 2 and 3 are closely inter-related, with respective foci on Community Based Adaptation and Ecosystem Based Adaptation.

Project targeting

53. The biophysical targeting for the project is based on previous work in developing land use planning zones for the Bakhtegan Basin[41]. These zones conform to various features of homogeneity which include the following
    - Common terrain, landscape and geomorphology characteristics
    - Common climatic zones
    - River morphology
    - Land-use
    - General ecosystem conditions

These have been matched with the administrative county boundaries (Figure 9) and also relate to identified hydrological units within the basin.

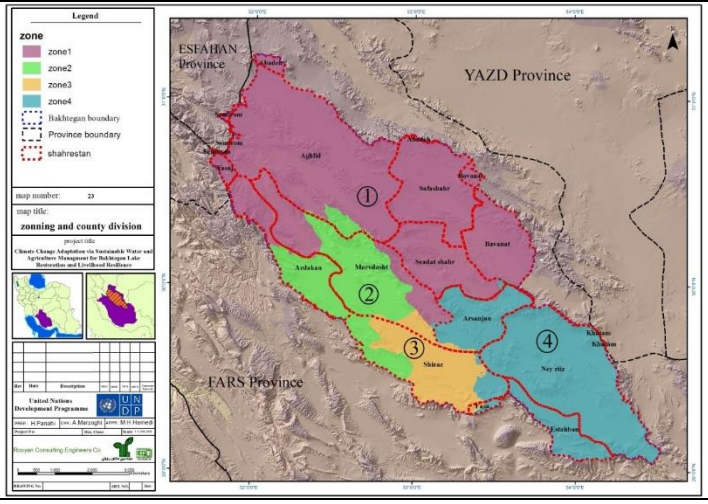


Figure 9: Relationship between targeting zones and counties in the Bakhtegan Basin

54. Zone 1 encompasses the Kor and Sivand sub-basins (see Figure 9) and includes the Eghlid, part of Marvdasht (referred to as Kor County), Safashahr, Bavanat and Saadatshahr. The Dozoodran, Mulla Sadra and Sivand dams are all located in Zone 1. This Zone is defined as a cold, semi-humid, mountainous ecosystem. It was previously all rangeland and forest, with seasonal grazing by nomads. Grazing rights were carefully managed to ensure protection of the land. This is now the only part of the Bakhtegan Basin with year round availability of surface water (although this is in decline) supplemented by water from wells (many of which are illegal). Irrigated agriculture, mainly for rice production, is widespread on river terraces with fruit production on converted rangeland areas and forests. In general the soils are poorer and crop yields lower than the traditional cropping areas of the basin. With declining water availability, yields are decreasing and people are increasingly struggling to survive.

[41] Rooyan Consulting Co. 2007. *Studies on Environmental Challenges on Bakhtegan Lake*. in Farsi

55. Zone 2 encompasses the counties of Ardakan, most of Marvdasht and part of Shiraz. This area is the traditional arable farming area of the basin. With the construction of the Doroodzan dam upstream and the building of irrigation canals, irrigated agriculture expanded significantly in this zone over the last 40 years. The current situation involves continuous cropping of wheat, with rice and to a lesser degree barley production. As a result of the drier average conditions over the last decade there is currently no water flowing in the Kor river into this area and insufficient water from the Doroodzan dam for irrigation. The consequence is much greater dependence on ground water. Soil erosion is apparent, with dust clouds rising from the bare soil throughout this zone.

56. Zone 3 includes most of Shiraz County. Conditions are similar to Zone 2. It occupies the lowest part of the plains area with irrigated lands over clay soils. This zone is completely dependent on the water resources of the upper two zones and is increasingly dependent on groundwater. It has become a desert-like environment as a result of human mismanagement. This zone also includes areas developed for weekend retreats by wealthier residents from Shiraz. These people are all putting in unregulated water bores to provide domestic water and to irrigate their small olive groves, orchards and gardens.

57. Zone 4 encompasses the Tashk and Bakhtegan National Park, which includes Lakes Tashk and Bakhtegan. It includes the counties of Arsanjan, Neyriz and Estahban. In the past surface water was mainly obtained during floods. These areas have been severely affected by the lack of water flowing into the lakes. What was previously described as humid environment is now a dry, desert-like and very dusty environment, described by one elder villager[42] as a 'living hell'. The worst drought effects and water tensions are being experienced in this Zone. Figs have traditionally been grown in this area, but crops are now suffering from the lack of water, large areas of arable land have been abandoned and there is increased migration of rural people to urban areas and associated social problems.

58. The environmental and socio-economic status of the four zones is summarized in Table 2 (more detail is provided in Annex 3). Reduced precipitation, increasing temperatures and increased evaporation and transpiration are common characteristics throughout the basin, although are being experienced with greater severity in some zones than others. Similarly the drying of the basin is widespread, even in Zone 1 which incorporates the upper reaches of the Kor and Sivand rivers. Biodiversity issues and conflicts are also widespread. The impacts, however, are strongest in Zones 1 and 4. This is reflected in the socio-economic issues, which are being experienced most strongly in Zones 1 and 4 and include increasing poverty, increasing mental health issues, increasing divorce rates and increasing crime rates in urban fringe areas.

Table 3: The environmental and socio-economic situation in the four zones aggravated by climate change.

Zone	Environmental issues	Socio-economic issues
1	• Dried Kaftar wetland • Reduced flow into the Mulla Sudra and Sivand dams • Reduced biodiversity in upstream areas • Increased conflicts between wildlife and residents of the catchment area	• Reduced income from aquaculture • Reduced farmer and dairy farmers' income • Increased unemployment • Increased poverty
2	• Doroodzan dam lake has become an alternative habitat for aquatic birds • Increased water exploitation • Conflicts between farmers and fruit growers	• Increased rice farms • Villagers preference to cultivate rice and have fish ponds • Conflict with downstream counties over water
3	• Dried Kor river • Destruction of the habitats of birds, pond turtles and aphanius fishes • Decreased spring flows • Conflicts between livestock farmers and leopards	• Conflict with upstream farmers in spring when water for irrigation is being shared • Dried wells • Migration to cities • Increased unemployment rates • Shift to safflower cultivation
4	• Dried wetlands • Severely reduced migratory bird numbers • Destruction of hatching habitats • Dried springs • Increased conflicts between farmers and birds • Wind erosion and increased dust storms	• Unemployment • Increased migration • A growing poverty trend • Increased divorce and crime rates • Decreased quality of farm crops and fruits such as fig •

59. Drawing from the preceding information along with local consultations and experience a number of project villages and sites have been identified for Components 2 and 3 of the project. More detail on the selection process and summary information

[42]From project development consultations 14-20 November 2017

on the project villages and sites is provided in Annex 4. While not exclusively focused on Zones 1 and 4, the project has a strong emphasis on these areas. Collectively these two zones account for just under 46 percent of the total population of 854,093. The most vulnerable are the rural dwellers (villagers) whose livelihoods are highly dependent on the natural environment, principally to support their agricultural activities. The current population of villagers in Zone 1 is 111,775 spread across 264 villages; with 69,118 villagers in Zone 4 spread across 172 villages.

Component 1: A data and information management system for decision support and communications is developed and implemented to support development of long-term climate resilience in the Bakhtegan basin.

60. Component 1 focuses on enhanced management and processing of relevant climate, hydrological, land use and other identified data and information aimed at supporting decision making and actions that enhance the climate resilience of the Bakhtegan Basin. Results from the identified Outputs, and specific Activities, will be tailored to directly support land and water use planning decisions and actions within the Fars Provincial Government, through the planned Bakhtegan Basin Council (Output 4.2) and through local County governance structures as well as through direct engagement with and participation of communities. There are both technical and non-technical aspects to this Component which will require a multi-partner, integrated, approach to ensure effective implementation and dissemination. The Ministry of Energy (MOE), Ministry of Jihad Agriculture (MOJA) and Department of the Environment (DOE), which have responsibility for monitoring and management of water resources, will take a lead role in the climate and climate change assessments and water/land use planning for the Bakhtegan Basin. Local community monitoring will be facilitated by identified local NGOs, with linkages to the Fars Provincial Government, MOE, MOJA and DOE.

61. Component 1 will encompass the following: a) the customization and application of an integrated climate, climate risk and climate change assessment model which has been progressively developed over the last 24 years. This model (SimCLIM) was developed in its original form as a customized model for climate change impacts assessment in New Zealand and was further customized for applications in Bangladesh and the Pacific Islands. Since 2002 the software has been redesigned into an open architecture platform and has been used extensively throughout the world in multiple applications. This model will be customized for application in the Bakhtegan Basin and will be used for integrated assessment of climate risk and climate change impacts on land and water resources. Simulations and assessments will be made using output from a full suite of GCM and RCM patterns and to cover the full range of IPCC AR5 representative concentration pathways (RCPs); b) development and implementation of a participatory and integrated approach to water and land use planning (WLUP) in the Bakhtegan Basin. This work will be guided by current water and land use planning, and will generate outputs that will further inform both planning and governance of water and land resources (through Component 4). It will involve comprehensive analysis of available data and information on land and water resources in the basin aimed at guiding and informing the wise and sustainable use of land and water resources; c) the development and implementation of a local community monitoring programme. Participating communities in the four Zones will be actively engaged in identifying indicators for monitoring changes in both vulnerability and resilience in their local environment, social situation and economy. This will include monitoring of changes in water use with participating farmers. The focus is to build knowledge, understanding and ownership of the severe situation that many households are now facing throughout the basin, while also building more effective information and communication bridges between local communities and local, provincial and national decision makes; d) education, capacity building and communications. This will include education and capacity building of all stakeholders but in particular focusing on training of trainers (i.e. training of facilitators) and building awareness and capacity of participating households, farmers and communities. This will be supported by a communications programme aimed at wide dissemination of results from Component 1 throughout the Bakhtegan Basin. There will be a strong focus on linking outputs from this Component to support enhanced governance structures and mechanisms under Component 4 aimed at improved decision making and actions which will be implemented through Components 2 and 3.

62. Under Component 1 results will be generated from the climate risk and climate change assessments, water and land use planning and local community monitoring aimed at directly building more climate smart and resilient use of land and water resources by 254560 families in more than 722 target communities and indirectly to the entire population of the Bakhtegan Basin (854,093 people, according to the 2016 census).

63. During the project formulation phase the needs for the Outputs presented in Component 1 were identified through consultations nationally with MOE, MOJA and DOE, provincially with the Fars Provincial Government, and locally with county governors, local representatives of government agencies and local community and NGO representatives. The results of these consultations are summarized in Section H with a report on provincial and local consultations provided in Annex 7. The capacity for in-depth climate risk and climate change assessments, particularly relating to water resources management and decision making, is a direct response to a high priority need identified by the MOE.

64. During project implementation a comprehensive participatory approach will be taken to ensure that outputs from this Component are both directly addressing identified needs and leading to enhanced decision making and actions in relation

to climate resilience. Output 1.3 has been specifically designed to empower communities through greater community understanding, engagement and ownership. The participatory approach is further supported and strengthened through Output 1.4 which will support a strong emphasis on education, capacity building and communications.

65. A consistent and comprehensive analysis of climate risk and climate change impacts in the Bakhtegan Basin will greatly assist with informed decision making, planning and action towards building climate resilience. The targeting of specific outputs to participating communities, families and farmers will foster 'champions of change' in the basin, while the widespread sharing of information throughout the basin will foster greater understanding of shared issues and challenges, as well as positive solutions. The partnership through this Component of three participating government ministries, of national, provincial and local stakeholders, and of communities representing the four different Zones and associated issues will greatly foster and enhance understanding of the water and land use and associated climate change crisis that must be addressed collectively for the benefit of all life in the Bakhtegan Basin.

66. Component 1 results will be disseminated to all national, provincial and local stakeholders through the information portal system (TIPS) which is described under Output 1.4. In particular this system will provide relevant information to support all Outputs and Activities in Component 4.

67. As the foundation for the project it is intended that all Outputs from Component 1 will be timed for completion during the first two years to ensure maximum input and support for Components 2, 3 and 4. Outputs 1.1 and 1.2 will be completed within the first two years of the project. The local community monitoring through Output 1.3 will be on-going throughout the project. All results from these three Outputs will be fed into Output 1.4. Under supervision of the project board, the project team will coordinate with MoE as the lead agency for managing hydrological systems and data to roll out the technical assessments. All relevant agencies will work in partnership with provincial and local governments and authorities and participating communities to implement all non-technical activities. The enhancement of existing governance mechanisms (under Component 4), together with the agreed project management structure (refer to Part III, Section A) will be used to guide this work, as will the Outputs from Component 1 be used to guide and support improved governance. In summary, it is expected that Components 1 and 4 will be mutually supportive and will be developed together in an iterative manner.

68. Component 1 will produce data and analysis aimed at supporting participatory decision-making mechanisms in Component 4.For example, decisions relating to water allocation for each type of land use in different parts of the basin will guide best practices for agriculture and water resources management which support wetlands restoration. Decisions relating to the crop pattern in each part of the basin will inform Component 2 (primarily CSA systems) and Component 3 (watershed management measures and landscape rehabilitation), with the latter further supporting the chosen land use practices.

69. Under Component 1, customized climate change scenarios for the Bakthegan basin will be generated and analyzed by national and provincial government to inform decision-making in the basin. Within the project the focus will be to support decision-making relating to project activities relating to land and water management, but the intention is that the climate change information generated will be mainstreamed into all decision making over time (including budgeting processes, etc.). By modeling various scenarios of change in temperature and rainfall and water yield as a result, corresponding policies for different regions will be determined. Currently reliable and up to date long-term scenarios are lacking to feed into adaptation decision-making.

Component 1 consists of the following Outputs and Activities:

Output 1.1 *– An integrated model for climate risk and climate change assessment supports medium and long term decision making.*

70. A customised version of SimCLIM will be developed for the Bakhtegan Basin incorporating monthly time series data for seven climate variables, daily time series of available climate data and GCM patterns from 40 models which are linked with the IPCC AR5 representative concentration pathways (RCPs). Output from SimCLIM. This will be linked to the Soil, Water Assessment Tool (SWAT) as part of a comprehensive climate change impact and risk assessment in the basin aimed at complementing and enhancing activities in Output 2.1. Assessments will focus on the basin as a whole as well as the three sub-basins (the Kor, Sivand, and Kor-Sivand. Analyses will incorporate different scenarios of water extraction, from surface and ground water, to support clearer understanding and decision-making in relation to the water resources situation in the basin and how it will be impacted by climate change. The different scenarios of water extraction will encompass the current situation based on available monitoring data, and different land use scenarios, aimed at determining as clearly as possible the sustainable level of surface and ground water use under both present and future climate change conditions.

71. The modelling work with SimCLIM will build on past analyses conducted in the Bakhtegan Basin. Importantly it will provide a coherent and consistent set of analyses and results that will be directly targeted at supporting greater understanding and decision making in relation to surface and ground water resources, and different land use options. This will be a clear

progression from previous analyses which have involved discrete studies by various researchers using different models, assumptions and scenarios.

72. This output is crucial to developing a clear and comprehensive understanding of how climate change is already impacting, and will continue to impact, on the currently very fragile situation in the Bakhtegan Basin. In combination with the results from Output 1.2 this will provide a much stronger basis for enhanced decision-making, awareness raising and action towards increasing the climate resilience of the environment, society and economy of the basin.

Activities under Output 1.1 include:

- SimCLIM will be customized for the Bakhtegan Basin. This requires data development applying the latest CMIP5 statistically and dynamically downscaled information for the seven variables of minimum, mean and maximum temperature, precipitation, relative humidity, solar radiation and wind. All of these can be generated for monthly patterns and used with SimCLIM to assess baseline and future scenarios of change across all the available Representative Concentration Pathways (RCPs). These GCM and RCM patterns will be at 1 km resolution and applied to the shape file that defines the Basin. Additionally historical time series data for the Basin will be provided by the Ministry of Energy and Iranian Meteorological Organization for inclusion to enable extreme event analysis. All climate scenarios developed will be consistent of a full suite application of current Global Climate Model (GCM) and Regional Climate Model (RCM) results combined with AR5 Representative Concentration Pathways (RCP) in the Bakhtegan Basin.
- Training in the data applied and SimCLIM will be undertaken to facilitate assessments of climate change and climate risk for the Bakhtegan Basin. Such training over a two week period will not only clearly articulate the underlying principles in the development of climate data for basin-wide application but will also encourage better understanding of IPCC guidelines for the application of climate models in decision making. Topics for inclusion include risk analysis using a scenario approach and threshold analysis and integration of climate model outputs for planning and decision making and community outreach.
- Application of SimCLIM will focus on comprehensive modelling of climate change and climate risk in the Bakhtegan Basin, with a specific focus on surface and ground water resources under current and future climate conditions.

Output 1.2 *– A water and land use planning (WLUP) framework is developed and implemented to support decision making.*

73. There are many challenges that the rural areas in the Bakhtegan Basin are currently facing. This includes: achieving food security; mitigating and adapting to climate change; protecting biodiversity; supporting economic growth; protecting people from natural disasters; preventing and settling land and water demand conflicts; and encouraging local people and communities to alternative livelihoods. An integrated approach to water and land use planning (WLUP) is one of the tools that can help to address these challenges as it focuses on making best use of available information and data to support informed decision making on the future use of land and water resources with participation of all relevant stakeholders.

74. The main objective of this Output is to develop and implement a land-use planning framework that is based on a fully integrated approach to addressing water resources limitations in the Bakhtegan Basin aimed at building resilience to climate variability and change. This framework can be used to guide land use decisions that protect and enhance natural resources and biodiversity by limiting agricultural expansion, protect and enhance the fragile water resources, and constrain the further conversion of forests and rangelands to arable land while also guiding reconversion of arable land to forests and rangelands. WLUP can also be used to identify areas suitable for carbon sequestration, for example through afforestation or for the introduction of agro-forestry. Examples include the transformation of high water demanding rice monocultures into rice/wheat/saffron systems, and establishment of agro-forestry plantations in which the carbon in biomass and soil litter can be multiplied through the cultivation of plantation shade trees.

75. The results of this Output will be combined with the results from Output 1.1 and integrated into the Decision Support System in Output 1.4 to provide a much stronger basis for enhanced decision-making, awareness raising and action towards increasing the climate resilience of the environment, society and economy of the basin.

Activities under Output 1.2 include:

- Public participation – All stakeholders, representing communities, authorities and industry, will be involved through participatory workshops in the planning and design of the parameters for this Output; in further workshops to agree on recommendations and revisions as the work progresses; and in determining final recommendations for implementation from this Output. Project will organize consultative participatory workshops for rural women to provide feedback into this process.
- Development of an integrated WLUP framework for the Bakhtegan Basin. This framework will consist of the following specific activities and steps, which will be undertaken at both the basin level and also for each of the identified land use planning Zones :
    - Analysis of existing land-use and policies by using remote sensed data and GIS analysis that includes the present condition of various land-uses including forest, rangeland, irrigated cultivation, rain-fed cultivation, residual area (urban

and rural) that prevail under existing national and provincial policies (e.g. allowable or disallowable arable land expansion).

- Analysis of existing water resources (surface and sub-surface) and systems including information and data from registered and unregistered wells, registered and unregistered river water diversions, updated well pumpage information and records, updated river diversion records. All data will be obtained from available hydrometric gauge stations, and planned waste water and desalinization projects.
- Analysis of data from existing water uses from both surface and ground water including agriculture, domestic uses and industrial uses (including mining, factories, hydroelectric power plants).
- Projections of future water supply and demands based on the results of the future climate projections that will be formulated in Output 1.1 using the SimCLIM model coupled with the SWAT hydrological model. WLUP will be introduced at the Bakhtegan Basin and land use planning Zone levels to identify measures to reduce vulnerability and build resilience to climate change. This will enable identification, discussion and decision-making on specific risks and interventions that are related to the unique characteristics and circumstances of each of the four Zones.
- Identification, review and assessment (including costing) of water and land resource options that include: changes and refinements to conventional water system infrastructure; alternative water resource measures (e.g. desalinization and use of recycled water); supply side and demand side options. The supply side will be evaluated under three climate change scenarios: projection under the optimistic climate change scenario, i.e. RCP 2.6; projection under the pessimistic climate change scenario, RCP 8.5; projection under a mid-range scenario. The demand side will be defined based on: different land use scenarios ranging from high water use to no water use and including retirement and reconversion of arable lands to rangelands or forest; population growth scenarios. This will help address the current situation where there are no limitations on water use and policy makers are not following any plan towards water resources management based on the water availability limitations in uplands and climate change vulnerabilities.

Output 1.3 *– Community engagement, empowerment and ownership in decision making is supported through local community monitoring*

76. A fundamental issue within communities in the Bakhtegan Basin is a lack of in-depth awareness and ownership of the seriousness of climate change impacts. The levels of awareness and ownership vary in the four different Zones identified for targeting. For example, it is clearly evident to people in Zone 4 that there is no surface water available and that they have saline water in their wells. They are aware that they are now living in a dryland environment, but they are not fully aware of all of the causes, the most importantly the role of climate change. On the other hand, people in Zone 1 have access to water but their production is still suffering due to factors such as high soil erosion rates. There is also a lot of blame being apportioned with people and communities becoming territorial as a result, particularly where they have water. This gap results from a lack of sharing of issues that people are experiencing in different Zones. At the same time people have no means to monitor improvements in their situations and environment and for sharing their success stories with others.

77. To address this situation this Output will focus on empowering communities to take ownership through developing, in a participatory manner, with targeted communities, a system for monitoring changes in both vulnerability and resilience and sharing this information between communities and with both county and provincial authorities. This local community monitoring will be accompanied by education and capacity building under Output 1.4. Examples of indicators for vulnerability and resilience monitoring include: biodiversity status, water situation, soil quality, household income, crop productivity, crop health, crop pattern, animal health. Specific indicators will be developed in partnership with the targeted communities, using as much as possible a simple ranking (e.g. on a scale of 1 to 5) for reporting on their status. The number of indicators and frequency of reporting to be determined with participating communities and families. Responses to indicators will be verified with quarterly site visits and facilitated sessions. Information will be collated into a form that will be available for communications, education and sharing with communities and authorities throughout the basin.

78. This Output will provide the basis for awareness building and ownership of issues and building resilience in response to identified vulnerabilities. It will also provide valuable information on the status of different communities that will be shared throughout the basin with the goal of informing people widely of the challenges that are being faced and what is being implemented to address them. It will also help the fine tuning and targeting of resilience building interventions for different communities. This local community monitoring will complement and add further insight to results from existing monitoring activities, in particular the monitoring of water resources and climate.

<u>Activities under Output 1.3 include:</u>

- Participatory engagement with targeted communities, farmers and households to identify and agree on a set of vulnerability and resilience indicators (encompassing environmental, social and economic) which will be used for local community monitoring. Project will facilitate presence of Rural Women's Trust Funds representatives in public consultation meetings.
- Development of a participatory monitoring system to facilitate tracking changes on the agreed indicators by targeted communities and households.
- Installation of a water monitoring system with participating farmers from Output 2.1 to measure and quantify water reductions from the introduction of climate smart practices.
- Quarterly site visits to all participating communities to verify and review information provided and discussed in the participatory monitoring system.
- In conjunction with Output 1.4, development and dissemination of information based on the local community monitoring, which will be fed back to communities and others through Output 4.1.

Output 1.4 *– A GIS based data and information management system and an information portal system are developed to facilitate more informed, effective and timely decision making*

79. The focus of Output 1.4 is on data and information management for improved decision making. This is focused on streamlining all relevant data and information generated through the project through a customized GIS platform and development of an information portal system (TIPS). This will then provide input to guide all Outputs under Component 4. Advances in data acquisition through remote sensing, data utilization through geographic information systems (GIS), and data sharing through the internet have provided watershed managers access to more information for management decisions. In the future, applications incorporating hydrologic simulation models, GIS, and decision support systems will be deployed through the internet. In addition to challenges in making complex modeling technology available to diverse audiences, new information technology issues, such as interoperability, internet access, and security, are introduced when GIS, simulation models, and decision support systems are integrated in an internet environment. This project will review current use of information technology in watershed management decision making and develop a discussion of issues created when developing internet based, integrated watershed management decision support systems. A prototype spatial decision support system (TIPS) for rangeland, forest, cultivation areas management will be developed around web services, which are components that communicate using text based messages, thus eliminating proprietary protocols. This new framework will provide an extensible, accessible, and interoperable approach for decision support in the Bakhtegan Basin. The information generated will be used by policy and decision makers in Fars Province, through the mechanism of the Bakhtegan Basin Council (Output 4.3).

80. Data and information management will be linked strongly to both the education and capacity building and communications elements of Output 4.3. In particular, but not exclusively, this element will focus on effective management and use of data and information that is either generated from, or underpins, other Outputs. The key is to insure that all data and information are brought together in a form that is accessible to all project stakeholders, from individual householders and farmers through to national level policy makers. In essence this will take the form on an internet based decision support system, as outlined above, to ensure effective decision making and actions of relevance to climate resilience.

<u>Activities under Output 1.4 include:</u>

- Data and information management for decision support will focus on the development of a GIS platform that integrates all relevant data and information layers generated for and through the project.
- Establishment of the information/data portal system (TIPS) to facilitate completion to disseminate the needs all the stakeholders based on the national, provincial and local scales.

Component 2: The resilience of communities in the Bakhtegan Basin is strengthened through implementation of climate smart agriculture and alternative livelihoods

81. Component 2 focuses on the development and implementation of climate smart agriculture and alternative livelihood practices which are aimed towards achieving significant reductions in the demand for, and pressure on, land and water resources in the Bakhtegan Basin. It is designed to address some of the core vulnerabilities that are increasingly being exacerbated by climate variability and extremes, in particular drought associated with climate change. Core vulnerabilities are arising from the unsustainable rates of extraction and overuse of both surface and ground water resources, combined with over-extensification and over-intensification of agriculture. The severe drought in 2007/08 intensified the effects of these practices and this has continued with the sustained period of drier than normal conditions since then. The consequences of this are severe in an already arid environment. While this Component cannot address all of the underlying issues throughout the basin, it will provide support for more climate smart and climate resilient agricultural practices and alternative livelihoods which will lead to significant reductions in vulnerability to drought and climate change by participating farmers, households and communities.

82. The project will strengthen and add value to existing agriculture initiatives within the Bakhtegan Basin. This includes supporting the Fars provincial government strategy to change cropping patterns and practices. Changes already occurring include: shifting arable land to alternative crops such as almond, fig, rose-flower (mostly using for cosmetics and some food industries), pistachio and medicinal herbs. Additionally farmers are already making changes such as: increasing the area of saffron cultivation (estimated to be increasing by about 100 ha annually); shifting to lower water demanding crops such as safflower (increasing by about 500 ha annually in Shiraz, Marvdasht and Kharameh Counties); increased cultivation of barley and introduction of less water demanding wheat varieties. Other current agricultural initiatives include organic certification of farms and processing facilities. However, it needs to be clarified to what extent these organically certified farms are receiving sufficient economic incentives to sustain their organic status and whether they are achieving significant reductions in water use. Crops currently covered include dates, figs, pomegranate, saffron and medicinal herbs.

83. Similarly the project will extend existing alternative livelihood practices within the Bakhtegan Basin aimed at diversifying household incomes away from dependence on land based, water dependent activities. Current alternative livelihood practices that will be extended include sewing, mushroom production, carpet weaving, vegetable production, processed food products (e.g. pomegranate sauce, tomato paste, fig products, grape juice, raisins, pickles), bread making, chicken and turkey breeding, bee keeping and sheep husbandry. A specific mechanism for supporting women is the Rural Women's Trust Fund, which will be supported and enhanced through the project.

84. Component 2 will therefore encompass the following: a) climate smart agriculture which will include a participatory planning process, market research, research on new crops and cropping systems that are suited for a dryland environment which can provide more income with less land and significant reductions in water use, extension of both existing initiatives and of the results from the research into new crops and cropping systems and widespread dissemination of results; b) alternative livelihoods which will also involve a participatory process, market research, education and training, certification, marketing and widespread dissemination of results. All activities and practices will be targeted to the specific needs of participating farmers, households and communities within the context of the limitations and challenges of each of the four Zones. In all cases a Community Based Adaptation approach will be used, which will be complementary to the Ecosystem Based Adaptation approach of Component 3.

85. Direct beneficiaries of sustainable livelihood practices will include 766 households, with 900 women receiving support from the Rural Women's Trust Fund, in ten villages with two from Zone 1, two from Zone 2, one from Zone 3 and five from Zone 4 (see Annex 4 for details). Targeting of villages for both Outputs in Component 2 has been developed to address the range of agricultural issues (e.g. from overuse of water to lack of water) and focusing in particular on identified vulnerable communities for alternative livelihood practices. Indirect beneficiaries of the project will be the entire population of the Bakhtegan Basin through communication of project results and outcomes, which will be facilitated through Output 4.1.

86. During the project formulation phase the needs for the Outputs presented in Component 2 were identified through consultations nationally with MOE, MOJA and DOE, provincially with the Fars Provincial Government, and locally with county governors, local representatives of government agencies and local community and NGO representatives. The results of these consultations are summarized in Section H with a report on provincial and local consultations provided in Annex 7. Reference was also made to existing successful initiatives in Iran, including the Lake Urmia project (see Section F).

87. Component 2 has been designed with the recognition that participation, empowerment and ownership building are the keys to success. This component along with component 3 will also provide a practical platform for implementing decision made in components 1 and 4. Project results won't be sustained if people are simply told what to do. Therefore both Outputs 2.1 and 2.2 will begin with a participatory planning process and will involve continual engagement with and feedback from farmers, women, households and their communities for the duration of the project. This process will ensure that all direct beneficiaries will own both the problems and the solutions.

88. The main outcomes of Component 2 will be successful introduction and extension of climate smart agriculture and alternative livelihoods that decrease vulnerability to drought and climate change in the Bakhtegan Basin in line with decision made by newly governance mechamisms established in the basin to address climate change. This component reduces pressure on scarce land and water resources, providing viable and sustainable sources of income, and reducing pressure towards migration from rural areas. By building climate resilience within the context of what is now a dryland environment the project will raise understanding and awareness of the underlying situation and associated effects of drought and climate change and provide solutions that will be of long-term benefit to the basin if adopted widely and wisely.

89. The two Outputs in this Component will be spread throughout the lifetime of the project. The Fars provincial government, through the Bakhtegan Basin Council, together with provincial and local staff of MOJA, MOE and DOE, and local county governors will have collective responsibility for implementation of Component 2 in line with decision made through mechanisms established in outcome 1 and 4.

Component 2 consists of the following Outputs and Activities:

Output 2.1 *– Climate smart agriculture practices are adopted in target areas*

90. Development and implementation of climate smart agriculture in the Bakhtegan Basin forms one of the most substantial components of this project, which aims to provide a practical platform to change traditional approaches of local related authorities, local companies and cooperatives and local communities and farmers to sustainable agriculture (SA) practices. In this regard, SA techniques are developed based on participatory approaches, bringing together farmers, agriculture authorities, agriculture research centres and professional facilitators aiming at water saving at farm level to help meet part of the ecosystem and lake water rights without compromising farmers' net income.

91. Agriculture is both the single major source of the situation that now exists in the basin and must be an integral part of the solution. The solution involves putting into practice many of the elements of the project, in particular drawing on results of the assessments in Component 1 and guided by the governance arrangements in Component 4. It will involve a clear action focus towards drastically reducing water consumption and shifting the mind sets of farmers and other related stakeholders towards what must now be treated as a dryland environment. Experience shows that this cannot be achieved by trying to tell farmers what they must do, for example by trying to shut down illegal wells. It can only be achieved by engaging with farmers fully in an action focused, participatory process. This will involve bringing together farmers, agriculture research centres and professional facilitators aimed at implementing identified climate smart practices that reduce water consumption without compromising farmers' net income.

92. Any adaptation measure won't be successful without sense of ownership among people in the basin through a participatory approach which support and advocate a sustainable change in their daily livelihood. For this reason, local community engagement is one of the major objectives of the project. The above-mentioned process led to engagement of government, private sector, NGOs and the local farmers. Significant improvement of inter-sectoral collaboration can be seen to the point where different stakeholders are participating in planning and decision making on a regular basis. Besides, a bottom-up planning and implementation of SA techniques is carried out by farmers in collaboration with local companies.

93. In addition, local companies and cooperatives play a key role in the project with regular and continued presence in the field and accompany with local farmers and providing a collaborative platform toward joint planning and implementation among key stakeholders in line with sustainable agriculture, applying smart agriculture technics and aiming to achieve results.

94. There are a number of critical elements to this Output which are aimed at building on other relevant projects elsewhere in Iran and within the basin. This is includes market research, including for organically certified products, research at the MOJA research station in Marvdasht on new crops and cropping systems suited to a dryland environment, participatory extension and engagement with farmers and communications drawing on existing and new research. These different elements need to consider the variation in conditions and agricultural activities throughout the basin, while at the same time considering the need for a coherent, integrated, approach for the whole basin. It will therefore draw strongly on results from the Output 1.2, which will guide and inform the limitations and opportunities relating to sustainable land and water use in each of the four Zones.

95. Considering the fact that water efficiency in most part of the basin is less than 30% and based on the current situation in the four different Zones , and subject to the results of Output 1.2 which will further guide this Output, the following is an overview of the activities in each Zone. Zone 1 encompasses the Kor and Sivand sub-basins, and was traditionally a rangeland area with seasonal grazing by nomads and rural people. There is now heavy use of water here, including significant amounts for rice cultivation on river terraces. The focus will therefore be on achieving significant reductions in water use drawing on available research from the MOJA research station in Marvdasht, while also encouraging diversification towards lower water-demanding and higher value crops and cropping systems and alternative livelihoods (Output 2.2). In Zones 2 and 3, where there is the highest concentration of water dependent arable farming, the focus will similarly be towards achieving significant reductions in water use and other sustainable agriculture practices and encouraging all water users to diversify based on revised water allocation plans, produced through Output 1.2 for the Bakhtegan Basin. In Zone 4, which is the most critical zone in terms of the lack of water, the focus will be towards enhancing already existing shifts towards higher value, less water demanding, crops and cropping practices.

96. Local cooperatives/local technical companies with technical expertise on climate smart agriculture, technologies and participatory approaches will be contracted for each target village in a competitive process. Selected companies are obliged to be in each village full time and responsible to develop and implement a participatory plan which is agreed by local community to apply smart agriculture systems for the village.

97. Each contracted company is responsible to fully drive the whole process in each village under supervision of local related authorities (MoJA and DoE) which include trust building in the village, public awareness activities on climate change and

climate smart agriculture, developing a participatory smart agriculture plan, participatory selection of target farms, gathering data and develop an action plan for each farm which will be agreed by the farmer owner.

98. The process of introducing SA techniques to the farmers include i) Development of Participatory Action Plan engaging

Farmers, Facilitators, Agriculture Researchers and, ii) Implementation of water management techniques, emphasizing on water saving at farm level iii) Implementation of soil fertility techniques, iv) emphasizing on application of biological fertilizers rather than chemical fertilizers; v) Implementation of crop protection techniques, emphasizing on application of biological pesticides rather than chemical pesticides and pollutants; vi) Supply and installation of monitoring equipment and measuring instruments to enhance water consumption management

99. Applying new CSA techniques and technologies at the farm level will be supported by MoJA and contracted cooperative/company based on agreed action plan for the farm but there is an emphasis on techniques which could be applied and advocated by the farmers themselves. The new technologies includes but not limited to improvement of irrigation systems through better flow management (irrigation with constant flow, dual flow, decreasing flow, surge flow, blocked furrows), Improvement of soil conservation at farm level (land levelling, no/minimum tillage, contour ploughing. terrace farming. runoff control. wind breaks. Cover crops/crop rotation. soil-conservation farming. salinity management, soil fertility management); introduction of new type of seeds, pesticide and fertilizer at farm level. , ,.

100. All farm level techniques/technologies will be discussed with farmers after initial monitoring of the farm and as possible solution to response climate change effect on their usual practices. Joint action plan will be developed based on possible solutions for farm and farmers will be supported to apply the action plan during the cultivation season.

101. In the first year of the project at least 20% of target farms/orchards will be covered and at least 80% will be covered in the beginning of the last year of the project. It needs to be noted that all farm level activities will also be directly linked to other initiatives in other components like sustainable alternative livelihood activities and value chain which will be promoted and supported by local NGOs and CBOs (Output 2.2).

<u>Activities under Output 2.1 include:</u>

- Development and Implementation of Climate Smart Agriculture Plans: Based on the consultations and the research carried out by the MOJA research station in Marvdasht, the project will support the development of CSA plans covering Zones 1, 2, 3 and 4 that will target 4,425 farmers and fruit & nut growers in 15 villages. (Target villages and selection criteria is described in Annex 3)
- AF resources will support the introduction of climate smart agriculture practices by providing a) continuous technical support during cultivation season, b) initial support to apply new technologies in the farm based on agreed action plan for each farm c) agricultural inputs (including but limited to seeds, seedlings and biologically friendly inputs) for participating farmers with guidance and extension services by MOJA Marvdasht Research Station and selected cooperatives/companies, d) training and capacity development practices for companies, authorities experts and farmers e) monitoring the results f) documentation and sharing lessons learnt.
- Based on research already undertaken at the MOJA research station in Marvdasht a 50 percent reduction in water use can be achieved with no loss in yield in rice production and substantial reduction of GHG emissions. [These systems are results of the development of a climate smart rice production systems by the International Rice Research Institute (IRRI) known as Alternate Wetting and Drying (AWD)]. It is expected that 21,910 hectares of cropping land will be converted to climate smart production systems and 1,726 hectares of horticultural land will be converted to climate smart production systems. The introduction of CSA systems will be done in current agricultural land, therefore the impact on soil will be minimal.
- Extension of existing knowledge and applied research results to participating farmers. Specifically, this will involve engaging with farmers to implement more water efficient practices in rice cultivation in upper land and other farm and orchard products in down stream.. This activity will also include introduction of practices aimed at increasing use of biological fertilisers and pesticides, and other sustainable agriculture practices such as mulching and discontinuing the practice of burning crop stubble. These practices have already been successfully applied with farmers in Lake Urmia, and to some degree in parts of the Bakhtegan Basin. The project will facilitate the presence of women farmers in training courses for climate smart agriculture practices, where possible.
- Market research, including value chain analyses, on alternative crops and cropping systems that are suited to a dryland environment under changing climate conditions. This will include market research on the potential for high value, export focused, organically certified crops. The focus on organically certified crops (focused mainly on fruit and nuts) for export is intended to identify as clearly as possibly the potential for alternatives to rice production that will give farmers a strong economic incentive to change. Additionally, it will include an emphasis on processing opportunities for added value products that are aimed at high end markets. One example is cold-pressed safflower oil aimed at international health food markets. Simply focusing on local markets in Iran is unlikely to be sufficient to provide enough of an economic incentive

for farmers to change. This market research will also encompass exploration of the potential to develop a unique branding of all produce from the Bakhtegan Basin[43], aimed at gaining international recognition of, and support for, the need to restore, revive and sustain its unique character as the heart of Persian civilisation.

- Development and implementation of a new applied research programme at the MOJA research station in Marvdasht. This will draw on the results of the market research on alternative crops, cropping systems and added value processing opportunities to ensure that it is focused only on new crops and techniques suited for a dryland environment that are likely to result in strong environmental, social and economic benefits. It will encompass introduction of fallow crops and periods, use of shelter trees around fields (ideally using nitrogen fixing species) to reduce wind erosion of soil and to provide mulch material, and other soil and water conservation practices. Subject to outcomes of the market research this will also include the design of farming systems that are capable of earning greater income from less land and with substantially reduced water inputs.
- Participatory engagement with farmers will be designed to ensure that they are committed to such changes. This research programme will be designed to be as action focused as possible, with implementation of participatory technology development (PTD) approach. Such an approach will involve the initial trialling of new technologies and cropping systems at the village level with local community and Marvdasht research station and then rapid extension of further trialling to identified leading, and innovative, farmers.
- Widespread extension of the results of the new research programme to farmers, particularly focusing on Zones 1, 2 and 3 where the greatest reductions in water use are required and there is an urgent need for climate smart agricultural practices. This will be accompanied by the water monitoring activity under Output 1.3.
- Support for extension of existing certified organic agriculture initiatives in Zone 4, to encompass additional crops such as pistachio and other agricultural products from all other Zones. For example, growing of medicinal herbs has been attempted in Kodre shul village in Zone 1 but was discontinued by farmers due to the lack of a market. Similarly, saffron growing is being attempted in Zone 1 but there is a lack of knowledge, skills and market access.
- Based on the results of the market research, development of a unique brand for the Bakhtegan Basin. Associated with this working groups will be established in each Zone, involving farmers and industry (i.e. food processors) aimed at working together to identifying and implementing new opportunities for high added value products, such as the previously mentioned example of cold pressed safflower oil.
- A comprehensive extension, communication and education programme to disseminate results and information as widely as possible throughout the Bakhtegan Basin (Output 4.1).

Output 2.2 *– Alternative livelihoods are adopted by women/women's cooperatives in target villages.*

102. Support and establishment of water-friendly alternative livelihoods with an especial focus on women and youth involvement forms a crucial part of this project. This activity could significantly decrease the dependency of local community to water resources in the pilot sites while providing new job opportunity to local community. It is also a complementary tool beside smart agriculture which provide alternative solutions for local farmers. Many households and villages within Zones 1 and 4 are no longer able to sustain themselves economically due to the sustained effects of drier than normal conditions over the last decade and depleted water resources. This situation will continue to worsen with climate change. There has already been land abandonment within these four zones due to drought, low rainfall, lack of available water and/or low crop yields, and migration of families to urban fringe areas with associated social issues of increased divorce rates. Zone 4, in the immediate and wider environments of Lakes Bakhtegan and Tashk is the most severely affected. These zones, in particular Zone 4, will be the primary focus for activities under Output 2.2.

103. The current situation is one where individual households are already practicing alternative livelihoods. The emphasis of Output 2.2 is therefore to build on and enhance these existing initiatives. The identified aim is to support the shift away from water dependent agriculture, which is already been enforced through lack of available water in some situations, increase the climate resilience of communities and stem the flow of people to urban fringe areas. Such initiatives decrease the local communities' dependence on wetland resources, while making rural people aware of their role in restoration and management of wetlands and increases the level of social responsibility.

104. Based on the Gender Assessment and Action Plan (GAAP) [Annex 9), it was identified that targeted villages currently have different capacities for adopting and sustaining alternative livelihoods and it was identified the need to provide financial support to the most vulnerable population in the target area – women – to implement livelihoods to reduce the pressure on scare water resources while creating opportunities for generation of income.

[43] For example, see the mountain partnership under FAO; "Mountain Product Initiative" http://www.fao.org/mountain-partnership/our-work/regionalcooperation/climate-change-and-mountain-forests/mountain-products/en/

105. Another important element distilled form the GAAP is not only necessary to consider the needs of men and women but also their potential capacity in dealing with economic, social and ecological vulnerabilities as individuals and as a community in the context of drought. The provision of small grants will increase women's agency and control over resources that ultimate are aimed at their economic empowerment.

106. AF funds will support the setup 15 women cooperatives based on the work that Rural Women's Trust Fund[44] has been done at the provincial and national level. The 15 cooperatives will cover all 15 target villages of this output and will respect current ways and norms of organization in the target area. By having one cooperative per village, it would be logistically easier to organize trainings and meetings with trainers and facilitators. AF resources will aim to target at least 900 women to implement alternative livelihoods by receiving small-grants support.

107. Fars province is one of the pioneers in the country on large number women cooperatives (more than 300 women cooperative in all province which 135 of them are in Bakhtegan basin) and women focused micro credit funds and project will cooperate jointly with MOJA to support existing capacities in line with project purposes. These cooperatives have already supported several alternative livelihood in agriculture sections and these initiatives might be used for climate adaptation activities within the project.

108. An alternative livelihoods catalogue was developed based on the participatory consultative process among sub-national, NGOs and local communities in target area in Fars province (See Table 3). The pre-selected set of livelihoods to be supported included in this table was developed in close coordination with regional governments, and validated during the GAAP.

Table 4: Pre-selected livelihoods

Livelihood	Prospective Village	Required Investment	Description[45]
Sewing & Tailoring	- Emamzadeesmaiil - Kordeshul - Ali abad - Doroodzan - Bandeamir - Kamajan, Jamishi - Jazin, Khanekat - Shargh Abad	Around $700 per beneficiary	Sewing supplies and accessories (sewing machines, fabric, patterns, etc.), training/workshops, post production support / links to markets Skills training, promotion of economies of scale (sewing machines with different features, fabric by the bulk)
Carpet weaving	Same villages as above	Around $ 600 per beneficiary	Weaving supplies (knitting machine /carpet weaving Loom, wool, cotton, natural coloring plants, combs, scissors, spindles, spinning wheels, etc) traditional and new methods, colors, patterns and weaving techniques workshops, post production support / links to markets
Dried fruit/herbs/vegetables processing	Same villages as above	Around $ 500 per beneficiary	Inputs (non-water intensive commodities), Solar drying machine, Packaging inputs, training/workshops, post production support / links to markets
Traditional aviculture	Same villages as above	Around $600 per beneficiary	Inputs (birds livestock /poultry, animal feed), Materials (fencing, water containers) Packaging inputs (egg cages), training /workshops, post production support / links to markets
Jewelry	Same villages as above	Around $800 per beneficiary	Inputs, jewelry machinery and accessories, Packaging inputs, training/workshops, post production support / links to markets

109. Local NGOs will play a crucial role in this output to provide a continuous support, capacity development and introducing new skills to local communities, women in particular, to set up environmental friendly alternative livelihoods. NGOs/local cooperatives will be selected to support community members to develop and establish sustainable alternative livelihoods to be implemented with AF resources.

110. Local NGOs will work closely with the communities to analyse possible sustainable alternative livelihood opportunities at village level, develop and agree on a joint plan with local communities, provide assistance to roll out prioritized alternative

[44] A specific support mechanism for women is the Rural Women's Trust Fund which, based on feedback during consultations, has had mixed success. The focus with this mechanism will therefore be on learning the lessons from both successes and failures to inform implementation.

[45] Project will build on economies of scale to maximize budget

livelihoods, linking possible product to markets, monitor implementation, lead participatory evaluation of the livelihoods and help synthesize lessons learned and other knowledge for policy inputs. The National Steering Committee will oversee the development of the portfolio of community-based alternative livelihoods, ensuring its alignment with AF requirements and that lessons learned are discussed and evaluated. Information collected from project M&E will be centralized in a database and shared with communities, organizations and government institutions for policy and program discussions.

111. The pre-define set of livelihood options aim to increase agency of women in the economic sphere by moving away from water-intensive agriculture systems with income opportunities thus increased resilience to drought. This will involve a fully participatory and structured approach encompassing market participatory planning, market research, vocational training, support for alternative livelihoods and support for processing, packaging and marketing.

112. Ultimately, this output would aim to increase potential collaterals and creditworthiness for all participating women to at a later stage be able to join the micro-credit market, if desired.

113. These alternative livelihoods will be implemented based on the experiences and best practices generated by the UNDP all around the country in past 30 years including GEF large scale projects and Iran Small Grants Programme (SGP) The AF project will build upon the project National Steering Committee (NSC) comprised by DoE and UNDP and other key institutions such as MoJA, MoE, others. The NSC is responsible for the review, selection and approval of small-scale projects and for ensuring their technical and substantive quality. The AF project will build upon existing delivery modality to direct grants to approved community projects. AF grants will be channelled directly to selected NGOs, community-based organizations (CBOs) and local cooperatives and the maximum grant amount per project will be US$50,000. To assess eligibility of CBOs and NGOs (grantees) proposals, the National Steering Committee will base its decisions using SGP´s Eligibility Criteria for Grantees and Projects (Annex 6). DoE, as a member of the Project Board will lead this process and will provide inputs as part of the strategic directions approved by national steering committee. A fundamental part of the proposals' screening process will be the technical elements, where a special focus will be put at supporting those proposals which contribute to increase the adaptive capacity and resilience to climate change impacts in the basin. The technical criteria will assess high adaptation benefit; degree of reliance on water inputs vs. water efficiency; potential for employment (agriculture and non-agriculture sectors); number of direct female beneficiaries; potential to contribute to landscape regeneration and integrity of the basin ecosystem; among others. The UNDP will provide financial oversight on grants allocation

114. These small-scale nature of the pre-selected alternative livelihoods in principle will not require an Environmental Impact Assessment (EIA) based on the nature, purpose and possible effects on the environment. The National Steering Committee will assess if a proposal would require carrying out an EIA, to showcase if the environmental and community benefits outweigh the negative effects, to be subsequently approved or rejected. As previously stated, the AF project includes technical and budget provisions in compliance with UNDP requirements, including adherence to all national and local standards on environmental and social impacts, to request and carry out EIAs if any of the activities would require. (More information on EIAs in Annex 10)

115. In addition, project team with the guidance of the Steering Committee, will ensure that each community is assisted by qualified technical personnel from government extension agencies and/or NGOs to ensure that all environmental, social and technical issues that may arise are squarely addressed. This will be important to guarantee that project activities are in full compliance with AF requirements, do not lead to maladaptation or other undesirable consequences, i.e. that activities aggravate inequality, cause negative environmental impacts or create dependency on technical solutions requiring resources and capacities beyond the reach of community participants. In its review of community proposals, the Steering Committee will determine the necessity of further design or development of specific risk mitigation measures to avoid maladaptive outcomes. On the Steering Committee UNDP will ensure that due diligence is observed.

Selection of Beneficiaries:

Project team in consultation with other government entities and local stakeholders and NGOs has identified a criterion to be used to identify and prioritize community beneficiaries for the development of proposed activities. The criteria are consistent with the rationale of the AF project which aims to increase not only ecosystem resilience but also economic, social and territorial climate-related resilience within targeted communities.

116. The main beneficiaries of the project will be the rural communities in within the target Zone1, 2, 3 and 4 as below:

Zone 1	Zone 2	Zone 3	Zone 4
•Emamzade Esmail •Kordshul	•Aliabad •Doroodzan	•Bande amir	•Kamjan •Jamishi, •Jazin •Khane kat , •Shargh abad

117. The rationale of selection of these communities is included in Annex Targeting of Beneficiaries.

118. The feasibility of the proposed interventions was assessed with local, regional and national stakeholders and beneficiaries as part of the consultation process, relying on their experience implementing related initiatives in the region (See Annex XX Report on Consultations in the Bakhtegan Basin).

Activities under Output 2.2 include:

- A qualitative and quantitative livelihood assessment, including alternative livelihood plans will be developed. This will encompass a participatory planning process with targeted households and villages, assessment of the local labour market (demand and supply), market research on the different livelihood options and identification of opportunities and capacities for livelihoods diversification at the local level.
- Local executive partners (NGOs/Local cooperatives) will be selected to support community members with special focus on women and women's cooperatives to establish sustainable alternative livelihoods based on the agreed plan and pre-selected livelihoods that will include a range of sustainable alternative livelihoods (i.e. sewing, carpet weaving, dried fruit processing, traditional aviculture, and jewelry, etc.).
- Local executive partner will help target groups to establish local cooperatives or strengthen existing cooperation mechanisms to sustain new initiatives in the community and giving further opportunity to other community members to join.
- Market participatory planning, market research, vocational training support for all participating household members including women/women's cooperatives will be provided, based on the implemented livelihood by each household. Some villages already have existing capacity which can be drawn on through development of a 'training of trainers' and mentoring approach within the village.
- Attracting effective support for establishment and operation of small and microenterprises oriented to women: The Employment Department of Ministry of Cooperatives, Labor, and Social Welfare (MOCLSW), , Center for Women Entrepreneurs and Traders of Fars Province, Professional Association Iranian of Women Entrepreneurs (AIWE), Dastadast Social Enterprise, among others

Component 3: The resilience of the natural environment of the Bakhtegan Basin is strengthened

119. Component 3 focuses on implementation of a range of soil and water conservation measures in rangelands and forests; and the rehabilitation and conservation of national parks and protected areas. The natural environment of the Bakhtegan Basin has been significantly modified and put under severe stress over the last four decades. These stresses are now being exacerbated by the prolonged dry period since 2007, with climate change an increasing influence. While it is not realistic to believe that this project can fully restore the natural environment of the basin, it can implement measures to increase the resilience of what must now be treated as a dryland environment.

120. The resilience of the natural environment of the Bakhtegan Basin will be strengthened through the following two Outputs: a) soil and water conservation in rangelands and forest areas which will involve implementation of collaborative adaptive rangeland management which fostering science-management partnerships and data-driven rangeland management through a participatory, multistakeholder approach. While targeting goals have been set the specific target sites for implementation of different measures will be identified based on the results of Output 1.2 and through a participatory engagement and decision-making process. Measures introduced will build on past successful work of this kind within the Bakhtegan Basin and in other Provinces; b) rehabilitation and conservation of national parks and protected areas will also involve implementation of specific measures at project target sites, to be undertaken as an essential part to recover and maintain overall functional integrity of the landscape. In particular this Output will draw on approaches, results and lessons learned from the Conservation of Iranian Wetlands project and Central Zagros Mountains project[46].

121. Component 3 will be implemented in Zones 1 and 4. Zone 1 forms the principal catchment area of the Bakhtegan Basin, while Zone 4 encompasses the Tashk and Bakhtegan National Park. Output 3.1 will be implemented in eight most vulnerable areas related to 14 and 13 direct and indirect vulnerable villages, respectively, with 21,380 directly vulnerable rural people, while Output 3.2 will be implemented in seven communities with 8,794 people. All Component 3 activities will be implemented in tandem with relevant activities from Component 2, with a particular focus on integrated approaches that combine climate smart agriculture and alternative livelihood activities with community engagement and participation in building the resilience of their natural environment.

122. The need for Component 3 was identified through national level consultations with MOE, MOJA and DOE. All three agencies place a high priority on rehabilitation and conservation of the natural environment of the Bakhtegan Basin. They recognize that the natural environment plays a fundamental role in the provision of ecosystem services which have widespread environmental, social and economic benefits if managed wisely and will play a key role of better adaptation to

[46]Conservation and Sustainable Development Program of Central Zagros Mountains

climate change. Given the current situation in the basin there is a recognition that a significant effort is required to strengthen the climate resilience to the now prevailing dryland conditions. Consultations with provincial and local stakeholders (Section H) confirmed the importance of this Component as an integral part of the project. It has also been indicated by stakeholders that improvement of natural environment situation in the basin is also a strong sign of better adaptation of basin and local community with new situation.

123. As with Components 1 and 2 a participatory planning and engagement process will be developed and implemented through both Objectives for Component 3, which will be sustained for the duration of the project.

124. The main outcomes from this Component will be enhancement of the natural environment of those areas that are targeted by this project, with wider benefits to the water catchments where they are located. Additionally, there will be greater awareness and ownership by participating communities of the need to continue protecting the natural environment within the wider environs of their villages. Component 3 will provide new opportunities to the local community for being part of the conservation measures while benefiting from ecosystem services.

125. As work progresses with implementation of specific activities within Component 3 there will be regular communication of results through the various mechanisms identified in Output 1.4

126. As one of the two main pillars of the project Component 3 will involve a significant amount of work which will be staged through the entire life of the project. Technical leads for Outputs 3.1 and 3.2 will be MOJA-FRWO and DOE respectively, working in partnership with the Fars Provincial Government, through the Bakhtegan Basin Council (Output 4.2) and with local officers from participating County governments.

Component 3 consists of the following Outputs and Activities:

Output 3.1 – *A range of watershed management measures are implemented in target areas aimed at increasing resilience to drought risks*

127. Under the changing climatic conditions of the Bakhtegan Basin vital, and scarce, water and soil resources have experienced measurable quantitative changes in recent years. Natural resources in the basin are now suffering directly from the impacts of climate change, with other socio-stresses (e.g., population growth, urban expansion, etc.).. The only realistic solution is to implement an integrated watershed management approach which involves practices including rehabilitation of vegetation cover in forests and rangelands and protecting natural resources. By implementing such practices widely over time this will help facilitate a much need situation of wise resource management. For long term success, it is essential to not simply see rehabilitation activities as the solitary and final task. An integrated and participatory approach is required to ensure sustainable management. This approach involves a two-way process involving sharing technical and scientific considerations with local people and listening to and incorporating their needs, knowledge and experiences into planning, policymaking and implementation of agreed solutions. Without such an approach, land degradation and desertification will continue unabated, aggravated by climate change, with continuing long-term environmental, social and economic costs.

128. Our objectives at this output are to 1) prioritize desired ecosystem services for better adaptation with climate chage; 2) determine objectives with stakeholders; 3) set stocking rates, criteria for livestock movement among pastures, and vegetation treatments to reduce previous adverse impact on rangeland; and 4) support implementation of agreed physical and non-phisical intervention in selected rangeland areas 5) select monitoring techniques that would inform decision making.

129. This Output will build on the success of other relevant projects elsewhere in Iran and within the basin. These projects have inolved successful implementation of watershed management practices using participatory approaches in East and West Azerbaijan, Khouzestan, Golestan, Kordistan, Markazi, Isfahan, Booshehr, Sistan and Baloochestan, Hormozgan, Fars, Yazd, Kermanshah, south Khorasan and elsewhere. They have been funded through national budgets under MOJA and through international projects in partnership with MOJA involving FAO, GEF, UNDP and JICA. Specifically, this Output will involve engagement with rural communitites from the Chahmahaki, Temshouli, and Tang-e-hana villages in Bakhtegan1 county and Koushk and JahanAbad villages in Bakhtegan 2 county (Zone 4), Bakian, Palangari, Khaniman, Hajiabad, Moradkhani, Chamriz and Chamchenar villages in Marvdasht and Kamfirouz (Zone 1), Dochahi and Nayris in Nayriz (Zone 4), Zino village in Estahban (Zone 4), Bolaghi village in Pasargad (Zone1) and Charghalat and Kenare villages in Arsanjan (Zone 1), to implement physical solutions and management practices to reduce soil erosion and increase the vegetation cover in forest and rangeland areas of the Bakhtegan Basin.

130. Based on the current situation in the four different Zones, the defined activities will be focused principally in Zones 1 and 4. Zone 1 encompasses the Kor and Sivand sub-basins, and was traditionally a rangeland and forest area with seasonal grazing by nomads and rural people. A major issue now is the encroachment of agricultural activities into the rangelands and forest areas. Zone 4 encompasses the land surrounding the Bakhtegan-Tashk lakes which are now severely affected

by soil salinization and desertification. The focus in Zone 4 will therefore be on achieving significant risk reductions terms of in soil erosion, drought control in rangelands and forest areas and combating desertification. Project work in Zone 4 will have a strong emphasis on combating desertification using best management activities aimed at achieving significant reductions in surface water runoff, increasing recharge to the aquifers and increasing vegetative cover.

131. Integrated Watershed Management (IWM) will be promoted in the basin as a suitable strategy for improving sustainable productivity and sustainable protection of landscape with a basin. The Forest, Rangeland and Watershed Organization (FRWO) has developed IWM for small- and large-scale basins at national level and in small-scale basins in Fars province and will guide this process during implementation.

132. IWM is a new approach to be replaced by older solely conservative /exploitation methodologies which were completely sectoral and did not lead to a sustainable management of forests and rangelands. The new approach emphasizes the need to go beyond conservation technologies engaging with diverse stakeholders to include multiple crop-livestock interventions that support and diversify livelihood opportunities for the most vulnerable and create synergies between targeted technologies, policies and institutions to improve productivity, resource use sustainability and market access.

133. One of main purposes of watershed management in drought-prone areas is to improve livelihood security by mitigating the negative effects of climatic variability while protecting or enhancing the flow of essential ecosystem services. This could be managed through practices like herbal medicines harvesting, rangeland restoration, local water harvesting, replantation of forests, etc.

134. In addition, the project will promote the installation of traditional water ponds to harvest rainwater both for domestic supply and to enhance crop, livestock and other forms of agriculture. Water pond technologies are simple to install and operate. Target communities will be trained to implement and operate these ponds, and construction materials are usually readily available. Rainwater harvesting is convenient because it provides water at the point of use and the local beneficiary has full control of their own system. Use of rainwater harvesting technology promotes self-sufficiency and has minimal environmental impact. Construction, operation and maintenance are not labor-intensive. Water collected is of acceptable quality for agricultural purposes. Other benefits include increasing soil moisture levels and increasing the groundwater table via artificial recharge. Rainwater harvesting and its application to achieving higher crop yields can encourage farmers to diversify their enterprises, such as increasing production, upgrading their choice of crop, purchasing larger livestock animals or investing in crop improvement inputs such as irrigation infrastructure, fertilizers and pest management.[47]

135. The most costly component of terrace construction is labor which will depend on average local daily wages. The time required to construct a slow-forming terrace will depend on available manpower, the type of soil and the time of year. The basic tools required (such as picks and shovels) usually belong to the farmer and can be used at no extra cost. Once built, annual maintenance costs are minimal. Research indicates that two people can build 7m² of wall in one day. Assuming a common size terrace wall of dimensions 1.8m high and 50m long, two people could restore an entire terrace in two weeks, or build an entirely new one in a slightly longer period of time. (The initial estimated for investment is about $415/ha with $75/ha per annum for maintenance.)

136. Another intervention to be supported is terracing practices[48] for slope management. A terrace is a levelled surface used in farming to cultivate sloping, hilly or mountainous terrain. They can be used on relatively flat land in cases where soil and climate conditions are conducive to erosion. Terraced fields are effective for growing a wide range of crops, shrubs and trees. Terraces have four main functions[49]:
    - Improve the natural conditions for agricultural production;
    - Decrease the rate of erosion; Increase soil moisture; and Generate positive environmental benefits.

137. This output will include the construction of small-scale works that in principle will not require an Environmental Impact Assessment (EIA) based on their nature. As previously stated, the AF project includes technical and budget provisions in compliance with UNDP requirements, including adherence to all national and local standards on environmental and social impacts, to request and carry out EIAs if any of the activities would require. (More information on EIAs see Annex 10 Environmental and Social Management Framework)

[47] United Nations Environment Program and Stockholm Environment Institute; Rainwater harvesting: a lifeline for human well-being. UNEP and SEI, 2009.

[48] Slow-forming terraces can be built where the land is marginally to steeply inclined and where the soil is sufficiently deep to create a drag effect. This leads to the formation of steps as sediment accumulates due to high density rainfall and natural gravity. Level ditches are traced and excavated along the contour line of a slope and then an embankment of earth, stones or plants is constructed at regular intervals. Eroded soil accumulates in these buffer strips every year and terraces slowly form.

[49] Gonzales de Olarte, E. and C. Trivelli (1999) Andenes y Desarrollo Rural: Es la recuperación de andenes una via para el desarrollo rural IEP-CONDESAN. 1999

Activities under Output 3.1 include:

- Development and implementation of an Integrated Watershed Management (IWM) plan guided and supported by DoE and FRWO in a participatory manner involving training of facilitators, engagement with local people, participation of researchers, local authorities and other relevant stakeholders. This plan will encompass preliminary identification and agreement on watershed management practices. DoE will make sure that IWM complies with national law and does not have negative impacts on ecosystem while FRWO has internal monitoring mechanisms on safeguards.
- Capacity building and training all the stakeholders to participate in planning, implementing and monitoring of the relevant activities for ecosystem protection. Training workshops will integrate the science and technology of the authorities with the knowledge and experiences of local people to rehabilitate and protect the Zagros forest and the rangelands in Bakhtegan basin.
- Implementation of integrated watershed management adaptation activities by local people, with support from MOJA, involving a range of physical options and interventions. These include terracing can be used to modify the slope of land from 50% to 5%, which reduces direct runoff and increases infiltration, thus improving soil moisture status and productivity, 250ha of rainfall trapping with pitting, groundwater artificial recharge projects[50] using traditional ponds to infiltrate the harvested rainfall, re-vegetation of rangelands and forest areas, contouring[51] and strip cropping[52]. Such an integrated, multi-faceted, approach will provide the necessary conditions to support conservation of the soil and water resources of the Bakhtegan Basin.
- A comprehensive extension, communication and education programme (through Output 1.4) to disseminate results and information as widely as possible throughout the Bakhtegan Basin, with a focus on role of rural women and the youth.

Output 3.2 – *Landscape rehabilitation to restore functionality of ecosystem services to increase climate resilience.*

138. The Bakhtegan Basin includes three general types of ecosystem which can be defined by their water status: aquatic, semi-aquatic and dryland. While many of the aquatic and semi-aquatic ecosystems are now mostly dry, these general types will be used to establish project activities aimed at enhancing the natural environment of the basin and building greater resilience to climate change.

139. Aquatic and semi-aquatic ecosystems in the basin include the Kor and Sivand rivers and their tributaries, Lakes Bakhtegan and Tashk and the Kamjan Marshes (abbreviated to Bakhtegan Wetland). The three lakes, their delta and spring-fed marshes are designated as Wetlands of International Importance by the Ramsar Convention on Wetlands. They are located in Zone 4 and are also referred to as the Neyriz Lakes and Kamjan Marshes[53] covering an area of 1080 km^2. The Bakhtegan-Taskh National Park is within this area, which also encompasses a wildlife protected area. Semi-aquatic ecosystems are those in the basin that can be seasonally wet and are used as habitat by migratory birds and also by farmers with water buffalo. This includes the Margoun waterfall protected area in Zone 3 which is located in western part of Bakhtegan Basin. Dryland ecosystems are divided between National Parks and Protected Areas, which are managed by DOE, and rangelands and forest areas which fall under the Forests, Range and Watershed Management Organisation (FRWO) of Iran. The main dryland area that falls under DOE is the Bamou National Park in Zone 3, which occupies an area of 486.78 km^2. Additional dryland areas are: Tang–e-Bostanak protected area in Zone 2 which is located in the northwestern part of the basin; Basiran hunting prohibited area in Zone 1 in the north and KouhSiahArsanjan hunting prohibited area in Zone 4.

140. All three ecosystem types have been disrupted by the combined effects of mismanagement of water resources, intensification and extensification of agriculture and the extended dry period that has been experienced since 2007, with serious impacts on and threats to ecosystems. The drought resulting in the drying of water sources used by wildlife for drinking, including springs and some small water ponds, which has been sustained since then along with serious depletion of food supplies.

141. Wetland systems are vulnerable to changes in quantity and quality of their water supply, and it is expected that climate change will have a pronounced effect on wetlands through alterations in hydrological regimes with great global variability. Wetland habitat responses to climate change and the implications for restoration will be realized differently on a regional

[50] Artificial recharge is the planned, human activity of augmenting the amount of groundwater available through works designed to increase the natural replenishment or percolation of surface waters into the groundwater aquifers, resulting in a corresponding increase in the amount of groundwater available for abstraction.

[51] Contouring is the tillage practice for planting the plants aligned to terrain contours in the forest and the rangelands.

[52] Strip cropping is a band arrangement of plants that is mainly used on steep slopes.

[53]The term Neyriz Lakes and Kamjan Marshes is used by the UNEP World Conservation Monitoring Centre (WCMC) with support from IUCN and its World Commission on Protected Areas (WCPA) https://www.protectedplanet.net/neyriz-lakes-kamjan-marshes-ramsar-site-wetland-of-international-importance

and mega-watershed level, making it important to recognize that specific restoration and management plans will require examination by habitat.[54]

142. The Kamjan Marshes previously covered about 10,000 hectares of permanent and seasonal aquatic habitat. Drainage began in 1967, principally for rice cultivation. There has subsequently been some rehabilitation work done with drainage systems from surrounding arable land being conducted into the wetland. A negative consequence of this has been the transfer of agro-chemicals into the wetland environment. There are pressures and tensions in the environs of Bamou National Park, the Bakhtegan National Park and wildlife protected area, the Margoun waterfall protected area, the Tang–e-Bostanak protected area, the Basiran hunting prohibited area and KouhSiah-e-Arsanjan hunting prohibited area between surrounding farmers and DOE rangers. Drier conditions due to the impact of climate change, have also increased the risk of wildfires and also reduce water and food availability for wildlife who then encroach into settled areas.

143. This project will benefit from experiences distilled from two GEF projects implemented in Iran: Conservation of Iranian wetlands project and Conservation of Zagros mountains landscape. The common feature of the two project is the participatory platform provided for effective participation of stakeholders relating to both forest/rangeland and wetlands ecosystems. From a technical perspective the experience from the wetland project will be used for aquatic ecosystems and the Zagros project experience will be used for upper basin land, forest and rangeland ecosystems. Inputs from both are essential to a truly integrated, holistic, approach to land and water resource management throughout the basin.

144. The project will build on past efforts in the Kamjan Marshes, Bamou and Bakhtegan National Parks, Margoun waterfall and Tang-e-Bostank protected areas and both Basiran and KouhSiahArsanjan hunting prohibited area with a strong emphasis on participatory engagement between the DOE other related authorities and local communities[55]. Such approach is essential to recover and maintain ecosystems services in the basin that will enhance climate resilience not only of the communities relying on these services but to the natural environment itself. Conservation of Iranian Wetlands project (DoE/UNDP joint project) has already support development of “Bakhtegan Wwetland Basin Integrated Management Plan” of " through a prariticipatory approach in which main governmental, private sector and local community were involved. The plan has been recently approved at provincial level.

Activities under Output 3.2 include:

- The activities under this output are result of a participatory approach to develop the Bakhtegan Wetland Basin Integrated Management Plan[56] that will include:
  - Rehabilitation and monitoring activities for the Kamjan Marshes, Bamou and Bakhtegan National Parks, Margoun waterfall and Tang-e-Bostank protected areas and both Basiran and KouhSiahArsanjan hunting protected area which are linked to basin level activities and within the framework of integrated landscape management.
  - Wetlands (Kamjan, Tashk, Bakhtegan) water rights will be calculated and considered within the water allocation of the basin and at least 50 percent of it will be realized at the end of the project. This will be done by calculating, monitoring and executing national protocols and guidelines for water rights allocation. This activity is linked with outcome 1 and 4 and realization of wetlands water right will be result of decision made and implemented through governance mechanisms.
  - The warmer the climate gets, the more plant and animal species will be at risk of extinction due to habitat loss. It is important to "allow ecosystems to adapt naturally to climate change,". For moving toward ecosystem adaptation ecosystem monitoring system is established within all targeted protected areas and national parks (Kamjan Marshes, Bamou and Bakhtegan National Parks, Margoun waterfall and Tang-e-Bostank protected areas and both Basiran and KouhSiahArsanjan hunting protected area) providing information and data of the effect of drought/ climate change on key fauna and flora species which could include: annual mammal census, mid-winter bird census, spring animal breeding monitoring, wildlife disease monitoring, springs and watering place monitoring, landscape monitoring in hunting prohibited areas (depth, quality and biological parameters). The monitoring system will be established building upon on the work of the rangers working in the target areas that will gather data and biological parameters to be shared and analyzed by DoE

[54] Kevin L. Erwin Consulting Ecologist, Inc.Ft MyersUSA , “Wetlands and global climate change: the role of wetland restoration in a changing world”

[55] There was another successful experience through the Conservation of Iranian Wetlands Project involving establishment of an Ecosystem Approach for management of wetlands in Iran. It has been applied to 18 wetlands in Iran. This approach emphasizes balance between development and conservation goals by promoting wise use of natural resources and involves all stakeholders in planning and implementation processes.

[56] The Bakhteghan Integrated Management Plan has been developed with a participatory approach and will be approved through high level governance mechanisms which provide a framework for management decisions and action plans in the basin. This reflects roles and responsibilities of stakeholders at basin level aimed at finding the right balance between conservation, development and wise use of the wetland and its sustainable management.

provincial staff. Based on the main results of time series of data and information reviewed and analyzed, DoE will share messages and policy advice to related Ministries' local offices to take necessary action to address impacts of drought/climate change on protected areas.

- A participatory climate resilience action plan for the key species in target protected area will be prepared and implemented per monitoring results from the ecosystem monitoring system which will include but not be limited to the following in-situ and ex-situ conservation-activities including:1) Conservation of preys 2) Captive breeding, 3) Control of invasive species.
- Successful long-term restoration and management of wetland ecosystems will hinge on how we choose to respond to the effects of climate change. Thus, rehabilitation of selected wetland areas will be implemented with local community participation with a strong focus to engage with the most vulnerable groups: women and youth, which will include but not be limited to the following 1) Establishing and supporting mechanisms to secure flow of saved water in the basin to realize the river and wetlands ecosystem water right 2) river ecosystem renaturalization in key areas to ensure water flow to the wetland 3)restoring existing small-scale drainage/channels linked to wetlands to increase water inflow to the wetland; 4) water treatment in drainage/channels linked to wetlands to improve the quality of inlet water; 5) re- introduction or protection of endangered species to support wetland biodiversity;
- Biological stabilization of margins of the wetland area by planting of native species (that cannot be restored in the short term) to control the sand and dust storm sources;
- Conservation activities to reduce climate change impacts on selected protected areas in the Bakhtegan Basin (Bamou and Bakhtegan National Parks) will be implemented to mitigate human-wildlife conflicts, control of wildlife disease, controls of invasive species, etc.

Component 4: Institutional Capacity at the local, regional and national level is strengthened for improved governance and decision making in relation to climate risk management and effective implementation of adaptation measures

145. Iran is yet to develop an official national climate change action plan. So far the country has envisioned climate change within the broader objective of achieving sustainable development. This vision was incorporated into the 2025 Vision of Iran, the Fifth Five-Year National Development Plan, as well as in other macro policies and sectoral plans. The 2025 Vision of Iran introduces a number of key objectives in areas such as culture, politics, economy, defence, education and environment. The document notes Iran should be a developed country that ranks as number one in the region by 2025. The Sixth Five-Year National Development Plan (SYDP) covering 2016 to 2020 mandates all relevant ministries to develop and implement programmes leading to reduction of GHGs and to manage the adverse impacts of climate change over water resources, agriculture and forestry, human health, biodiversity and coastal zones. The sixth FYDP is currently under development.

146. The National Rules of Procedure for Implementation of the UNFCCC and the Kyoto Protocol were approved in 2009, and revised in 2012. These National Rules of Procedure provide a path for implementation of climate strategies and the climate action plan, which mandates all ministries and organisations to incorporate climate change considerations in drawing up their development plans. The National Climate Change Committee (NCCC) is responsible for implementation of climate strategies and action plans. It comprises the deputy ministers of the most relevant ministries, under the responsibility of the Department of Environment. The Committee is organised into sectorial working groups, as well as an inter-sector layer, which ensures that the policies and projects promote climate change adaptation and mitigation across areas, as well as across regional and provincial spheres.

147. Within the above context there is currently a fragmented approach to land and water resource planning at national level, with no explicit consideration of climate change. There is therefore a need to carry out water management from a more integrated and less segmented focus, in which all the disciplines that rely on water in one form or another meet and are represented, with climate change fully considered and accounted for. Neither water resource plans nor land use plans currently give sufficient attention to territorial needs due to the absence of specific mechanisms in the current water resource planning process. This situation directly affects the instruments for territorial planning in areas such as the Bakhtegan Basin. At the local level, within the Bakhtegan Basin, this fragmented, sectoral, approach is therefore perpetuated. This situation arises from and results in the competitive compartmentalization between management administrations for water, agriculture and the environment. The need, in a twenty first century context with climate change, is therefore to shift from the current situation of fragmentation and artificial division to one of interdependence and cooperation. This can be achieved in this project through an integrated, multi-administration, approach to land use planning and water resource management. An important mechanism for facilitating this is a basin wide council, the Bakhtegan Basin Council, which is responsible for coordinating effective planning and timely decision making across all relevant sectors.

148. The above represents a refinement of traditional 'top down' decision making structures and while an essential ingredient for more effective and timely planning and decision making the important role of households and communities cannot be ignored. For this project to truly be successful, not just within its lifetime but to be of enduring benefit for the whole of the

Bakhtegan Basin, it is essential that there is strong involvement and empowerment of local people from throughout the basin.

149. A key gap that has to be addressed to ensure that this Component delivers as effectively as possible in support of the remainder of the project, is the widespread need for education, capacity building and communications. This is required at local community level all the way through to senior decision makers at Fars Provincial Government level. This therefore forms the first Output of Component 4.

150. Adaptive management will be overseen by the Governance body of the project – Project board / Steering committee – As this committee consists of government bodies and UNDP it will ensure that adaptive management is in line with government, AF and UNDP policies and regulations. The strategy is to use the reporting milestones (PPRs, MTR, monitoring missions) to assess progress and suggest any required changes to the Project board for approval.

Component 4 consists of the following Outputs and Activities:

Output 4.1: *A comprehensive communications, education and capacity building programme on climate resilience is implemented*

151. Output 4.1 will draw directly from data and information collated under the GIS platform and disseminated through TIPS (Output 1.4) as a basis for supporting Outputs 4.2 and 4.3 and the project as a whole. The two key elements of Output 4.1 are: education and capacity building; and communications. These two elements have been brought together within this Output to form an essential part of Component 4 that are integral to all three other Components. While targeted and tailored for different audiences, the two key elements to this Output serve a common purpose of ensuring that all stakeholders throughout the basin develop a much deeper understanding of the issues and challenges they are facing and the solutions that are required and are empowered to take action. They are therefore designed to ensure that the project doesn't simply support a set of discrete activities that have a finite life and thus no enduring benefit beyond the project.

152. Education and capacity building will be targeted at participating farmers, households and communities as well as participating local government authorities. This will specifically include education and capacity building that is conducted in a fully participatory manner aimed at both understanding more clearly the problems and what is required to develop and implement solutions. The focus on the problems will be on both the underlying conditions and situation throughout the Bakhtegan Basin and the already changing climate conditions, and likely future climate change and associated climate risks and impacts. The focus on the solutions will be on developing a clear understanding of what is required to build environmental, social and economic resilience throughout the basin.

153. Documenting lessons learned and developing learning objectives and indicators will be an important part of a comprehensive communications, education and capacity building programme under output 4.1. This programme will be developed in a way that addresses the learning needs within project life cycle as well as documenting project achievements and lessons learned for further scaling up after the project has been completed.

154. Communications will involve the use of multi-media platforms, including social media, to ensure that data and information relating to the project, and results generated through the project, are communicated widely throughout the Bakhtegan Basin.

<u>Activities under Output 4.1 include:</u>

- Education and capacity building will involve development of resource materials based on information shared through TIPS (refer to Output 1.4 for details), training of facilitators, and facilitation of participatory workshops with all identified target groups and participating authorities. As the project progresses further workshops will be facilitated, together with farm and other field site visits, to share results more widely.
- Organize a series of raising awareness workshops for women farmers on sustainable agriculture, cultivation of resistant species, participatory IWM approaches, links between health, food security and water use, good practices of women's engagement in IWM;
- Communications will include the use of video to share stories within the basin and more widely, publication and dissemination of training materials, brochures and posters, sms messaging, television programmes and communication through the arts (e.g. poetry and painting).

Output 4.2: *Bakhtegan Basin Council is formed to facilitate the long-term sustainable and climate resilient management of the Bakhtegan Basin*

155. The proposed governance structure for the project and beyond is based on the existing management plan for the Bakhtegan-Tashk Lakes and Kamjan Marshes that has already been prepared by the DoE of Fars province and UNDP of Iran to combat drought. The intention to build on this existing mechanism represents a focus on ensuring participation of all relevant stakeholders to address the consequences of water and land resource mismanagement and adapt to the

unfolding negative impacts of climate change in the Bakhtegan Basin. This includes working to ensure maximum participation from local people and authorities to support a bottom up approach management mechanism.

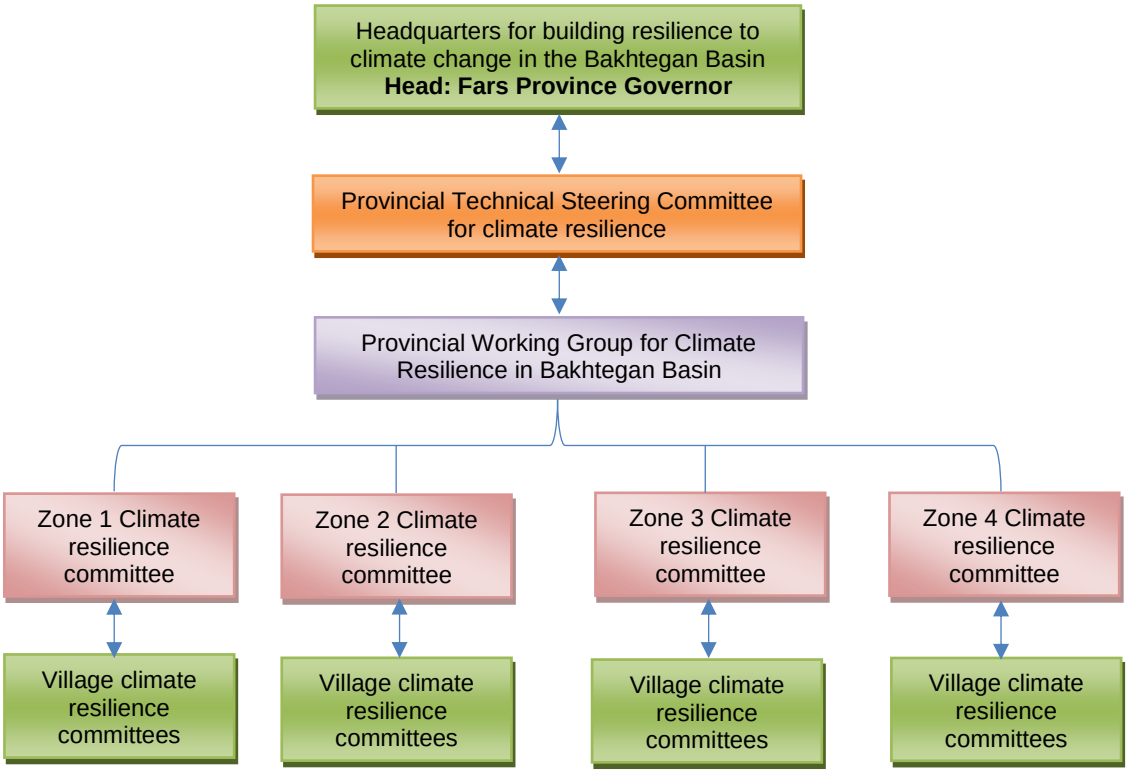


Figure 10: The proposed governance structure for the Bakhtegan Basin

156. The proposed governance structure is shown in Figure 10. At the highest level in Fars Province the Fars provincial governor, as the highest local official, will oversee the project's goal of building resilience to climate change in the Bakhtegan Basin. The Director General of the DOE in Fars Province will serve as the secretary. Head of all related provincial agencies are member of this structure align with province planning council as the highest decision taking mechanism at provincial level.Ministry of foreign affair is a member of project board and could be invited to theses meeting accordingly Under this provincial leadership there will be a working group that is headed by the Director General of the DOE from Fars province. The Provincial Working Group will be made up of county level representatives from Marvdasht, Arsanjan, Neyriz, Kherame, Estahban and Pasargad counties. From each county it will include the local governor, head of DOE, head of water and sewage system (MoE), MOJA and head of the natural resources office. Local NGOs and women's cooperatives will also be represented. Most importantly, a mechanism will be established for direct community input and engagement to ensure that decisions being made are workable and fully owned at the community level. It is noteworthy that no new management structure will be built to prevent any duplication in duties and responsibilities but existing legal mechanisms will be modified or strengthened for better climate change adaptation and embedding it within national budgeting and planning mechanism.

Activities under Output 4.2 include:

- Establishment of a Bakhtegan Basin Council under existing Fars Province structures. This activity will build on existing Fars provincial structures and also the existing management plan for the Bakhtegan Wetland that has already been defined by the DoE of Fars province and UNDP of Iran. The functions of this existing taskforce will be extended to incorporate adaptation to climate change in the Bakhtegan Basin. This will require some capacity building of provincial officials, to be undertaken through Output 4.1, to increase their awareness of climate change within the context of the current land and water crisis in the basin and what is required to build resilience, with a specific focus on the project Components, Outputs and Activities.
- Guided by recommendations from the National and Provincial Councils and responding to identified needs from local communities, the Bakhtegan Basin Council will take account of the following national, provincial and local realities:
- Commission a thorough review of existing national/province frameworks and policies relating to climate change adaptation and land and water resources planning and management. This review will focus on identifying key gaps and needs, particularly in relation to the efficiency and effectiveness of current governance mechanisms from national level all the way through to local farmers.

- Drawing on the results of the above review to establish an integrated water and land management system that incorporates considerations of climate change and natural elements of the total water cycle alongside the realities of human resource use. This will involve the use of a "national spatial strategy plan" approach based on natural water basins, which will be trialed in the Bakhtegan Basin. It will require a fully participatory approach among all stakeholders in the Bakhtegan Basin. To be effective this process must work from the ground up, as well as being informed by climate change and natural resource issues and constraints and the national policy and planning context. Outcomes from this will guide and inform the provincial environmental working group under the Environmental High Council of Iran at the highest national scale.
- Alignment with relevant national plans and policies based on the resistance economy57 and food and water security in Bakhtegan Basin within a climate change adaptation context;
- Addressing the need for people to sustain their livelihoods within the context of the land and water crisis and associated impacts of drought and climate change within the Bakhtegan Basin and in a manner that supports environmental, social and economic resilience throughout the basin;
- Addressing the necessity to protect and rehabilitate water, land and other natural resources for future generations.

B. Economic, Social and Environmental Benefit

157. The Bakhtegan Basin is one of the most drought prone agricultural areas of Iran. The worst droughts in recent decades occurred in 1999 to 2002 and then 2007. Subsequently there has been a decade of drier than average conditions. This period has been preceded by at least four decades of land and water resource mismanagement with the result that the hydrological system of the basin is collapsing. Farmers and their communities are struggling to come to terms with a situation where they are now living in what must be treated as a dryland environment which is increasingly being impacted by climate change.

158. The project has been designed to address the climate change issues that are now apparent with the intention that a pathway will be established towards resolution of the much larger underlying developmental issues. The latter includes, in particular, the drying of the Bakhtegan Wetland. It is a massive undertaking to try and restore this highly significant protected area and it is not even certain that this can be achieved given the current lack of surface and ground water recharge and the very high rates and increasing depth of ground water extraction. The project is therefore focused clearly on what can be realistically achieved within the context of the current dry land environment and with a range of communities throughout the basin, focused in particular on those who are most vulnerable.

Socioeconomic benefits

159. This project is recognised as being of national importance and it is expected that it will provide a model for other parts of Iran, building on the work of other relevant projects such as the Lake Urmia and Zagros Mountains projects. The Bakhtegan Basin, as the home of Persian Civilisation, is of high significance nationally. The symbolic and utility value of water is strongly embedded in Persian culture and therefore this project, through its location, will be of very high symbolic value to the whole of Iran. In particular it provides a unique opportunity to remind and re-educate as many Iranians as possible about the fragile nature of their environment, the impacts of climate change and the importance of using water and land resources wisely. Effective communication of the Bakhtegan Basin story, by helping foster mind-set changes throughout Iran, will therefore have widespread social and economic benefits.

160. Within the Bakhtegan Basin the current population of 854,093 people will benefit directly through increased awareness of the issues throughout the basin, the respective roles of resource mismanagement and climate change, and the solutions that are required. The results from Component 1 will be of particular importance in this regard. Output 1.1 will provide specific information on drought risk and the potential impact of climate change. This information will be applied within the context of a comprehensive review and revision of water and land use planning through Output 1.2. Additionally, local community monitoring through Output 1.3 will both enhance knowledge and awareness of participating communities and provide better community based information to enable more informed decision making. All of the data and information generated by these three outputs will be integrated and fed through an online information portal, which will provide a mechanism for its widespread dissemination and application throughout the Bakhtegan Basin.

161. The introduction of climate smart agricultural practices (Output 2.1) will be of direct benefit to 4425 farmers from 15 villages, covering 23,636 ha of land and be of indirect benefit to all 374795 rural people throughout the Bakhtegan Basin. Climate smart agriculture will be carefully targeted and tailored to address the different issues and needs that are evident

[57]The "Resistance Economy" is a concept declared originally by the Supreme Leader of Iran in his August 2012 speech to promoteeconomic self-reliance, a strategy that would defeat the US-led efforts against Iranvia economic and trade sanctions.https://en.wikipedia.org/wiki/Resistive_economy

in the four different zones of the basin. There will be a strong focus on the most vulnerable communities and households within Zones 1 and 4, which are both experiencing the worst effects of the current extended dry conditions. Zone 4 in particular is severely affected and there will be a strong focus in this zone. Some farmers are already taking action in terms of shifting to alternative crops such as safflower and expanding cultivation of others such as saffron. However, such activities are occurring in the absence of a basin wide coordinated response that is focused on added-value production systems that are more climate resilient. Output 2.1 will address this situation, firstly by supporting market research on the economic value of alternative crops and associated cropping practices. This is an essential component to the project, to ensure that there are strong economic incentives for farmers to both reduce the amount of land under cultivation and significantly reduce the amount of water that is being used. At the same time there will be a focus on developing a unique Bakhtegan Basin brand, which is targeted at discerning national and international markets for high value products that have environmental integrity. This market research will then be supported by action-focused research which specifically targets those crops and cropping systems that have genuine economic potential. Participating farmers will benefit directly from this research, with the expectation that there will be widespread adoption by other farmers once the benefits become evident.

162. The provision of support for alternative livelihood practices (Output 2.2) will directly benefit 11750 people in 10 villages, with a strong emphasis on the most vulnerable communities and households in Zones 1 and 4. Some villages and households have already been proactive in developing alternative livelihood practices and the project will focus on building on these existing initiatives. One example is mushroom growing, with the development of household level production systems. At present all of the mushrooms being produced are sold in the local market in Shiraz city and there is an informal view that there is scope for more. However, this requires proper market research to determine the real scope for expansion along with support for marketing and selling. A similar approach will be taken for all alternative livelihood options. As much as possible these options will focus not just on providing supplementary income to households, but on strong alternative incomes streams that are not highly dependent on land and water resources.

163. Environmental protection and enhancement in the Bakhtegan Basin is a huge undertaking within the context of the combined effects of the development context and climate change. This is particularly so when seeking to address the effects of drought and extended dry periods, which are both insidious and widespread. The direct social and economic benefits of all activities under Component 3 will therefore be localised to those communities that are associated with project activities, but it is expected that there will be indirect benefits to the whole Bakhtegan Basin. An important dimension to this will be the opportunity for developing success stories of environmental protection and enhancement which can be associated with the Bakhtegan Basin branding of value added agricultural products under Output 2.1.

164. Decision makers at all levels, including households and local through to national government authorities, will benefit through Component 4 from increased awareness of climate change within the context of the development situation and through strengthened governance structures for decision making. Increased awareness will be achieved through multiple approaches and platforms involving education, capacity building and communications. Increased awareness, coupled with strengthened governance structures, will ensure that timely and effective decisions are made to improve the social and economic situation in the Bakhtegan Basin.

Environmental benefits

165. The unique challenge of this project is to establish a pathway towards the aspirational goal of restoring the Bakhtegan Wetland in a manner that is achievable within the timeframe and budget of the project and sustainable beyond its lifetime. The whole project has been designed in this manner, taking account of the fact that the basin is now a dryland environment. By adopting a climate resilience emphasis within this context the intention is to shift people towards livelihood practices that are beneficial both to the environment and and their communities. This is a very complex and challenging undertaking. Fortunately there is growing awareness of the issues and challenges and a willingness to take action. However, as is often the case, the awareness and willingness to act is currently strongest with those who are the worst affected. A big part of the challenge therefore is to also engage with those who are currently less affected and less willing to take action, to foster an understanding that they are all part of the same environment and that their collective actions can either be to the detriment or benefit of all.

166. The first step towards environmental enhancement is to develop greater awareness of the environmental issues and associated effects of climate change throughout the Bakhtegan Basin. This will be achieved through the combined work generated from Components 1 and 4 of the project. Firstly, people need to recognise that there is a problem. This will be supported through the local community monitoring (Output 1.3). Secondly, they need to understand the problem. This will be supported through all education, capacity building and communication activities through Output 4.1 which is based on data and information provided through Output 1.4. Thirdly, they need to own the problem and take action. This will be supported through all activities under Components 2 and 3.

167. The direct environmental benefits of climate smart agriculture will be enhanced management of 10000 hectares of agricultural land, involving at least 30 percent reductions in water use on all participating farms and introduction of more sustainable land management practices. This will result in decreased extraction of ground water, reduced demand on surface water resources, increased soil organic matter, reduced wind erosion and increased biological diversity in agricultural systems. The successful introduction of alternative livelihoods to 570 households in 10 villages will reduce dependence on agricultural production and therefore reduce demands for both land and water resources. This is particularly important in Zones 1 and 4 where there is encroachment into rangelands and protection areas, issues with saline water intrusion into groundwater (Zone 4 in the vicinity of the Bakhtegan Wetland), and over extraction of surface water (Zone 1) and increasing depth of ground water extraction (Zone 4).

168. Component 3 is directly focused on environmental protection, enhancement and conservation in selected areas of the Bakhtegan Basin. Under Output 3.1 this will involve participatory engagement with communities aimed at identifying and implementing specific measures that are designed to enhance the environment in the vicinity of their communities. These measures will involve a range of physical options and interventions including constructing various embankment dams (small earth dams) and check dams, groundwater artificial recharge projects, re-vegetation of rangelands and forest areas, contouring and strip cropping. Output 3.2 will focus on restoration and conservation work in protected areas and National Parks, focusing in particular on the Bakhtegan Wetland.

169. A crucial element to ensure environmental benefits are fully realised through the project is the development of awareness, knowledge and ownership of both the problems and solutions. This need to happen from the community level, and at all levels of governance within the Bakhtegan Basin. All activities under Component 4 are designed to ensure that such results are realised both throughout the lifetime of the project and beyond.

170. In a general perspective the approximate 900,000 people who are living in the basin, whose daily lives are increasingly impacted by the effects of climate change and drought ,will benefit from implementation of a successful AF project in the long-term with having a better life condition through climate change adaptive governance mechanisms. In component 1 and 4the project will provide a practical platform for all decision makers to work cooperatively through a climate resilience lens and for communities to adopt new climate resilient approaches which provide both local and basin-wide benefits. This outcome will provide a shorter impact one livelihood of communities which will be targeted under decision made based on the scenario development tools. In component 2 In the short term and under output 2.1, 4425 people in vulnerable target communities will benefit from CSA project activities in pilot sites including more than 1500 female beneficiaries while under output 2.2 more than 900 women from identified target communities will be involved in sustainable alternative livelihood practices. The communities in selected catchment areas are direct beneficiaries of output 3.1 and communities in villages around the lake will benefit directly from output 3.2. these benefits are Social as they will have their opportunity to stay in their homeland as they are not loosing their livelihood while there is economic benefit for them as previous experiences show that the amount of yield will be increased in most cases and there are environmental benefit as new approaches are completely environmental friendly specially in terms of fertilizer and pest management and in a long term can effect ecosystem and lake restoration. Under outcome 3 all resident of the basin will be benefited through restored/adapted ecosystem while local community in the rangeland, forests and around the lake have a short term social benefit through hope and opportunities provided to them to stay in their home land.

Gender Equality

171. The project was developed through various consultations in the target area, where the comments, feedback and needs from women were specifically identified in the workshops and reflected in the proposed interventions. Th inclusion of output 2.2, is a clear indication of this approach as it will target and support women and women-headed households who are seeking to develop alternative livelihood practices (i.e. sewing, carpet weaving, dried fruit processing, traditional aviculture, and dairy products, etc.) with small-grants.

172. In addition, it is expected that throughout the project, women will play a vital role as part of the project management unit and as beneficiaries of the project to receive productive inputs (seeds, seedlings, etc.), to be active participants in meetings and workshop, by providing small grants to implement alternative livelihoods, and engage working in protected areas as rangers to gather biological data.

173. The project will promote the agency of women in the light that climate change impact differently men and women. For monitoring, disaggregated and measurable data related to empowerment of women has been incorporated.

174. Furthermore, when possible, measures and techniques that can have a positive impact by closing the gap of inequality between men and women will be promoted.

Environmental and Social Risk Management

175. UNDP's Social and Environmental Standards (SES) have been applied during development of the project. UNDP's SES have been reviewed by the Adaptation Fund and it was determined that the SES address the requirements of the

Adaptation Fund's Environmental and Social Policy. UNDP will not support activities that do not comply with national law and obligations under international law, whichever is the higher standard.

176. The project was screened with UNDP's Social and Environmental Screening Procedure (see Annex 8). The screening and preliminary analysis found that certain project activities could generate a number of limited adverse social and environmental impacts. The screening resulted in an overall social and environmental risk categorization of "Moderate." (e.g. Category B) overall project social and environmental risk categorization. Based on this categorization, an Environmental and Social Management Framework (ESMF) has been developed.

177. An EMSF is a management tool used to assist in minimising the impact to the environment and society; and reach a set of environmental and social objectives. The ESMF identifies relevant legislation, multi-lateral agreements, steps for screening activities, potential environmental and social impacts, recommended mitigation measures, and proposed monitoring schedules.

178. To ensure the environmental and social objectives of the projects are met, the EMSF will be used by the project implementers to structure and control the environmental management safeguards that are required to avoid or mitigate adverse effects on the environment.

179. The EMSF will be updated from time to time by the implementing Project Management Unit (PMU)/contractor in consultation with the UNDP staff and GoZ to incorporate changes in the detailed design phase of the projects.

180. The project will include a complaints and grievance redress process. The project complaints and grievance process has been designed to be problem-solving mechanism with voluntary good-faith efforts. The Grievance Redress Mechanism is not a substitute for the legal process. In addition to the project-level and national grievance redress mechanisms, complainants have the option to access UNDP's Accountability Mechanism, with both compliance and grievance functions. The Social and Environmental Compliance Unit investigates allegations that UNDP's Standards, screening procedure or other UNDP social and environmental commitments are not being implemented adequately, and that harm may result to people or the environment. The Social and Environmental Compliance Unit is housed in the Office of Audit and Investigations, and managed by a Lead Compliance Officer. A compliance review is available to any community or individual with concerns about the impacts of a UNDP programme or project.

181. Main result and activities under each component has been elaborated in below table regarding the link with CC effect and risk management

Outcome #	Main delivery/activity	Description in line with CC adaptation and Risk Management
1	•to acquire technology and a practical methodology for MoE to generate climate change scenarios nation-wide and for the Bakhtegan Basin •a climate risk-informed Water and Land Use Planning framework will be developed	• These are the tools will inform governance mechanisms to support linking CC effect to medium- and long-term decision-making processes both at national and local level and will provide an enhanced tool for further plans and programs in line with evolving risks of climate change
2	• climate smart agriculture systems will be introduced and practiced among affected local community • Introduction and support alternative livelihoods to move away from water-intensive agriculture practices	• Climate smart agriculture increase the resilience of the agricultural systems and livelihoods to climate change – in particular the rising temperatures, reduced rainfall, and droughts. • As the agriculture section is the main user of water in the basin (more than 80%) Low water efficiency (less than 30%) in the agriculture sector provides a key entry point for adaptation involving implementation of low cost techniques/technologies by a large number of farmers. • The process of introducing SA techniques to the farmers include i) Development of Participatory Action Plan engaging Farmers, Facilitators, Agriculture Researchers and, ii) Implementation of water management techniques, emphasizing on water saving at farm level iii) Implementation of soil fertility techniques, iv) emphasizing on application of biological fertilizers rather than chemical fertilizers; v) Implementation of crop protection techniques, emphasizing on application of biological pesticides rather than chemical pesticides and pollutants; vi) Supply and installation of

		monitoring equipment and measuring instruments to enhance water consumption management • Sustainable Alternative livelihood practices increase the resilience of local community for effect of CC on their livelihood through shifting to water independent livelihood. • All the above CSA and sustainable alternative livelihood practices are environmentally friendly practices in small scale which are discussed by local community and verified by related authorities (mainly DoE) to prevent any maladaptation activities. • This outcome is in line with decision made in outcome 1 and 4 to support fast track actions and ensure sustainability in the future
3	• to establish climate risk-informed Integrated Watershed Management framework • ecosystem-based adaptation through restoration of the functionality of ecosystem services	• Integrated Watershed Management will support to improve management of water at watershed scale under conditions of increasing evapotranspiration and reduced rainfall. It also helps increasing resilience of communities in the rangelands for CC affects. • Restoration of the functionality of ecosystem services is increasing resilience of both local communities around the lake and biodiversity against the affect of a drying lake.
4	• enhancing the capacities of the relevant stakeholders in improved, climate-risk informed water management and governance	• This is critical to not only sustain the investments made across the other project components but to ensure that long-term planning and governance to advance water security and agricultural resilience takes into account evolving climate risks. While the government is pursuing investments and policies to develop resources and capacities, currently the additional risks and impacts of climate change are not taken into account

C. Cost-effectiveness

182. As a predominantly arid country that is highly dependent on its agriculture the cost of drought in Iran is very high. The estimated cost of the prolonged drought from 1999-2002 was US$3.5 billion. This situation is likely to worsen rather than improve based on a number of key factors unless proactive measures are taken. These include: rapid population growth; a strong focus on agricultural production within Iran; deforestation and land degradation; over-exploitation of surface and ground water resources and climate change. The most cost-effective solution to address this situation within the context of climate change adaptation is to adopt an integrated landscape management approach which includes strong participatory engagement with affected communities. This project is therefore focused on an integrated, participatory, approach to climate change adaptation in the Bakhtegan Basin as a successful model for other regions of Iran.

183. The situation in the Bakhtegan Basin, as with other regions of Iran, involves a complex of interacting factors with climate change having an increasing influence. Historically, as a result of the agrarian reforms of 1961-1972, there was a destruction of social capital in farming communities. Subsequently there has been a strong focus on increasing agricultural production with little attention, until more recently, to the need for farmer education and the need to address the growing environmental costs. Iranian farmers on the whole have limited understanding of markets and the environment and lack the capacity to produce food in a sustainable and climate smart manner. Physical constraints to agriculture include "*water scarcity, drought, soil erosion, fertility decline, plant pests and diseases, natural disasters, variable temperatures, dispersed farm plots, unstable markets and arbitrary price policies, and lack of access to credit, innovations and inputs.*"[58] Many of these factors are increasing, with climate change exacerbating an already fragile situation. Although not quantified in the Bakhtegan Basin the combined cost of the above factors is very high. The current situation is one of positive feedback where continued environmental degradation, lowered production, reduced water availability, and high social costs are resulting in increasing pressure on the natural environment leading to further environmental degradation and increased vulnerability of households and communities.

[58]Karamidehkordi, Esmail, 2010. A Country Report: Challenges Facing Iranian Agriculture and Natural Resource Management in the Twenty-First Century. *Human Ecology, 38: 295-303*

184. While there has not been any detailed analysis of the socioeconomic consequences of drought at the household level in the Bakhtegan Basin, a recent study[59] made in Sabzevar County, Khorasan Razavi Province, in north-eastern Iran provides valuable insights. This study assessed villager responses to 29 economic variables and 28 social variables. The economic variables were grouped into seven main components covering the amount of production, quality of production, costs of natural resources (losses), production costs, costs of living, overall level of living, and investment. Similarly the social variables were grouped into seven main components covering quality of life, poverty or income, employment, psychological tensions, public safety, crime and delinquency, and social damage. Overall, the socioeconomic costs were significant and high and mirror those that have been qualitatively identified in the Bahktegan Basin for each of the four Zones.

185. Doing nothing is clearly not an option. At the same time the complexity of issues makes it clear that there are no simple solutions, with the need for *"sustainable strategies in natural resources management (NRM) and agricultural and rural development at multiple levels."*[60] This requires an approach that recognises the continued importance of agriculture to Iran, the resource constraints on agriculture, the underlying development issues, the increasing role of climate change and the importance of engaging rural people in both understanding the problems and being an integral part of the process of identifying and implementing solutions. Such an approach has been adopted through the Lake Urmia project (see Section F) and has proven to be highly successful.

186. As already explained in previous Sections and in the opening paragraph of this section the realistic and most cost-effective approach for this project is to focus on what is achievable within a climate change adaptation context. While the restoration of the Bakhtegan Wetland is an important aspirational goal, a more achievable goal is to build on existing initiatives and successes with the Bakhtegan Basin aimed at building resilience to the dryland environment that now exists.

187. At an operational level the cost-effectiveness of the project is reflected in the following ways:
- A governance body is proposed at the local level which will be supported by three government ministries (DOE, MOE and MOJA) at national and provincial level with required technical expertise;
- The project is building on past and on-going projects with proven track records, including past and existing initiatives within the Bakhtegan Basin;
- The PMU will be based on the target area which will reduce costs and increase efficiencies.

188. Additionally the generation of a comprehensive drought and climate change risk analysis, the development and implementation of targeted solutions through a participatory community planning process, and lessons learned will result in more informed public policy at both national and provincial level. This will result in more timely, integrated and effective responses to drought and climate change that also take account of the underlying development issues that are impacting strongly on local communities.

189. All elements of the project have been brought together in an integrated manner within the context that has been outlined above. Without exception every Output within the project is designed to build on existing tools, methods, mechanisms and initiatives. It is therefore strongly focused towards adding value, rather than building things from scratch. This is evident in each specific Output as follows:

Table 5: Proposed interventions and Alternative options / cost-effectiveness.

Output	Alternative	Cost – effectiveness
1.1 An integrated model for climate risk and climate change assessment supports medium and long term decision making This output entails the customization of SIMclim software to develop climate change scenarios.	Option 1: Commission climate change scenarios to national /international consultancy companies any time these are required. Option 2: Supporting Business as Usual practices in Iran which involves disparate development and application of climate change scenarios for	Output 1.1 is focused on the customisation and application of an existing, well-proven, tool for integrated analysis of the impacts of climate change in the Bakhtegan Basin. An important element of this Output is to build the capacity to readily duplicate such work throughout Iran by Government staff. Option1: The alternative option is highly reliant on an external consultant that is 1) high in costs in the long term with climate change scenarios that can be quickly outdated, and 2) not building capacity at Government staff level in Iran. Option2: There is no consistency in the scenarios used, some are out of date and in some cases, there is selective use of scenarios. Because of the disparate, and uncoordinated nature of this approach, the results

[59]Darban-e Astane, A. R., &Azimpour, Gh. (2017). Evaluation of Farmers' Resilience Against Socioeconomic Consequences of Drought: A Case Study on Sabzevar, Iran. *Journal of Sustainable Rural Development, 1*(1), 27-38.

[60]Karamidehkordi, Esmail, 2010. A Country Report: Challenges Facing Iranian Agriculture and Natural Resource Management in the Twenty-First Century. *Human Ecology, 38: 295-303*

	different parts of the country by separate consultancy firms or universities.	generated are confined to research papers and are not usually used for decision making processes.
1.2 A land and water use planning framework is developed and implemented to support decision making. The LWUP framework envisions: -Analysis of existing land-use and policies by using remote sensed data and GIS analysis -Analysis of existing water resources (surface and sub-surface).	Option 1: Commission separately all analysis as per each Ministry's mandate (MoE, MoJA, or DoE) and focus only in this specific mandate (i.e. energy, agriculture or environment) when developing policies towards water management in Fars province. Option 2: Budget for a foreign consulting company to develop a comprehensive land and water planning framework.	Output 1.2 is aimed at conducting an in-depth review and revision of water and land planning resources in the Bakhtegan Basin to develop a framework that combines the current status of water (surface, sub-surface, groundwater), current uses and extrapolating to expected climate change impacts. This will inform policy-making decisions at the provincial and district level. This will be the first attempt to have MoJA, MoE and DoE developing an integrated framework aimed at better management of water resources in Fars province in the context of drought. Option 1: One alternative option is to keep a siloed approach with each ministry moving ahead with their own mandates and agendas when in reality the current drought needs to be analyzed and addressed from diverse angles with a comprehensive framework that links the current status of water, water use and climate scenarios. Option 2: The basin could benefit from the input of a completely un-biased group of technical experts, with no affiliation to the goals of any particular ministry. However, there are two major short-comings to this approach: i) it would cost significantly more to bring in foreign expertise; ii) it would not foster the collaborative process that has already begun between the three participating government ministries and the development of in-country capacity and skills that is essential for long-term ownership of the problem and solutions.
1.3 Community engagement, empowerment and ownership in decision making is supported through local community monitoring. The project will develop a participatory monitoring system to facilitate tracking changes on agreed indicators by targeted communities and households.	Option 1: Establishment of set of indicators at relevant ministries to be monitored, reported, analyzed, disseminated and used in policy-making. Option 2: Outsource the monitoring system of set of indicators to a research institute and/or university.	Output 1.3 is focused on engaging local communities and CBOs directly in monitoring their local environment as a cost-effective means of data and information gathering as well as building local ownership and increasing awareness among communities from both the upstream and the downstream areas of the basin where the perception of water resources (and the scarcity of these) is vastly different. Option 1: This option lacks two important elements: 1) the process to raise awareness from the consumer/end-user standpoint about the real impacts of the drought in the entire basin as an interconnected system (zones in the upstream don't realize the harsh impacts on the drought, while zones downstream are suffering already the impacts of the drought), 2) the ownership of the process, as the land and water resources are the main source of livelihoods in the basin. Option 2: This alternative is unviable as Ministries will not be able to formally delegate their mandate to monitor indicators on environment, energy and agriculture to another entity.
1.4 A GIS based data and information management system and an information portal system are developed to facilitate more informed, effective and timely decision making	Option 1: To have each participating Ministry (DoE, MoE and MoJA) using different data and information systems. Option 2: Outsource the data/information management to a national company/consultancy	Output 1.4 is designed to ensure that all data and information generated through the project is readily available and accessible for timely use in education, capacity building, communications and decision making at all levels. Option 1: This option is not cost-effective as it would entail 3 different systems to capture data and information and that will only focus on information related to each Ministry's mandate (i.e. energy, agriculture or environment) prompting on-going silos in policy-making efforts. Option 2: The information to be generated and compiled during the project lifetime will be sensitive as will be used for public-policy purposes during and after the project. Based on the nature of the information, if the information management system is outsourced it will increase higher costs (during and after project closure) to maintain the system running and will

		increase the risk of limiting ownership of DoE, MoJA and DoE to use information not monitored internally.
2.1 Climate smart agriculture practices are adopted in target areas	Option 1: Move away entirely from water-intense agriculture practices in the basin. Option 2: Support a past initiative in the country involving high tech irrigation systems to reduce water consumption in the agriculture sector.	Output 2.1 is focused strongly on encouraging farmers away from agricultural production systems that have high water demands and are leading to continued degradation of both land and water resources. Based on market research it is strongly focused towards added-value and environmentally friendly production systems that are climate smart and linked to markets. Option 1: The alternative option is unviable as it will be 1) too costly – economically and socially - to move away entirely from agriculture-based livelihoods to other sectors, 2) given that rice is intrinsically related to the Iranian diet with a strong national market, and 3) that farmers have passed their knowledge on traditional rice production generation by generation and new skills would require a high investment plus social acceptance. Option2; This approach was tested and supported by the government for several years but without sufficient technical support and financial support from the government the high-tech technologies could not be implemented as a sole solution to the problem.
2.2 Alternative livelihoods are adopted by women/women's cooperatives in target villages	Option1: Promotion of alternative livelihoods through micro-credits in the basin. Option 2: Involving the private sector with large investment to introduce new job opportunities	Output 2.2 is focused on providing strong support for alternative livelihoods, with a strong focus on women and women-led households, which are aimed at reducing negative impacts on the environment and increasing household income as well as providing strong economic benefits that in the long-term will provide them will means to join the micro-credit market. Option 1: This option could potentially support beneficiaries to move away from water-intense agriculture livelihoods, however the micro-credit banks will not be able to reach the most vulnerable group: extreme poor woman, as most of them lack collaterals and creditworthiness to access any micro-credit as explained in the GAAP. Option 2: This approach was supported by the government for a while but wasn't successful for two main reasons: i) the sense of ownership was not strong among local communities, ii) addressing ecosystem vulnerability is not a priority focus for large businesses and the risk of investment was high.
3.1 A range of watershed management measures are implemented in target areas aimed at increasing resilience to drought risks	Option1: Move away from agricultural land to conservation of area / protected area status. Option 2: Supporting a dedicated engineering approach for adaptation to climate change impacts.	Output 3.1 will develop and implement an Integrated Water Management (IWM) framework along with the installation of traditional water ponds to harvest rainwater both for domestic supply and to enhance crop, livestock and other forms of agriculture. In addition, terracing practices will be promoted to prevent erosion of soils while retaining rainfall/soil moisture in agricultural landscapes. Option 1: IWM is a new approach to be replaced by older solely conservative /exploitation methodologies which were completely sectoral and did not lead to sustainable management of forests and rangelands. The new approach emphasizes the need to go beyond conservation technologies engaging with diverse stakeholders to include multiple crop-livestock interventions that support and diversify livelihood opportunities for the most vulnerable and create synergies between targeted technologies, policies and institutions to improve productivity, resource use sustainability and market access. Option 2: This was the usual practice in the past and is still supported by some relevant authorities because of fast and tangible results. However, such approaches do not consider the long term and wider impacts but rather aim to solve the immediate problem and the immediate needs of communities... In essence it has led to maladaptive outcomes.

3.2 Landscape rehabilitation to restore functionality of ecosystem services to increase climate resilience.	Option 1: Creation of more Protected Areas (PAs) in the Bakteghan Basin ensuring connectivity among PAs systems to avoid encroachment and to ensure native flora and fauna protection. Option 2: Focusing on only endangered species	Output 3.2 aims at the rehabilitation and establishment of an ecosystem monitoring system within all targeted protected areas to provide information and data of the effect of drought/ climate change on key fauna and flora species. In addition, the project will support the rehabilitation of selected wetland areas and biological stabilization of margins of the wetland area by planting of native species. Option 1: The alternative option will involve 1) more donor and/or government funding to establish and maintain the new PAs to avoid encroachment, 2) relocation of all communities living in the new established PAs, 3) development and funding of compensation mechanisms for the relocation of communities, 4) social unrest if communities are not willing to move. Option 2: This is a narrow, short-term, approach which does not protect natural ecosystems and species from the long term impacts of climate change.
4.1 A comprehensive communications, education and capacity building programme on climate resilience is implemented	Option1; Each participating Ministry develop their communication, education and capacity building programme around their mandates (i.e. energy, agriculture or environment) to reach their core audiences in the basin. Option 2; Focusing only on local community public awareness activities	Output 4.1 is aimed at ensuring everyone in the Bakhtegan Basin is informed about the issues and challenges being faced and solutions that are required and being implemented. An essential component to this Output is to build a sense of shared ownership throughout the basin. Option This option lacks the comprehensiveness of explaining and addressing the impacts of droughts from different angles and keeps promoting the work in silos for each participating Ministry. Option 2: Public awareness activities among local community are good but do not consider the ownership building that arises from capacity development and training for both local communities and government experts. Because it lacks this participatory element it ownership of issues is not developed and sustained among local communities.
4.2 A Bakhtegan Basin Council is formed under an existing platform to facilitate the long-term sustainable and climate resilient management of the Bakhtegan Basin	Option 1: To strengthen the current governance bodies around the Bakhtegan basin at the district level under the leadership of the Fars Governor to support water management-related efforts. Option 2: Create a new provincial governmental body covering the Bakthegan basin	Outputs 4.2 is designed to ensure informed, timely and effective decision making at all levels by establishing a platform under an existing governance structure to focus solely on the basin. Option 1: The Bahtegan basin overlaps with many district's political boundaries in the Fars province and currently policy making efforts (and impacts of the drought in the basin) vary depending on the district. The alternative option is still a business as usual approach where the basin is not seen as an interconnected system and policies/initiatives fall short of addressing the issue in a comprehensive manner. Option 2: This alternative could involve creating a new government body that will require pollical and financial back-up to be formally created and the process will require few years to get approval an provincial and national level.

190. The project is strongly focused on implementing cost-effective solutions that are of direct and immediate benefit with 85% percent of the budget allocated towards the implementation of actions aimed directly at improving the resilience of the natural environment and increasing the social and economic well-being of people and communities in the Bakhtegan Basin, particularly those that are most vulnerable.

D. National and Sub-National Priorities

191. Vision 2025. The 20-Year National Vision of the Islamic Republic of Iran for the dawn of the Solar Calendar Year 1404 [2025 C.E.] has been defined as the "Vision 2025 document". Its Article 43 address issues of sustainable development and the necessity of environmental protection in the development process of the country in relation to environmental and land administration.

192. Sixth Development Plan. On 19 March 2017, the "Law on the Sixth Five-Year Economic, Cultural, and Social Development Plan for 1396-1400 (2016–2021)" (the "Sixth Development Plan") was approved by the Iranian Parliament. The development plan sets out the goals and objectives to be achieved by the country over the next five years. The plan addresses relevant water and environmental issues, which were identified as specific issues of strategic importance when the plan was submitted by the government to the parliament. Articles 45 to 47 address water-related issues such as the

need for increased productivity, integrated water resources management, water needs, and determining suitable cultivation patterns to increase productivity and reduce water use. Also, Article 48 in the environmental section identifies the need for implementation of a program for the next five years aimed at protection, restoration and management of wetlands, with the participation of other executive agencies and with emphasis on wetlands that are registered under the Ramsar Convention. These above articles cover the core focus of this project, which are specifically addressed through Components 2 and 3.

193. National Strategic Plan on Climate Change. The first draft of the National Strategic Plan on Climate Change was launched in May, 2017. This plan includes strategies to both address the need to reduce greenhouse gas (GHG) emissions and to adapt to the impacts of climate change. Strategies of direct relevance to this project are summarized as follows:

- Food security and agriculture identifies the follows strategies: establish and improve climate smart agriculture to combat the negative impacts of climate change; develop plans, with climate change considerations fully integrated, for agriculture, horticulture, animal husbandry and fisheries.
- Natural resources and biodiversity strategies include: climate based regional and rural development; integrating climate change considerations into the management structure for natural resources and biodiversity; empowering financial supporting systems.
- Water resources strategies include: Strengthening the sectoral and multi-sectoral management and institutions for cooperation on water management; awareness raising related to climate change and water; sustainability of water demand and supply based within a climate change adaptation context.

194. Iran's Intended Nationally Determined Contribution (INDC).The Vulnerability and Adaptation section of Iran's INDC identifies the following key climate change vulnerabilities, which are aligned with the main issues identified in the Bakhtegan Basin:

- Reduction of the levels of agricultural production;
- Sharp drops in surface runoff and underground water storage;
- Increase of mean temperature with its consequences (heat exhaustion and spread of some diseases);
- Increased hot-spots of dust and sand storms (with high health and industrial adverse impacts);
- Extreme vulnerability of biodiversity and natural resources are some of the direct and indirect extreme impacts of climate change.

195. Iran's second National Biodiversity Strategy and Action Plan (NBSAP2, 2016-2030). The vision for Iran's second National Biodiversity Strategy and Action Plan (NBSAP2) 2016-2030 has four strategic goals, 24 national targets and 99 actions. The four strategic goals are:
Strategic Goal 1: Mainstreaming biodiversity across government and society and promoting awareness and public participation to achieve sustainable development goals;
Strategic Goal 2: Integrated biodiversity monitoring, assessment and reporting;
Strategic Goal 3: Reducing pressures on biodiversity and promoting sustainable use of natural resources;
Strategic Goal 4: Integrated conservation of biodiversity.
The proposed project is aligned with all of these. The NBSAP2 recognises that as a result of excessive unsustainable development and population growth Iran is now facing serious environmental challenges including water shortages, desertification, habitat destruction, drying of wetlands, soil erosion and pollution. It further recognises that serious threats to biodiversity are arising from the combined effects of climate change, water shortages and the continuation of droughts.

196. Long-term Development Strategies for Iran's Water Resources. The following are relevant strategies from those approved in the Cabinet Council meeting dated October 19, 2003.

- National water management must be based on supply and demand management, integrated consideration of the water cycle, principles of sustainable development and land use planning in national and joint basins, and to realize integrated water resources management, various economic, social, infrastructural and service sectors must be coordinated with the water sector.
- The utilization of Iran's water resources in each basin must be planned in such a way that the volume of the utilized underground water does not exceed the present utilized volume considering their tolerance. Therefore, structural and nonstructural actions must be taken to meet people's new demands to the extent that the utilized share of surface water resources increases from the present 46 percent to 55 percent within the coming 20 years and meets the minimum need of the natural environment.
- The water consumption pattern in Iran must be reformed in such a way that the agricultural water consumption share will be reduced from the present 92 percent to 87 percent within the coming 20 years while doubling water use efficiency of 1 kg/m^3 and allocating to more economically valuable crops. New water allocation priorities will be drinking and hygiene, industry and service, and horticulture and agriculture respectively.

197. The UN Development Assistance Framework for Iran (2017-2021). The proposed project aligns with the following Outcome areas identified in the United Nations Development Assistance Framework (UNDAF) for Iran (2017-2021): 1.1, Integrated natural resource management; 1.2 Low carbon economy and climate change; 3.1 Inclusive growth, poverty eradication and social welfare; 3.2 Food security, sustainable agriculture and improved nutrition.

198. The Country Programming Framework (CPF) 2012-2016 for Iran's Agriculture Sector. The Country Programming Framework (CPF) 2012-2016 for Iran's Agriculture Sector. Developed by the FAO, focuses on three main Strategic Priority Areas (SPAs):
    1. Pro-poor enhancement of productivity for better food security, nutrition and livelihood of vulnerable groups in rural and urban areas;
    2. Enhanced sustainable management and development of natural resources, climate change mitigation and adaptation to its impact, and disaster risk management; and
    3. Strengthened governance and enhanced knowledge management of agricultural and rural development, food security and food safety.

199. National Action Plan to Combat Desertification and Mitigate the Effects of Drought 2005. Iran as a signatory to the United Nations Convention to Combat Desertification (UNCCD) produced its National Action Plan to Combat Desertification and Mitigate the Effects of Drought in 2005. The plan identifies the need for a well-coordinated and integrated approach with a strong focus on engagement with and participation of local communities aimed at the sustainable management of Iran's natural resources. Based on this premise the plan framework consists of four pivots:
    1. Identification and control of the factors contributing to desertification;
    2. Support for the sustainable use and management of natural resources through conservation and reclamation;
    3. Promotion of sustainable livelihoods in affected areas through job creation, income generation and the improvement of socioeconomic standards;
    4. Strengthening the role of rural communities in terms of decision-making, planning, designing, implementation, monitoring and evaluation.

200. Strategic Plan of Ramsar Convention for 2016-2024. The Contracting Parties approved the Fourth Ramsar Strategic Plan for 2016-2024 at COP12. The Plan lays out a new vision under the Convention mission, four overall goals and 19 specific targets which are designed to support the efforts of Parties, partners and other stakeholders in preventing, stopping and reversing the global decline of wetlands.

Technical Viability

The project conforms with the following national laws:

201. The project is compliant with the legislation, technical/implementation system under the Technical and Implementation System Bureau[61] (TISB), and associated national standards, under the Institute of Standards & Industrial Research of Iran (ISIRI)[62], the Water Industrial Standard[63] (WIS) and will seek to strengthen these by mainstreaming climate change adaptation guidelines as per the Third National Communication of climate change and the National Climate Change Policy for Iran.

202. There are various relevant laws and regulations for protection and improvement of the environment; Land and Coastal; water fair distribution; Regulations on rivers, anchors, mussels, marshes, natural ponds and water supply networks, irrigation and drainage and the general environmental policy under the supreme leader's announcement.

203. Law of protection and improvement of the environment; One the most important existing laws is "The law of protection and improvement of the environment" which was approved in June, 18, 1974 and updated November, 19, 1992. Based on Article 16, the Iranian Department of Environment (DOE) is the main government agency responsible for environmental protection and is the legal officer (authority) to manage the country's' wetlands and their properties. The article also says, DOE does not have the right to transfer the utilization rights of wetlands to other authorities/organizations. This article also emphasizes that if the management and development of the wetlands requires the cutting the trees the Forest, Range and Watershed Management Organization (FRWMO) of Iran has to act.

204. Land and Coastal Law (Approved 20/07/1975); Under this law, lands that appear or are created as a result of lowering water level on the banks of water bodies including the sea, lakes, islands etc. are under government jurisdiction.

205. The law of water fair distribution (Approved 07/03/198); According to Article 45 of the Constitution of the Islamic Republic of Iran, the waters of the seas, natural rivers, streams, valleys and every natural water path, including surface and ground

[61] http://isiri.gov.ir/portal/home/?331765/ISIRI-Portal
[62] http://sama.mporg.ir/sites/publish/SitePages/Home.aspx
[63] http://www.waterstandard.wrm.ir/

water, floods, sewage and drainage, lakes, natural ponds, and springs are common property under the governance of the Islamic Republic. The protection, monitoring and harvesting of all above water resources are delegated to the government to ensure they are used according to the public interest. Furthermore, any water contamination is prohibited, and responsibility for preventing the pollution of water resources is delegated to the DOE.

206. Regulations on rivers, anchors, mussels, marshes, natural ponds and water supply networks, irrigation and drainage (approved on 01/11/2000): According to this regulation, the river or stream bank border is determined with the Ministry of Energy or regional water companies in each location with regard to the hydrometric data and water tail footprint of and maximum flood with a 25-year return period. The regulations consist of 15 articles.

207. General Environmental Policy, Supreme Leader's Announcement November 17, 2015,This announcement includes 15 articles that covered various issues such as requirements for integrated natural resources management and focused on issues such as environmental monitoring and protection. An important point in this notice is the attention to climate change as an emerging pillar and its emphasis on the need to manage these changes and the resulting effects. Some of the important and relevant provisions of this announcement are as follows:

- Comprehensive, coordinated and systematic management of vital resources (such as air, water, soil and biodiversity) should be arranged based on the potential and sustainability of the habitat, especially by increasing the legal and structural capacities and capabilities associated using the participatory approach;
- Establishing an integrated national environmental system;
- Correction of living conditions in order to enable the community to enjoy a healthy environment and respect for intergenerational justice and rights;
- Preventing of the spread of all types of illicit pollution and the crippling of environmental degradation and the effective and deterrent punishment of polluters and environmental degraders and their obligation to compensate for damages;
- Continuous monitoring and control air, water, soil, noise, waves and destructive rays, pollutants sources and climate change. This process requires an obligation to comply the monitoring process based on environmental standards and indicators as well as land development/ planning programs.
- Providing an ecologic atlas of the country –covering conservation, restoration, rehabilitation and development of renewable natural resources, i.e. sea, lake, river, dams reservoirs, wetland, groundwater aquifer, forest, soil, rangeland and biodiversity, especially wildlife.

208. The basic idea of establishing ISIRI emerged upon the approval of "The Law of Weights and Measures" in 1925. Following the approval of the bill to establish ISIRI in 1960, the Institute became operational within the framework of the specified functions and responsibilities and joined the International Organization for Standardization (ISO) in the same year. In 2011, ISIRI status was set under the direct supervision of the President of the Islamic Republic of Iran as it has already been under the supervision of Minister of Industry, Mines and Commerce.

209. The TISB, under the Plan and Budget Organization (PBO), is the main national body for setting the executive criteria and methodology in Iran. The assigned missions for TISB are formulation and notification of technical and regulatory criteria, including legal and contractual conditions, the principles of remuneration, the relationship between private agents, technical and general specifications, etc. The development and dissemination of technical standards in various fields of the water and electricity industry was considered in order to improve the quality of technical activities and to adapt the advanced technology. In late 1981, following the negotiations between the MOE and the Plan and Budget Organization, there was agreement to establish the water industrial standards. There are more than 300 standards, criteria, guidelines and Terms of References (ToRs) related to water resources management, Environmental Impact Assessment (EIA), watershed management activities etc.

210. The following are references, standards, ToRs and guidelines that govern the implementation of climate change adaptation measure in the Bakhtegan Basin.

References/Standards/ToRs/Guidelines	Issued by & Date	Subject
Guideline to harvest the river bed material	WIS (2011)	Water and Environmental
Guideline for Environmental Impact Assessment (EIA) on River Engineering projects	WIS (1998)	Water and Environmental
Guideline for Environmental Impact Assessment (EIA) on water and sewage projects	WIS (1999)	Water and Environmental
Guideline for studying the big dam's reservoirs	WIS (2011)	Water and Environmental
Guideline for monitoring surface water	WIS (2009)	Water and Environmental
Guideline for monitoring sub-surface water	WIS (2012)	Water and Environmental

Environmental criteria for reusing recycle and sewage water	WIS (2011)	Water and Environmental
Fundamental of environmental issues to design artificial recharge projects	WIS (2010)	Water and Environmental
Term of References for Soil and Watershed Management studies	WIS (1994 & 1996)	Water Resources Management
Term of References for Sub-surface water studies	WIS (2001)	Water Resources Management
Guideline for water sampling	WIS (1999)	Water Resources Management
Term of References for Water Artificial Recharge studies	WIS (2001)	Water Resources Management
Guideline for agricultural wells rehabilitation and restoration	WIS (2002)	Water Resources Management
Applied guideline for using GIS & RS in Hydrology studies in various Iranian water basins	WIS (2013)	Water Resources Management
Guideline to calculate Probable Maximum Flood (PMF)	WIS (2013)	Water Resources Management
A Revision on the Current Studies of EIA,SEA and the Proposed Adaptive Needs	CZM[64] (2015)	Environment Impact Assessment
The Guideline of Sustainable Agriculture	CZMP (2015)	Sustainable Agriculture
The Guideline on Sustainable Tourism	CZMP (2015)	Sustainable Tourism
The Guideline on Sustainable Use of Forests	CZMP (2015)	Sustainable Use of Forests
The Guideline on Sustainable Use of Rangelands	CZMP (2014)	Sustainable Use of Rangelands
The Guideline on Sustainable Use of Water Resources	CZMP (2014)	Sustainable Use of Water Resources
The Guideline on the Effluent Management in the Rural Areas	CZMP (2013)	Effluent Management in the Rural Areas
The Guideline on the Solid Waste Management of the Rural Area	CZMP (2013)	Solid Waste Management in the Rural Area
The Guideline on Sustainable Aquaculture	CZMP (2013)	Sustainable Aquaculture

211. An Environmental and Social Management Framework (ESMF - Annex 7) has been prepared to address potential social and environmental risks and impacts and to ensure compliance with applicable regulations and standards. The ESMF outlines procedures for screening, assessment, and development of measures to manage potential social and environmental risks and impacts during project implementation.

E. Chances of Duplication

212. The project is designed to build on and learn from existing and past activities in Iran, rather than duplicate. At present there are a number of relevant activities underway in the Bakhtegan Basin, but nothing is being done within a climate change context and current efforts mostly involve local government authorities working with communities as well as they can within their resource constraints. Relevant projects currently within Iran are briefly described below. Of most direct relevance is the project currently underway in Lake Urmia. Completed projects include the Central Zagros Mountains project which completed a number of relevant activities in the Bakhtegan Basin.

213. Conservation of Iranian Wetlands Project - Phase II (Scale-up): The second phase of the Conservation of Iranian Wetlands Project builds on the results and achievements of the initial Wetlands Project launched in 2005 and funded by the Global Environment Facility. The second phase expands the project throughout the country. The goal is to enhance the sustainability of Iran's wetland protected areas and conserve its globally-significant biodiversity. It will do so by establishing eco-system based wetland management plans and inter-sectoral coordination structures for 15 important Iranian wetlands. A grant of US$3 million has been provided by the Government of Japan to UNDP, contributing to the revival of one of these important wetlands, Urmia Lake, from its current critical situation. The project specifically addresses the restoration of the lake through modeling local community participation, promotion of sustainable agriculture and effective reduction of water consumption. The project engages with local communities and farmers using sustainable agriculture techniques. This approach is expected to contribute to an increase of inflow to the lake as well as to the protection of the biodiversity in the area.

214. Currently Integrated Management plan of LU basin developed under Conservation of Iranian Wetlands Project (CIWP). This project specifically addresses the restoration of Lake Urmia mainly through effective reduction of water/agricultural chemical input consumption at farm level by engaging local community and farmers applying sustainable agriculture

[64] These guidelines have resulted from the Central Zagros Mountain Project (CZMP)

techniques. It is expected that this approach would lead to increase of inflow to the lake as well as protect the biodiversity focusing on the island habitat of two main IUCN red list species. At the same time there would also be direct biodiversity protection by implementing a water harvesting project in one of the key wildlife island habitats.

215. The Central Zagros Mountains project: This project included a number of relevant activities in the Bakhtegan Basin, with additional activities supported by various government agencies, as follows:
    - Preparation of an integrated rangeland management plan (multipurpose) in Kor catchment management area in Sepidan County (Zagros project)
    - The implementation of a school nursery "program, 978 students and 120 teachers were covered by this program (Zagros project)
    - Implementation of ecotourism and sustainable tourism project in Mengan village (Zagros project)
    - Equipping and activating the Mountain Biodiversity resource Centre and empowering the only existing Local Association (in that region) to work in the centre (Zagros project)
    - A sustainable agriculture program was conducted in Bakan village in the years 2012-2013, and was extended to 6 villages: Sarbast, Hossein Abad, Abbas Abad, Bakyan, Chogha, Mansour Abad (50 percent reduction in water consumption, developing and increasing the mechanized rice planting in more than 70 percent of the under cultivation area, the use of biological fertilizers, etc.) Introducing the achievements of the sustainable agricultural project in other villages in the Kor and Kamfiroz districts (39 villages) as well as promoting the objectives of the plan in the form of Green Initiatives (Zagros project)
    - The creation of a research site for planting medicinal plants at 300 square meters and planting 12 species of medicinal plants (Zagros project)
    - Maintenance of 2000 oak seedlings located in the northern part of Kamfirooz Free Zone Deh Damche village in 400 hectares (Zagros project)
    - Equilibrium groundwater allocation plan (Fars regional water authority)
    - Almond and apple sapling plantation, Plantation of almond and apple trees on the contour lines instead of annual rain-fed crops such as wheat and barley on hills with 8 to 30 degree slope. (MOJA)
    - Drought-tolerant tree cultivation (MOJA)
    - Medicinal plants and by-products such as devil dung in the upstream rangelands (forests, rangeland and watershed organization)
    - 850 hectares was planted with seedlings, in Neyriz County, 100 hectares of which was planted in 2015, and 100 hectares was planted in 2014. Subsequent irrigation and protection has been undertaken
    - Improvement of the KorRiver banks by bio structure technique (5.5 km, by Zagros project and Fars regional water authority)

216. Participatory Management of Natural Resources and Sustainable Rural Development in line with Carbon Sequestration in Desertified Areas: The Carbon Sequestration Project (CSP) aims to sequester atmospheric carbon in arid and semi-arid areas of Iran and improve the socio-economic status of local communities. It uses a community-based natural resources development approach.The project has empowered local communities, generated sustainable enterprises, built local institutions, thus ensuring ownership by local communities. These communities have, in turn, assumed responsibility for the restoration, conservation and sustainable use of Iran's limited land and water resources.

217. MENARID-Institutional Strengthening and Coherence for Integrated Natural Resource Management: MENARID is a Middle East and North Africa Regional Development for Integrated Sustainable Development. MENARID provides valuable lessons and experiences for promoting Integrated Natural Resource Management (INRM) in arid, semi-arid and dry sub-humid environments. It also addresses regions suffering severe land degradation and loss of ecosystem services. The goal of the project is to promote climate-resilient integrated management of renewable natural resources, while maintaining the capacity of ecosystems to deliver the goods and services needed to support local livelihoods.

218. Study on Integrated Water Resources Management for the Sefidrud River Basin: Within the context of rising water demand for agricultural, industrial and domestic use, construction and planning of dams are proceeding without integrated water resources management planning in the Sefidrud river basin. This typifies what has happened throughout Iran, including the Bakhtegan Basin, over the last 40 years. This study was therefore started with the objectives of formulating a Master Plan for water resources management in Sefidrud river basin and to transfer technology on integrated water resources management to all stakeholders..

219. The following is a tabulated summary of relevant projects

Project Title	Main Objective	Geographic Area	Status	Adaptation Approach	Potential Synergies and Coordination Mechanisms
Conservation of Iranian Wetlands Project - Phase II (Scale-up)	Enhancement of the effectiveness and sustainability of Iran's system of wetland protected areas as a tool for conserving globally significant biodiversity	Across Iran	Ongoing	Ecosystem approach in wetlands management	Inter-sectoral coordination structures for 12 (9 new wetlands + 3 demonstration sites) important Iranian wetlands, Put in place strong wetlands ecosystem management legislative platform and inter-sectoral administrative structures at national level, supporting implementation of the "Ecosystem Approach" in important Iranian wetlands and share CIWP and other wetlands management initiatives, knowledge and lessons learnt with the neighbouring countries
Contribution to Lake Urmia Restoration via local community participation in sustainable agriculture and biodiversity conservation	Wise use of land and water Resources Including agriculture water saving, urgent biodiversity conservationand awareness rising.	Urmia	Ongoing	Climate change mitigation and adaptation, water management	Participatory decision making and planning at national, provincial and local level will enhanced bottom up and inter sectoral collaboration during the project
Participatory Management of Natural Resources and Sustainable Rural Development in line with Carbon Sequestration in Desertified Areas	Rehabilitate the desertified areas and rangelands, while also seeking capacity building for communities who will carry out the activities to achieve this rehabilitation and conservation.	North Khorasan (two sites), South Khorasan, Yazd and Golestan provinces	Closed	Climate change adaptation	Inter-sectoral coordination and cooperation mechanisms established and strengthened at the provincial and local levels to facilitate sustainable rural development
MENARID - Institutional Strengthening and Coherence for Integrated Natural Resource Management	Removal of barriers to Integrated Natural Resources Management (INRM) by developing and strengthening institutional knowledge, capacity and coordination, and by demonstrating and up-scaling successful sustainable land and water management practices	Kermanshah; Sistan and Baluchistan; Tehran; Yazd; North Khorasan; Semnan; Karoon watershed	Closed	Climate change adaptation and mitigation	Inter-sectoral coordination and cooperation mechanisms established and strengthened at the provincial and local levels to facilitate sustainable rural development

Monitoring water use efficiency in Qazvin through City Prosperity Initiative	The Greener Cities Partnership (GCP) is to develop a list of recommended indicators that shall be added to the extended City Prosperity Initiative (CPI) framework to enhance the quality and depth of monitoring in the city. The Qazvin Pilot will be the first global project on Urban Environmental Indicators Monitoring, with the aim to collect long-term data and analyse these for more sustainable policies and results.	Qazvin Province Qazvin city	Ongoing	Climate Change adaptation and SDG	The new indicators tackle the issues of water quality, water usage efficiency, more specifically reducing the use of potable water for non-drinking purposes, wastewater management, public transport and preservation of natural heritage. The data will be made available based on inter-sectoral coordination by various local and regional stakeholders e.g.,National Statistics Organization and academic institutions, as appropriate.
Study on Integrated Water Resources Management for Sefidrud River Basin (Iran and JICA)	Under the circumstances, the study was started with the objectives to formulate a Master Plan for water resources management in Sefidrud river basin and to transfer technology on the integrated water resources management to the counterpart personnel.	Sefidrud Basin, Kordestan, Zanjan and East Azerbaijan, Ardabil, Qazvin and Gilan provinces	Closed	Climate Change Adaptation and Integrated Water Resources Management	In the study, conflict management is employed to coordinate the water conflict. As a part of the management, workshops were held in 7 provinces which are Zanjan, Kordestan, East Azarbaijan, Qazvin, Ardabil, Tehran and Gilan.
Project on Establishment of Participatory Water Management System in Golestan Province (Iran & JICA)	JICA development study "the Study of Improvement of Irrigation, Drainage and Agricultural Development for Gorgan Plain, in Golestan Province. The project was aimed at capacity building of the staff in JAO of Golestan Province as well as strengthening of structure in JAO of Golestan Province for extension of the model.	Golestan Province	Closed	Climate Change Adaptation & Sustainable Agriculture	In this project, "Participatory Water Management System" was to be promoted in Tazeh Abad irrigation area, one of 40 irrigation areas in Golestan Province.

Anzali Wetland Ecological Management Project (Iran & JICA)	Environmental conditions in the Anzali Wetland have been degraded due to direct impact by development activities and indirect impact through inflow of sewerage, wastewater and solid waste, and soil inflow from the upper stream mountainous area. Government of Iran requested the Government of Japan to consider a technical co-operation for a comprehensive study to establish a plan for conservation of the Anzali Wetland.	Gilan Province	Closed	SDG and Ecological based adaptation to Climate Change	The study accomplished the following activities: 1) Development of an integrated Master Plan (M/P) for the conservation of the Anzali Wetland, 2) Implementation of pilot activities, some of the prevention measures identified in the M/P, and 3) Assistance for capacity development of the concerned organizations and their staff to build up co-ordination mechanisms for overall wetland management.

F. Learning and Knowledge Management

220. Dissemination of all relevant data, information, knowledge and lessons learned through the project is addressed explicitly in the project design. Under Component 1, relevant data and information that is generated through the project will be collated within a customised GIS platform for the Bakhtegan Basin. Project Management Unit with support from local government staff and national/local NGOSs/CBOs part of the project will gather and report delivery and impacts of investment on a quarterly basis in a pre-defined format. These data and information will then be made available through the planned information portal system (TIPS). The TIPS will be the principle mechanism by which data and information are provided as input to Component 4.

221. Component 4 is focused towards enhanced governance and decision making in relation to climate resilience in the Bakhtegan Basin. This will be supported, through Output 4.1, by a comprehensive focus on education, capacity building and communications. Data and information generated through Component 1 and made available through TIPS will provide primary input for Output 4.1. Additional knowledge and information will be integrated to address specific education, capacity building and communication needs. This will include, for example, relevant background summary information on the science of climate change, likely impacts in Iran, and implications for the Bakhtegan Basin. This will be combined with results generated from the climate change analysis under Output 1.1. Additional information of relevance to Components 2 and 3 will also be provided for use in education and capacity building activities. This will include materials relating to climate smart agriculture practices, results of market research, water resource management, alternative livelihood practices, marketing of value added products, and natural resources management.

222. Education and capacity building will be implemented with decision makers at multiple levels and will involve on-going activities for the duration of the project. This will involve dedicated sessions with local and regional government authorities and with local communities. There will be a strong emphasis on education and capacity building with local communities. This will focus on two principal dimensions. Firstly, the focus will be on building ownership of the issues and challenges that are being faced. This will involve activities both within communities in the four different Zones as well as between communities across the four Zones. The intention is to build a widespread sense of shared ownership throughout the Bakhtegan Basin. Secondly, the focus will shift to active participation in developing and implementing solutions. This will involve a strong 'learning by doing' emphasis, through both Components 2 and 3. Regular community meetings will be conducted to discuss and review lessons that are being learned, with continual feedback and refinement of approaches and methods. Furthermore this process will serve the purpose of engaging people more widely, beyond the initial target beneficiaries, in the project and its results.

223. The communications part of Output 4.1 will be focused on wide dissemination of results and lessons learned from the project. This will involve the use of multiple media platforms, including video, TV, social media and publications. The intention will be to educate and inform all people living in the Bakhtegan Basin and to also reach as many people as possible nationally.

224. The KM and media outreach strategy goals of the project are:
    - To inspire, inform and engage with local communities affected by this project;
    - To motivate other surrounding zones/district/provinces facing similar challenges by transforming this project into a role model for effective water management in the context of drought, ensuring relevant knowledge generated is easily accessible and can be replicated and scaled up;
    - To support the information and internal communication needs of all our stakeholders while promoting the government's reputation in promoting climate smart agriculture and alternative livelihoods with the communities.

225. In summary the KM and media outreach strategy will comprise of:

a) Visibility material and SOPs:

All visibility material and Standard Operation Procedure for public communications must adhere to the AF, UNDP and Gov guidelines. For that effect, specific branding guidelines and public communication focal points will be included in the communication strategy document, including examples for printed Materials (banners, billboards, etc…)

b) AF Project website:

A central management platform for sharing and disseminating the body of knowledge and lessons learned generated and build a Community of Practice that contributes to the scalability and replication across other provinces.

All communication activities undertaken should be reflected on the website.

226. Here are some of the key areas to cover:

- Education (i.e.): Why is Bakthegan basin important, historical drought, how can I help, what plants and animals live there, loss of biodiversity, training and mentoring
- Knowledge management (i.e.): Success stories, publications, photo & video database, press releases, interview with experts etc…)
- Vertical Themes (i.e.): Gender and youth, Climate Smart Agriculture, Alternative livelihoods, Endemic wildlife, Partnerships etc…
- Media: Communication/advocacy initiatives, media packs, Social media news feed, Facebook and twitter partners (@AFIran), photos and video catalogue.

c) Photovoice exercise:

This is a process by which people can identify, represent, and enhance their community through photographic means by entrusting cameras to people that act as recorders, and potential catalysts for social action and change in the riverside communities.
It can also be used for documenting positive adaptation changes along basin communities. For example, as a participatory photography stories in partnership with the schools or women's cooperatives to empower community youth groups to portrait their views and issues related to drought.

d) Reports and publications:

An integral part of the knowledge management strategy to replicate, scale and generate lessons learned.

e) Social Media

This distribution channel can be very effective to inform communities, cross link to our website and keep a log of the works to tell the project's story annually, after completion of the project and to support project evaluation.

f) Traditional Media:

Local newspapers, TV and radio broadcast, to reach the affected communities and establish media connections to receive the maximum media attention for our press releases, news stories, special events, press kit, interview with experts etc.

G. Stakeholder Consultation and Participation

227. During the project preparation consultations were conducted with stakeholders at national, provincial and local levels. The consultation process involved meetings, workshops and informal discussions with local communities. The bulk of these consultations were conducted during an 11 day mission to Iran and the Bakhtegan Basin with a team that involved an international consultant, national consultants, local consultants from Fars Province, a UNDP Bangkok technical support person, UNDP Iran and representatives from participating government ministries. Additional consultations will communities were conducted by the local consultant team.

228. At national level the emphasis was on clarifying expectations of the participating government ministries and the national technical committee (NTC) for the project, identifying needs from their perspective, reporting back to them at the conclusion of the mission and receiving their feedback. At provincial level a meeting was held with provincial government staff and representatives. The focus of this meeting was to inform them about the planned project and to receive their feedback on key issues and needs with the Bakhtegan Basin. At local level, three participatory workshops were held with local governors, local government representatives of the three principal central government ministries, NGOs and others.

229. The three participating government ministries are the Department of Environment (DOE), Ministry of Jihad Agriculture (MOJA) and Ministry of Energy (MOE). All three ministries have previously worked on separate ideas and plans for an Adaptation Fund proposal. However, they subsequently came together and agreed that a combined, cross-sectoral, approach would be much more powerful and effective. Such an approach, involving several government ministries, is a new initiative in Iran and challenges the compartmentalised and silo-based thinking that prevails. They had held their own meetings and internal discussions prior to the project planning mission focused on initial scoping for the project. During the planning mission each of these participating ministries were consulted jointly, through the NTC, and separately.

230. The silo-based approach to climate change has been addressed since the outset by establishing a National Technical Committee in Iran to guide the proposal development process. The committee is comprised of senior representatives from DoE, MoJA, MoE and MoFA, who are determined to collaboratively implement this project building on their collective expertise. They will work jointly and in close coordination, as the drought in the Bakteghan basin has multi- sectoral impacts. National representatives from these Ministries will be part of the Steering Committee/ Project Board. Most of the components will be implemented jointly (as stated in the organigram) and performance will be reported back at Project Board. As mentioned in Component 4 of the project, existing intersectoral mechanisms within the province and at district level will be used with enhanced responsibilities for the basin to practice collaboration among stakeholders. These enhanced mechanisms will have enough opportunity to practice and refine their new role during the project life cycle.

231. Following the national level consultations in Tehran the project team travelled to Shiraz, the capital of Fars Province. In Shiraz they held an initial meeting with staff from the provincial DOE and the local consultant team. A briefing on the situation in the Bakhtegan Basin was provided in this meeting, data and information needs were discussed and plans for site visits and local consultations were presented and discussed.

232. The meeting with the Fars Provincial government was chaired by the Acting Deputy of the Governor General of Fars Province. This meeting involved a briefing on the project and what was required to develop an AF proposal, presentations from provincial representatives, and identification of issues and needs from provincial government staff representing environment, water and agriculture.

233. Three local consultation workshops were held within the Bakhtegan Basin along with visits to potential project sites and villages. A report on outputs from these consultations is presented in Annex 7. These workshops were held in the towns of Kharame, Estahban (both in Zone 4) and Marvdasht (Zone 2). The latter, while located in Zone 2 included representation from the upper part of the basin (within Zone 1). In each workshop there was an introductory presentation on the project followed by an overview from the local governor, and then a facilitated process with participants to identify issues and needs.

234. The needs of women were specifically identified in the workshops. This included an extended discussion in the Estahban workshop on the Rural Women's Trust Fund, which is a mechanism for support women who are seeking to develop alternative livelihood practices. One of the main foci of this fund is gender equity, with the goal of empowering women. This discussion highlighted the fact that this fund has had successes and failures and that the project needs to learn from these lessons to ensure that it works effectively.

235. In the upper part of the basin, above Doroodzan Dam, the project team were also hosted for a day by the governor of Kamfirouz district (within Marvdasht County). Despite the relative abundance of water in this part of the basin, many households are suffering due to the poor soils and low yields. Visits to several local alternative livelihood initiatives were undertaken, including to a local women's cooperative that has been established to make jewellery for sale in Shiraz city and elsewhere.

236. Further consultations were held by the local consultants to identify locations and villages for implementing Components 2 and 3 of the project. This involved consultation with county authorities, farmers, NGOs and also drew on field experiences of the local consultants.

237. The following table summarise the stakeholders consulted and contributions they made to the project design.

Organisation consulted	Role/Responsibility	Issues addressed	Project components
National Technical Committee (NTC)	Cross-departmental committee overseeing development of the AF proposal on behalf of the Iranian Government Provided conceptual and technical guidance an input to the project development process	Identified the Bakhtegan Basin as the project location Project scope and management arrangements Feedback and comments on the project proposal	Components 1, 2, 3 and 4
Department of Environment	Responsible for natural resources management, with a particular project focus on protected wetland areas	Provided technical input into the formulation of Component 3	Components 1, 2, 3 and 4
Ministry of Energy	Responsible for water resources management	Developed a pre-proposal that guided the formulation of Component 1	Components 1, 2, 3 and 4
Ministry of Jihad Agriculture	Responsible for agriculture and food security	Provided technical input into the formulation of Component 2	Components 1, 2, 3 and 4
United Nations Development Programme	Provided technical and administrative support during the proposal preparation, organised the project development mission to Iran and the Bakhtegan Basin	Input to project formulation and design Contributions and support to the National Technical Committee Project management and institutional arrangements	Components 1, 2, 3 and 4

Fars Provincial Government	Responsible for the management of land and water resources in the Bakhtegan Basin Provided an overview of the situation in the basin Assisted in gathering requested data for the national consultants from stakeholders	Identification of issues and needs within the Bakhtegan Basin Information on existing activities and initiatives	Components 2, 3 and 4
Kharame County Government and community representatives	Responsible for local decision making in relation to land and water resources management Coordination between different County authorities and assistedwith the workshops	Provided information of the issues being experienced in Kharame County, actions that are already being taken and what additional support is required	Components 2 and 3
Estahban County Government and community representatives	Responsible for local decision making in relation to land and water resources management Coordination between different County authorities and assistedwith the workshops	Provided information of the issues being experienced in Estahban County, actions that are already being taken and what additional support is required	Components 2 and 3
Marvdasht County Government and community representatives	Responsible for local decision making in relation to land and water resources management Coordination between different County authorities and assistedwith the workshops	Provided information of the issues being experienced in Marvdasht County, actions that are already being taken and what additional support is required	Components 2 and 3
Non-Governmental Organizations	Participation in consultative workshops	Provided information of the issues being experienced, existing livelihoods and alternative ones	Components 2 and 3

H. Funding Justification

Component 1: A data and information management system for decision support and communications is developed and implemented to support development of long-term climate resilience in the Bakhtegan basin.

Baseline (without the AF investment)

238. Many Iranian institutions, including the Ministry of Energy and the Iranian Meteorological Organisation, currently have access to historical data sets for relevant climate and hydrological parameters. Similarly there is a strong capacity within Iran to undertake drought risk assessments. This is confirmed with a predominantly web based search identifying at least 20 published papers from within Iran focused on drought analyses, with and without consideration of climate change. At least two of these have included drought assessments in the Bakhtegan Basin. While a lot of relevant work has been done nationally there is a lack of consistency with modelling approaches including selection of GCM scenarios, use of outdated emissions scenarios by some and application of different drought models. Within this context there has been no systematic climate change risk assessment of each province in Iran. In summary, current analyses are fragmented, inconsistent and incomplete.

239. Iran's draft third National Communication to the UNFCCC includes a country-scale climate change analysis. This analysis uses results from 15 Global Climate Models (GCMs) in combination with emissions scenarios (referred to as the SRES scenarios) that were used the IPCC third and fourth assessment reports. These SRES scenarios have now been superseded by the Representative Concentration Pathways (RCPs) scenarios which were used in the IPCC fifth assessment report. The draft third National Communication analysis also uses the now outdated Standardised Precipitation Index (SPI) for drought analysis, which has been superseded by the Standardised Precipitation Evapotranspiration Index (SPEI). Results are presented for temperature and rainfall changes only, projected to 2030, with no in-depth analysis of drought risk nationally and provincially and how it might change with climate change. Nor is consideration given to potential impacts on available water resources.

240. A comprehensive report on land and water resources was published in 2007[65], with relevant summary material presented in Annex 1. While very valuable this information needs to be updated and revised to account for the significant changes that have occurred over the last decade. The Ministry of Energy has a current national strategic water plan which provides general guidance but no specific detail on the amount of water available for agriculture and other uses in the Bhaktegan Basin.

241. There is no coordinated community based monitoring of vulnerability and resilience. Evidence of the impacts of the 2007 drought and extended dry period since on communities and their local environments is predominantly anecdotal. For example, the information presented in Table 3 on the socioeconomic and environmental situation in the four Zones is principally based on local knowledge. Local people are aware of the situation in their locale but more widely throughout the basin there is a lack of understanding of the issues and their causes. The result of this is apportionment of blame and growing disharmony between communities in different parts of the basin.

242. Overall, the current situation is one that lacks clear and consistent application of climate change impact and vulnerability assessment methodologies at all levels, including national, provincial, county and local community. Within the Bakhtegan Basin there is a strong base of climate and hydrological data, but a lack of up to date socioeconomic and environmental data. There is also a lack of coherence in terms of the collation and dissemination of available data and information, between different government agencies and between the different levels of decision making (national to local and vice versa).

Additionality (with the AF investment)

243. Component 1 is designed to provide a coherent structure and consistent approach for assessing climate change impacts and vulnerabilities, as a basis for identifying and implementing solutions aimed at building climate resilience in the Bakhtegan Basin. This will also be of wider benefit throughout Iran. As a first step the capacity for consistent, and rapid, assessments with all currently available GCM results (from at least 40 models) and the current IPCC emissions scenarios (Representative Concentration Pathways) will be developed. This will then be implemented in association with a comprehensive updating of water and land use planning within the Bakhtegan Basin, to ensure that climate change impacts and vulnerabilities are fully integrated. Greater understanding of vulnerabilities, within and between communities and with decision makers at all levels of administration, will be facilitated through development and implementation of a structured approach to local community monitoring. Finally, platforms for collation, storage and dissemination of results will be established by building on current GIS capacity and through the development of an online information portal system. This will ensure that all stakeholders will have ready access to the same data and information, in support of the goal of more effective, efficient and timely decision making which takes full account of climate change.

Component 2: The environmental, social and economic resilience of the Bakhtegan Basin is strengthened through implementation of sustainable agro-ecological practices and alternative livelihoods.

Baseline (without the AF investment)

244. Farmers within the Bakhtegan Basin are currently facing different circumstances, as summarised in the opening paragraphs of Section A. Within this context different measures are being adopted, mostly involving autonomous adaptations. In Zone 1 there is a situation of declining rice yields on the river terraces as a result of declining surface and ground water (extraction of the latter is mostly illegal) and also due to poor soil quality. There is also on-going encroachment into rangeland and forested areas for fruit production and other activities. Some attempts are being made to grow higher value crops such as saffron and pistachio, but there is limited knowledge and experience with growing these crops. Zones 2 and 3, in particular Zone 2, encompass the principal (and historical) agricultural area of the Bakhtegan Basin. The prolonged dry period over the last decade is leading to deeper and deeper wells and also an increase in the number of illegal wells. Continuous cropping is also resulting in soil degradation and wind erosion. Some farmers are switching to less water demanding crops such as safflower. Zone 4 is the worst affected by the activities in Zones 2 and 3, with local conflicts arising relating to water. This is the traditional fig growing area of the Bakhtegan Basin but fig production has declined significantly due to the lack of rain, impacts of saline water around the margins of the lakes and as a result of wind borne salt particles. There are also villages around the lakes that have traditionally relied on water buffalo and other activities that are associated with a wetland environment. Overall, many farmers in Zone 4 in particular are suffering and most have limited capacity to explore, develop and implement alternatives.

[65]Rooyan Consulting. 2007. *Studies on Environmental Challenges on Bakhtegan Lake*", in Persian.

245. On the positive side there are some added value initiatives that provide scope for further development. In particular there is currently some organically certified production in the Bakhtegan Basin, covering dates, figs, pomegranate, saffron and medicinal herbs. However, there is a general lack of market research and basin wide coordination. Additionally it is presently not clear to what extent these added value practices fit within the criteria of what might be defined as 'climate smart'. While organic practices such as mulching, increasing agro-biodiversity, crop rotations with fallow periods, a focus on build soil biology and use of biological friendly products, are aligned with climate smart agriculture this does not mean that all organically certified farms can automatically be considered to be climate smart.

246. In Zones 1 and 4 in particular some villages, and some households in villages, are already self-organising in terms of adopting alternative livelihood practices. This includes mushroom production, dairy production, beekeeping, food processing (tomato paste and pomegranate sauce), tailoring and embroidery, carpet weaving, processing and packaging of produce. Data are available on the number of households currently engaged in different alternative livelihood activities and have been provided for the villages identified for inclusion in this project (Annex 4). The extension of these practices to other households and villages is limited by a number of factors including: access to appropriate knowledge and skills; access to finance; and relevant market information and marketing expertise and capacity.

247. The Rural Women's Trust Fund provides an existing mechanism for women to access financial support to initiate alternative livelihood activities. This fund is currently more active in some counties and villages than others. There are also anecdotal reports of both success and failures with the fund.

248. In summary, the current situation involves differing impacts on communities in the different Zones in the basin. Some farmers and households are already adapting autonomously to the changed conditions. However, there is no clear emphasis on the development and implementation of climate smart agriculture practices and there is no overall coordination of efforts to introduce alternative livelihood practices, in particular to the most vulnerable.

Additionality (with the AF investment)

249. Component 2 is focused firstly on establishing a clear climate change context for the introduction and implementation of relevant adaptation measures aimed at strengthening the resilience of livelihood practices in the Bakhtegan Basin. This context will be provided through Component 1 and further supported through Component 4. Within this context a systematic approach will be adopted, which is aimed at building on and adding value to existing initiatives. The primary focus of Output 2.1 will be the introduction of economically viable climate smart agricultural practices which are aimed at reducing demand for water and also the amount of land that is under cultivation. Essentially its core focus will be on behaviour change, to be fostered through a strongly participatory process that is focused on building ownership and learning by doing. While farmers and their current agriculture practices have rightly been identified as part of the problem it is also essential to recognise that they need to be an integral part of the solution. The primary focus of Output 2.2 will be on extending and adding value to existing alternative livelihood initiatives and practices by the provision of small-grants with a target on women entrepreneurs and women-headed households. This will include a strong emphasis on supporting those in the most vulnerable communities, particularly in Zones 1 and 4.

250. Lessons learned from the Rural Women's Trust Fund will inform the provision of small-grants to women to implement alternative livelihoods, that otherwise won't be able to be implemented and will not be able to promote off-farm livelihoods maintaining the dependence on water-intense agriculture practices.

Component 3: The resilience of the natural environment of the Bakhtegan Basin is strengthened.

Baseline (without the AF investment)

251. The situation with the natural environment in the Bakhtegan Basin is highly complex with no simple solutions. There are multiple issues arising from the decline in surface and water resources, particularly in the lower parts of the basin, and the increasing encroachment of people into national parks, protected areas, forests and rangelands. This situation has arisen as the results of decades of mismanagement following, firstly, the land reforms that were implemented in Iran in the 1960s and subsequently with further development decisions. This situation has been exacerbated by a prolonged drier than average period since the last serious drought in 2007.

252. The above situation, including the restoration of the Bakhtegan Wetland in alignment with the national priority focus on wetland restoration, cannot be easily resolved. Government agencies and communities are focused instead on what is achievable within their human and financial resource capabilities. Soil and water conservation work undertaken in the Bakhtegan Basin during the last 18 years has included revegetation of 106,700 hectares of land, exclusion of livestock from 65,000 hectares, construction of 22 embankments and 1712 masonry check dams and 61 groundwater artificial recharge projects. Work in protected areas and national parks has involved a combination of efforts from local communities

and DoE. Restoration work in the Kamjan Marshes was initiated by the local community and has subsequently been supported by the DOE. Runoff was flowing in drains which were constructed 35 years ago to drain Kamjan for agricultural purposes. Local people blocked these drains to conduct water to the Kamjan Marsh. These drainage systems also reached to Tashk Lake. One on-going issue in this area is the nutrient and agro-chemical loading of the runoff. Other important work includes that undertaken through the Central Zagros Mountains (CZM) project. In the Bakhtegan Basin this involved a number of activities which are summarised in Section F.

253. One of the biggest issues for communities to come to terms with in the Bakhtegan Basin is that what was previously a moist, humid environment is increasingly becoming an arid, dryland environment. The focus on the natural environment therefore needs to be on the design and implementation of measures that enhances resilience of the rangelands, forests, wetlands, protected areas and national parks within the context of these changed conditions. As much as possible this needs to include restoration and protection of wetland habitats in local areas to support migratory birds and other wildlife.

Additionality (with the AF investment)

254. Component 3 is focused on implementing realistic and achievable measures to protect, enhance, and build the resilience of the natural environment within the context of the prevailing dryland environment. AF resources will be used construct small-scale works such as check-dams, contouring, strip-cropping that are intended to achieving significant reductions in soil erosion, drought control in rangelands and forest areas and combating desertification. In addition, rehabilitation and monitoring of forest rangelands, protected areas, national parks and wetlands will strengthen the necessary conditions to support conservation of the soil and water resources in the Bakhtegan Basin. Rehabilitation activities will be implemented with local community participation. On the same regard, AF resources will be used to develop and implemented a climate resilience action plan for the key species in target protected areas to monitoring results and conserve biodiversity in the context of severe drought.

255. Importantly, it is recognised that such work needs to involve active engagement with and participation of local communities. As much as possible this work will be aligned with communities who are also engaged with through Component 2 of the project, to ensure a fully integrated approach to resilience building which addresses environmental, social and economic issues.

Component 4: Institutional Capacity at the local, regional and national level is strengthened for improved governance and decision making in relation to climate risk management and effective implementation of adaptation measures.

Baseline (without the AF investment)

256. There is a current lack of clear understanding and integration of climate change considerations to guide decision making at all levels in the Bakhtegan Basin. Additionally the current situation involves a combination of government agencies operating in their individual silos and, in general, a top down approach to decision making. The latter is not exclusively the situation. For example in Arsanjan County (Zone 4) the local government authority has worked in a participatory manner with communities to stop rice cultivation and bring an end to the burning of stubble. Those local authorities who are working more proactively with their communities tend to be those are in more of a crisis situation. There is also an atmosphere of blame, increasing mistrust, and also people wanting to retain what they believe is their unrestrained right to have access to water. In the words of the Arsanjan Deputy of Local Government, *"you can't stop people, you can only advise them".* There is no existing governance structure specifically for the Bakhtegan Basin.

Additionality (with the AF investment)

257. Component 4 will provide, firstly and very importantly, a comprehensive and inclusive approach to education and informing as many people as possible in the Bakhtegan Basin about the current situation, its causes, and the increasing role of climate change. The latter will involve the provision of a clear, but concise, understanding of the science of climate change, what is already happening as a consequence, what it means for the basin in the future, and what can and needs to be done to build resilience. This will occur through multiple approaches and platforms, and will include education and capacity building of local communities, local authorities and provincial government. This improved knowledge and understanding of issues, challenges and solutions will be supported by strengthened governance structures and mechanisms, which build on existing governance structures. This strengthening of governance will have a very strong focus on inter-agency cooperation and strong engagement with and participation of local communities.

I. Sustainability of the project/programme outcomes

Institutional sustainability

258. The proposed project is the first attempt by DoE, MoJA and MoE to address the drought crisis in the Bakteghan basin. The approach sough after is to have national, provincial and local government staff working with communities in target areas

(Zone 1, 2, 3 and 4) in the basin. The foundation for the project's institutional sustainability is the community-institutional partnerships that will be built to promote the exchange of knowledge, experiences, and dialogue among the local communities, project staff, and local, provincial and national authorities about climate change adaptation and vulnerability.

259. Institutional sustainability is also associated with the capacity of local communities and of local and regional authorities to influence collective decisions regarding the implementation of climate change adaptation measures in the target area. In this regard, the project will provide spaces for government and communities to jointly incorporate climate change impacts into a Water and Land Use Planning framework to guide land use decisions to protect and enhance natural resources and biodiversity in the context of drought and socio-economic stresses, which will guarantee the institutional support of project actions and results after the project is completed.

260. The project will provide training in different topics related to climate change and adaptation to target communities, local, provincial, and national-level institutions directly involved in managing drought-related vulnerability of local communities and ecosystems. Improved institutional knowledge and skills will be instrumental in the development and implementation of adaptation measures during the life of the project and in the future, as well as for the replication of successful activities in other areas of Fars Province and in Iran.

261. Specific measures that have been incorporated in the project design to ensure institutional sustainability of project outcomes are: the generation of relevant data and information from Component 1, incorporating climate change analyses, water and land using planning and community based monitoring, which are all designed to ensure more informed, timely and effective decision making at all levels; through Output 4.2, a thorough review of relevant national plans and strategies leading to a comprehensive plan for management of land and water resources in the Bakhtegan Basin; establishment of the Bakhtegan Basin Council under Output 4.2, with clear mechanisms for strong community participation in decision making.

Technical sustainability

262. The key to ensuring technical sustainability of project outcomes is effective education and capacity building, and on-going positive relationships between technical staff from government agencies and local communities. This has been taken into account for all technical aspects of the project design. Under Component 1 a fundamental technical dimension to the project is the development and implementation of a capacity for consistent and up to date climate change and climate risk assessments. This work will build on the strong existing technical capacity that already exists within Iran for conducting such assessments. It will be achieved through customization of a widely used climate change scenario generator and risk assessment tool for Iran as a whole and specifically for the Bakhtegan Basin. Customization of this software tool will be accompanied by capacity building in relation to its application at national and provincial level. On-going applications will be supported and enhanced through the joining of an international community of scientists and technical staff who are engaged in applications of the same software. Other technical aspects of Component 1, in particular the development of a decision support system, will build on existing capacity and expertise with GIS as well as drawing on existing capabilities for the development of the information portal system (TIPS).

263. Components 2 and 3 will also require strong technical support and input. Engagement with, and increased ownership of, communities will be fundamental to ensuring that these efforts are sustained beyond the project. Of particular importance under Output 2.1 will be the research programme to be developed and implemented at the Marvdasht research station. To ensure its on-going success this work is focused on building on existing capacity within the research station. Importantly, the emphasis in the project design has been on an action research approach which is aimed at building ownership with farmers and rapid dissemination of results as widely as possible. With such an approach the technical capacity for new innovations is not simply held by scientific experts, but is held, owned and shared by a community of farmers with on-going feedback to scientists. Under Output 2.2 the technical dimensions of alternative livelihoods will be supported and sustained by local community experts, with additional input through specific education and training activities. Some villages already have strong technical capacity in certain areas, such as weaving for example, with sharing of technical skills through inter-generational learning and existing community structures. The project will build on these existing capacities as much as possible. Under Component 3 there is strong existing technical capacity amongst MOE, DOE and MOJA staff within the province and locally. As with Component 2, the key to long-term sustainability is the building of ownership, which requires firstly the development of strong working relationships between technical staff and local community members.

Environmental sustainability

264. The current crisis in the Bakhtegan Basin is first and foremost an environmental crisis. This situation has been clearly presented in this proposal and is the main underlying driver for the whole project design. The environmental issues in the

basin are large, widespread and complex. This project cannot address them all and it cannot undo the progressive, and rapid, changes that have arisen since the 1960s that have resulted in the drying of the Bakhtegan Wetland and is now threatening the whole hydrological system of the basin.

265. The project has therefore been carefully designed to encompass what can be realistically achieved and sustained within a climate change adaptation context. Specifically, it is deliberately focused on the current dryland environment that is now prevailing. The rationale for this approach is that even if there is a climate shift in coming years towards wetter than average conditions which ease the situation, there will have been a significant raising of awareness and implementation of actions that are designed to conserve water and protect and enhance the environment. These actions will be supported by the strengthened institutional and technical capabilities which have been summarised above.

Social sustainability

266. Communities within the Bakhtegan Basin, particularly in the rural areas, have strong social networks and support systems. However, the unfolding land and water crisis has had serious social impacts which have been summarized in Table 3. The loss of rural livelihoods, in particular through lack of water, environmental degradation and declining production, has directly resulted in migration to urban areas, loss of self-esteem, increased divorce rates, increased drug use and addition and increased crime. These, and other issues, are not unique to the Bakhtegan Basin and have been documented and studied in more depth elsewhere in Iran. Drought is a particularly insidious phenomenon that can have long-lasting impacts on individuals and communities.

267. Despite these challenges there is evidence of the strong social networks and support systems at work in the basin to address the crisis situation. This is apparent through the concerns and proactive work already being undertaken by a number of county governors and their administrations which were shared during project design consultations. It is evident in local examples of communities and individuals who are already adapting autonomously to the changed conditions. It is also evident in the increasing focus of government agency staff at provincial and local level on working together with communities to develop and implement solutions.

268. The project is designed to build on and enhance these existing social structures and initiatives and therefore has a strong foundation to work from to ensure the social sustainability of project outcomes. This will be achieved in two key ways. Firstly, the strong focus on education and capacity building in a participatory manner which builds long-term ownership will directly strengthen the social sustainability of participating individuals and communities. Secondly, the communication of project results widely to all people throughout the Bakhtegan Basin combined with an emphasis on sharing stories and fostering constructive dialogue between communities in different parts of the basin will provide enduring social benefits to the whole population.

Financial sustainability

269. Many of the environmental and social issues within the Bakhtegan Basin have arisen from the basic need of people to make a living from the land. With the removal of traditional land management systems and practices in the 1960s, accompanied by the absence of any education of farmers, a situation of unrestrained development has occurred. This has been exacerbated by subsequent government policies that have been narrowly focused on production with no consideration of the environmental and social costs. This is exemplified by the strong emphasis on rice production, which has been supported by high economic returns to farmers. The consequences of this narrow focus on production at all costs are now evident. An important part of the challenge now is to identify new initiatives that are environmentally and socially beneficial and provide strong economic incentives to change.

270. It is a reality that people are much less likely to sustain initiatives and activities when they experience direct economic benefits. Component 2, therefore, is strongly focused on improving the economic well-being of project beneficiaries, while at the same time enhancing and protecting the environment and improving social well-being. This forms one of the two key pillars of the project and is of fundamental importance to its enduring success. For the implementation of the Climate Smart Agriculture Systems, which are designed to reduce demands of land and water and at the same time increase farmer incomes, will be linked to the market research to identify potential national/international markets that will provide clear economic benefits to farmers after project closure. These activities will be guided and supported by MoJA's extension services.

271. In regards of the alternative livelihoods activities, based on results from the GAAP, the project will support the most vulnerable women and women's cooperatives with small-grants and skills training on the pre-selected alternative livelihoods identified to implement livelihoods to move away from water-intense agriculture. The financial sustainability strategy considered for this output is for these women and women's cooperatives to increase their collateral and creditworthiness, so

they can access the micro-credit market, hence the interest to have the Rural Women Trust Fund and other women-oriented business initiatives being part of the project.

272. In addition, for the implementation of alternative livelihoods for women/women's cooperatives, DoE will seek to formalize support with diverse organizations during the 3rd year of implementation (through a LoA/ MoU) to keep links the AF-supported cooperatives with women-oriented organizations and financial institutions to maintain and expand their livelihoods. Among the institutions that DoE will reach to, it's expected to discuss formalization of support from Employment Department of Ministry of Cooperatives, Labor, and Social Welfare (MOCLSW), Center for Women Entrepreneurs and Traders of Fars Province, Professional Association Iranian of Women Entrepreneurs (AIWE), Dastadast Social Enterprise, among others. In addition, DoE will have special decision with Agriculture Bank of Iran and other micro-lending institutions working in Fars Province to discuss special borrowing services and credit lines for catered for these cooperatives (preferred borrowing services/incentives to differed payment timeframes, etc.)

273. For activities under component 3 that are targeted at achieving significant reductions in soil erosion, drought control in forest, rangelands, protected areas, national parks and wetlands, sustainability is associated with the capacity of local communities and of local and regional authorities to influence collective decisions regarding the implementation of policies and activities to address climate change impacts which are embedded in the project's approach.

274. The construction of water ponds to harvest rainwater both for domestic supply and to enhance crop, livestock and other forms of agriculture and terracing (Out 3.1) will be fully financed by the project with paid labour from beneficiaries. The Forest, Rangeland and Watershed Organization (FRWO) will guide and support this output and it's expected for FRWO to provide O&M expenses of the ponds and terracing jointly with beneficiaries' support.

275. Regarding the financial sustainability strategy for the rehabilitation, conservation and monitoring of these sites, the DoE will incorporate in its general operation budget all associated costs related to the involvement managing, rehabilitating, and monitoring strengthened forest, rangelands, protected areas, national parks and wetlands.

276. As already discussed with the government partner of the project the new approaches and activities will be supported through national financial schemes under the national/provincial development programme of each responsible organization. Some of these national/provincial programmes already exist but need modification. In other cases, new programmes will be proposed to the Planning and Budgeting organization based on project best practices and lessons learned which will ensure both financial and technical support of project achievements in later stages

J. Overview of the environmental and social impacts and risks identified and relevant to the project / programme.

277. Following the UNDP Social and Environmental Screening Procedure, the project was assessed as Category B (Moderate), based on the aspects identified in the last column of the Checklist Table below. An Environment and Social Management Framework - ESMF (Annex 9) has been prepared to ensure that risks on the project and the above risks in particular, are managed appropriately and therefore mitigated. A summary of the risks and the potential impacts for each item in the Checklist Table is given below.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks –further assessment and management required for compliance
Compliance with the Law		X
Access and Equity		X
Marginalized and Vulnerable Groups		X
Human Rights	X	
Women's Empowerment		X
Core Labour Rights	X	
Indigenous Peoples	X	
Involuntary Resettlement	X	
Protection of Natural Habitats	X	
Conservation of Biological Diversity	X	

Climate Change	X	
Pollution Prevention and Resource Efficiency		X
Public Health	X	
Physical and Cultural Heritage	X	
Lands and Soil Conservation		X

Compliance with the Law

278. The following legislation will be considered during the implementation of the project:

National Legislation	**Objective/Relevance**
Constitution	"After the Islamic Revolution, the government enshrined environmental protection in the Constitution. "In the Islamic Republic of Iran protection of the environment, in which present and future generations should enjoy a transcendent social life, is regarded as a public duty," reads **Article 50**. "Therefore, economic and any other activity, which results in pollution or irremediable destruction of the environment is prohibited."
Environmental Protection Law 1974	The Environmental Protection Law specifies rules and measures for the protection and management of the environment. The objectives of this Law, consisting of 21 articles, are the protection and improvement of the environment. Appropriate measures must be taken by the department of Environment (DOE) and the High Council for Environmental Protection in order to: (a) Preserve the ecological balance; (b) Prevent and control waste and noise pollution considered harmful to the environment; (c) Establish a system of supervision and monitoring for wildlife and marine resources; (d) Conduct environmental scientific research aimed at protecting and improving the environment; (e) Adopt effective measures against polluting units in order to prevent air, water, and soil pollution; (f) Arrange public training courses in order to raise awareness about environmental protection and improvement; and (g) Establish limitations for hunting and shooting in some protected areas.
Regulations on Environmental Protection Law 1975.	These Regulations were adopted in accordance with article 21 of the Environmental protection Law. The text is divided into 9 Chapters. "National parks", "Natural resources", "Wildlife shelters", "Important protected areas" have been defined in Chapter I. Basic principles and rules, which govern these areas and their limitations, have been defined in Chapter II. Remaining chapters spell out provisions for strengthening the prevention, control on hunting, shooting, and grazing in these designated areas. Sections on regulations concerning inspection of polluting units, emphasis on promotion of environmental education and formulation of standards for improving environmental quality with cooperation of relevant organization are also included in this text.
Environmental Protection and Enhancement Act (1974):.	Identifies four categories of protected natural areas: national parks, wildlife refuges, protected areas, and national nature monument
National Law of Conversation, Restoration and Management of Wetlands. 2017	Any development activities that will cause pollution and destruction its non-compensable, completely prohibited and the reference organization to distinguish the destruction and pollution is DoE. DoE should determine the water needs of wetlands and ministry of energy is obligated to supply the water need based on an approved plan.
National Regulation for Conservation, Restoration and Management of Wetlands 2015	Provides a definition of wetlands, water rights definition and supply, and preparation of integration of management plans for wetlands, and considering the plans within ministerial action plans.
Act on plant varieties registration, control and certification of seedlings 2003	The Act sets up the Seed and Seedling Registration and Certification Research Institute, which supervises and regulates the identification of both new plant varieties and breeders' rights, as well as issue a patent for the newly certified registered seed and seedling varieties. Article 3 refers to non improved and wild plant genetic resources, whose patenting procedures shall be restricted to the State. Further the Act establishes that varieties prevalent in the country shall be given priority in the registration process.

Comprehensive Program of Public Education on Environment 2009	The Act aims to reduce environmental degradation and increase the sustainable use of natural resources through training of various groups of population.
Executive By-Law on improved utilization of water in agriculture 1996	This By-Law consists of 4 Chapters and 3 Annexes making provisions for the improved utilization of water in agriculture by presenting some methods on behalf of the Ministries of Agriculture (MOA) and Energy (MOE).Chapter 1, general description and issues: (a) Supplying a method for improvement in utilization according with Annex 3; (b) Establishment of expert committee with representatives from MOA and MOE; (c) Supplying a comprehensive agricultural and watershed management plan in each region after 3 months of approving this By-Law; (d) MOA will prepare a cultivation plan for each region taking into consideration national and regional policies; and (e) MOA commits to establish legal bodies for the land that is under the coverage of water delivery system. Chapter 2, delivery volumes in irrigation networks. The Regional Water Organization will deliver required water to consumers according to the new methods of consumption which can reduce water usage or limit delivery particularly during incidences of drought. Chapter 3, controlling water volume in deep and semi-deep wells. The Regional Water Organization is required to determine the exact water needs for agricultural land using deep and semi-deep wells 3 months following approval of this By-Law.
Instruction of Assignment of National and Public Resources for Agricultural and Non-agricultural Purpose 2008	The Instructions lay down provisions on assignment of national and public resources for agricultural and non-agricultural purposes.
Iran Water Law and Methods of Nationalization of Water 1968	The purpose of the Law is to nationalize all internal waters and recognize the Ministry of the Energy as a responsible authority for maintaining and exploiting of water resources. The Ministry is responsible to determine the permitted water consumption for domestic, agriculture and industry sectors, as well as to establish the official tariff for each. For any use of public water, as well as groundwater resources, a special authorization is required from the Ministry.
Iran Water Law and the manner of water nationalization 1968	The Law provides for the nationalization of river basins and of other water resources, the public use of water resources, the concession of permits consenting use of aforesaid resources and the relative prescriptions. It also defines and set the charges due for water utilisation, the conditions involved in using water resources and for their protection from polluting and wasting.
Law on Agricultural Labour 1974	The purpose of this Act, which consists of 40 articles, is to regulate obligations governing employment conditions in agricultural jobs. Thus, it provides comprehensive definitions for a number of basic relevant concepts, such as agricultural worker, agricultural job, agricultural employer, agricultural labour contract and wage. According to this Act, agricultural jobs include all jobs related to farming, gardening, animal husbandry, fishery, forestry and any related technical jobs.
Law on Biosecurity 2009	The Law, which consists of 11 articles, aims to regulate provisions on production, domestic or cross-border trans-shipment, importation, exportation, trade, supply and consumption of genetically modified organisms.
Law on Conservation and Protection of Natural Resources and Forest Reserves of the Country 1992	The Act aims to protect and rehabilitate the natural forests and resources. The Acts considers particular species of trees and plants as national forest reserves and prohibits their cutting. In case of necessity, these species may only be cut with permission obtained by the Ministry of Agriculture. Any violation of this Act shall be punished by imprisonment and fine.

Access and Equity

279. A potential negative impact has been identified in the access and equity for beneficiaries to adaptation measures and technologies proposed by the project. To mitigate this impact, the project will establish and implement transparent and clear criteria, which will be socialized into the coordination mechanism of local and community organizations, as well in the

Bakhtegan Basin Council and partner institutions, on how the selection of interventions sites and direct beneficiaries will be done, and who and how they will have access to on-ground measures, and related capacity building support and information services to be provided by the project.

280. Transparent and clear criteria will be applied along the following principles:

- Open to all persons in project areas on non-discriminatory basis;
- Benefits to be provided on basis of fair treatment of all eligible beneficiaries;
- Targeted outreach to marginalized, vulnerable groups and individuals;
- Clear, accessible, culturally appropriate communications that inform potential beneficiaries of available services, entitlements and how to obtain them;
- Sensitive to diverse cultural and socio-economic backgrounds of potential beneficiaries and be responsive as far as practical to individual circumstances;
- Clear beneficiary feedback and complaint processes will be outlined.

Marginalized and Vulnerable Groups

281. A risk has been identified considering that affected stakeholders, in particular marginalized groups, could potentially be excluded from fully participating in decisions that may affect them. This is due to limitations that may exist in the capacities of local stakeholders, in particular poor and vulnerable groups, to participate effectively in decision making that can affect them. Marginalized groups in the project area of Bakhtegan Basin can be considered poor and vulnerable population, land and water resource issues.

282. Mitigation measures to this risk will be as follows:

- Analysis of groups in the project inception phase and prioritized for adaptation interventions.
- Stakeholder engagement process will be fully participatory, assuring broad representation of existing relevant community-based organizations/groups. These include community development associations that are represented in villages and sub-basins, women's committees, water associations, community producer associations, forestry cooperatives, communal health promoters.

221. Overall, the Project is expected to have a positive impact on vulnerable and marginalized groups that can be considered as poor and vulnerable populations living in the Bakhtegan Basin. The Project is expected to benefit these communities and groups by implementing measures that are proposed to build resilience and support their livelihoods. Therefore, the project will support improving the availability, accessibility and quality of information and services (e.g. technology, finance) for individuals and potentially marginalized groups, and increasing their inclusion on decision making processes that may affect them (in accordance with the principle of human rights and non-discrimination and equality).

Human Rights

283. Project preparation and planned implementation process follows a human-rights based approach. In the face of climate change impacts and unsustainable land and water management and agricultural practices, the project supports the Iranian government's efforts to ensure access to sustainable livelihoods, water and productive land through integrated land and water resources management and restoration and conservation of critical ecosystems.

284. The project will directly benefit an estimated 766 households, 900 women and 5575 farmers who are especially vulnerable to the impacts of climate change, through the design and implementation of concrete adaptation measures for more efficient agricultural practices and use of water resources, along with diversification of livelihoods. Providing families with alternatives and improving community economic bases will also help reduce the migration of rural communities to urban fringe and the associated increase in crime, divorce, violence and drug use.

285. Potential project-related concerns and/or grievances of local communities will be addressed through a complaint's register along with a Grievance Redress Mechanism consistent with the UNDP's Stakeholder Response Mechanism: Overview and Guidance (2014). The Grievance Redress Mechanism will be designed in consideration of the specific local context and draws on existing processes and procedures for the resolution of complaints and grievances.

Women's Empowerment

286. There is a risk of potentially reproducing discrimination against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits as women may be excluded from decision-making or not adequately participate in the design/implementation of the Project. As a result, they might have unequal access to resources and/ or access to opportunities and benefits.

287. Female representation in project decision-making bodies will be ensured. Participatory processes will include specially designed methodologies that enhance the participation of women and therefore enhance the inclusion of their views into the activities of the project, using existing mechanisms for representing women's views, such as the Rural Women's Trust Fund and other women's associations.

288. For monitoring, disaggregated and measurable data related to empowerment of women will be incorporated. Furthermore, when possible, measures and techniques that can have a positive impact by closing the gap of inequality between men and women will be promoted.

Core Labour Rights

289. The project will promote employment through the support of micro-enterprises and promotion of alternate livelihoods. Improved agricultural practices should enable farmers to dedicate more time to productive farming.

290. Relevant labour laws will apply to the project. The Project will also monitor carefully and enforce necessary measures so that there is no child labor involved in its activities.

Indigenous Peoples

291. No indigenous people have been identified in the project area, thus the Project does not foresee any change or negative impact on the current livelihood of indigenous peoples. In fact the Project will promote the use of traditional knowledge and will support the implementation of adaptive techniques to current livelihood activities

292. The Project does not foresee any change or negative impact on the current livelihood of any indigenous people or their natural resource base, in fact it will promote the use of traditional knowledge and will support the implementation of adaptive techniques to current livelihood activities.

293. In case any project activities would require formal processes of Free and Informed Prior Consultation (FPIC), then the Project will revert to existing national mechanisms.

Involuntary Resettlement

294. Involuntary resettlements are not foreseen within the project.

Protection of Natural Habitats

295. Conservation and restoration activities will be implemented in rangelands and forest areas as well as in national parks and protected areas. Targeted productive sectors, in particular agriculture, have been expanding into some environmentally sensitive areas. The project will support zoning in order to reduce productive expansion into particularly critical sensitive areas.

296. "The Bakhtegan Basin is a Ramsar wetland and is protected by both international and national legislation, the project has been designed to comply with these.

297. Historic activities have severely degraded the habitat values of the basin to the verge of ecosystem collapse. The project is focussed on protection, restoration and enhancement of natural habitats and therefore does not pose a risk to these areas, rather the reverse as it aims to reverse some of the historic damage and poor practices. Conservation and restoration activities will be implemented in rangelands and forest areas as well as in national parks and protected areas. Targeted productive sectors, in particular agriculture, have been expanding into some environmentally sensitive areas. The project will support zoning in order to reduce productive expansion into particularly critical sensitive areas.

298. *Examples of similar projects that include enhancement or protection of natural habitats are given in Section F.*

Conservation of Biological Diversity

299. There will be no loss in biological diversity as a result of the project. In fact, diversity will be increased due to reforestation and habitat restoration activities"

300. With reforestation activities, there is an identified risk of potential use of alien and invasive alien species, although forest and rangeland restoration will only involve planting of more resilient native tree species. To mitigate this risk, the work will be undertaken following the establishment of a restoration protocol/guide for CFC municipalities integrating climate change and variability.

301. The Project will generate a positive impact on the conservation of biological biodiversity through forest and rangeland protection and restoration. The Project will also support the development of information platforms (GIS, TIPS and an App) for monitoring and reporting of restoration actions implemented. This information will be accessible to all stakeholders so that there will be shared ownership of successes.

302. The project will provide training on more sustainable use of resources, particularly aimed at the reduction in use of water, also the introduction and promotion of alternative livelihoods (e.g. bee keeping) which can enhance biodiversity.

303. Training, broader awareness of issues and greater ownership, coupled with information platforms is expected to lead to improved decision making, reduced conflict, more equitable use of resources and in turn slowing of the current loss in biodiversity.

304. The project will also incorporate ecosystem-based adaptation measures and technologies focused on climate resilience into the integrated land and water planning and management plans.

Climate Change

305. The project is directly addressing climate change vulnerabilities and adaptation capacities in the Bakhtegan Basin. The project will adopt a National Strategy approach to implementation of adaptation measures at the basin, sub-basin, village and household level. All stakeholders within the Bakhtegan Basin will gain a deeper understanding of the issues facing them as a result maladaptive practices and climate change. Through this will be a greater ownership of problems and responses required to address them.

306. More sustainable practices will help negate the growing negative impacts of climate change and poor management practices. Application of consistent and comprehensive analysis of climate risks and climate change impacts throughout the Basin will lead to improved planning and regulation of resource use.

Pollution Prevention and Resource Efficiency

307. The Project will promote measures and technologies for the optimal use of water and land resources, which will have a positive impact. Through the project, producers should also adopt improved farming techniques (e.g. organic agriculture, soil and water conservation) that would reduce the use of fertilizers and pesticides, thus reducing the contamination of soil and water bodies.

308. Some physical disturbance of previously farmed land may release residual herbicides and/or pesticides, however prior assessment of risk and application of mitigation measures will reduce the likelihood of adverse impacts.

Public Health

309. Improved access to water, reduced conflict over resources, reduction in erosion and dust generation, and reduced migration are expected to result in improved health of residents and ecology.

Physical and Cultural Heritage

310. There are no expected negative impacts on physical and cultural heritage sites in the Bakhtegan Basin.

Lands and Soil Conservation

311. Through the application of adaptive and organic agricultural practices (including soil and water conservation techniques), rehabilitation and restoration of forests and rangelands, improved protection for reserves and National Parks (in particular wetlands) it is expected that the project will support soil conservation.

312. The adaptive water management activities may involve construction of embankments and check dams; contouring, strip cropping, that will imply some earth works. To avoid any adverse effects on soil conditions, the project will ensure compliance with environmental impact assessment procedures of DOE. In addition, the project will follow technical guidance developed by previous projects in the Bakhtegan Basin.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Adequacy of Project Management Arrangements

313. The Government of the Islamic Republic of Iran will execute the project with the support of the UNDP under the National Implementation Modality (NIM). The Department of the Environment (DOE) will be the Executing Entity responsible for ensuring that the objectives and components of the project are delivered, and that resources are allocated and disbursed in an efficient and effective manner. The DOE will have the technical and administrative responsibility for applying AF inputs in order to reach the expected Outcomes/Outputs as defined in this project document. The DOE will be responsible for the timely delivery of project inputs and outputs, and in this context, for the coordination of all other responsible parties, including other government agencies, regional and local government authorities.

314. As a Multilateral Implementing Entity, UNDP is responsible for providing a number of key general management 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: programme formulation and appraisal; determination of execution modality and local capacity assessment; briefing and de-briefing of programme staff and consultants; general

oversight and monitoring, including participation in programme 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. In this context, UNDP will provide support to the Project Coordinator of the programme to maximize its reach and impact as well as the quality of its products. Moreover, it will be responsible for administering resources in accordance with the specific objectives defined in the Programme Document, and in keeping with its key principles of transparency, competitiveness, efficiency and economy. The financial management and accountability for the resources allocated, as well as other activities related to the execution of Programme activities, will be undertaken under the supervision of the UNDP Country Office, UNDP Regional Hub and UNDP HQ, in line with the 3-tiered quality assurance function of UNDP. UNDP will undertake the internal monitoring of the Programme and of evaluation activities, taking into account from the outset local capacities for administering the programme, capacity limitations and requirements, as well as the effectiveness and efficiency of communications between ministries and other institutions that are relevant to the programme[66].

315. Implementation of the project will be carried out under the general guidance of a **Project Board (or Project Steering Committee)** that is responsible for making management decisions for the project in particular when guidance is required by the Project Manager. The Project Board plays a critical role in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual WorkPlan, the Project Board can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans based on AF budget guidance.

316. In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with UNDP.

317. Potential members of the Project Board are reviewed and recommended for approval during the PAC meeting. Representatives of other stakeholders can be included in the Board as appropriate. The Project Board will be composed of designated senior-level (national and provincial) representatives from MOE, MOJA, MFA, DOE and Fars Province governor and community representative(s). Other related authorities could be added to this committee with confirmation of other members or being invited to the meeting accordingly. The establishment of a Bakhtegan Basin Council under existing Fars Province structures will provide long-term sustainability. The council will be comprised by committees from each target zone (Zone 1 to 4) that will form a "Provincial Working Group for Climate Resilience in Bakhtegan Basin" headed and housed at Fars Province Governor. The council will provide recommendations to the Project Board related to implementation of the outputs from Component 2, 3 and 4. It's expected that after project closure the Council will take over the Project Board's functions to the extent possible with financial support from Fars Province Governor. A complete list of PB members and their designated alternates will be provided in the inception workshop report. The project board will be the higher governance body for the project planning and result while the council is a governmental body which will lead adaptation activities and project in the basin and will manage all sectoral planning and budgeting according to new approached to adapt with climate change effects.

318. **Project Manager:** The Project Manager has the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager'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

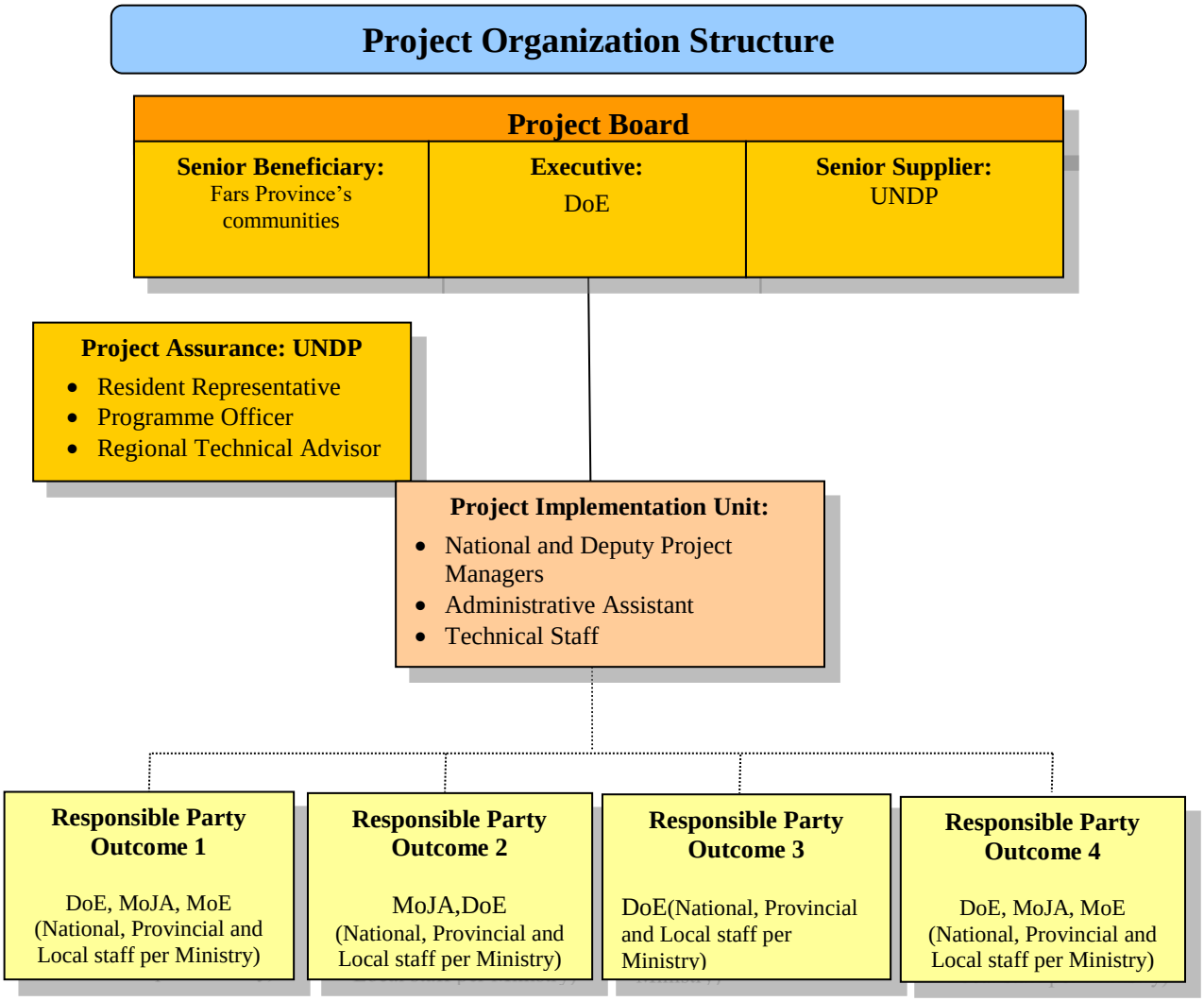
[66] As outlined in UNDP's application to the Adaptation Fund Board for accreditation as a Multilateral Implementing Entity, UNDP employs a number of programme execution modalities determined on country demand, the specificities of an intervention, and country context. Under the national execution modality proposed to be used for this programme, 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 programme outputs. It is responsible to UNDP for activities including: the preparation and implementation of programme work plans and annual audit plans; preparation and operation of programme budgets and budget revisions; disbursement and administration of funds; recruitment of national and international consultants and programme personnel; financial and progress reporting; and monitoring and evaluation. As stated above, however, UNDP retains ultimate accountability for the effective implementation of the programme.

specified constraints of time and cost. The Project Manager or Coordinator will prepare a Work Plan to incorporate the activities and results of the project to be delivered. The Plan will define the timeframe for implementation of each activity and the parties responsible for their implementation. The First Work Plan will be finalized and incorporated into the Project Document within 30 days of its signature.

319. **Project Support:** The Project Support role provides project administration, management and technical support to the Project Manager as required by the needs of the individual project or Project Manager.

320. **Project assurance:** UNDP Iran 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 Iran 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 Officer to support the Project Board to objectively and independently oversee and monitor the project.

321. Upon request from the Executing Entity, UNDP can provide Direct Project Services (DPS) according to its specific policies and convenience. In this case, the Executing Entity will sign a Letter of Agreement specifying the services to be provided and their costs. The costs of these services will be part of the project management costs of the executing entity identified in the project budget. UNDP and the government of Iran recognize that these services are not mandatory and will only be provided in full compliance with the UNDP recovery of direct costs policies. The DPS will be charged annually using the UNDP Universal Price List.



B. Measures for financial and project risk management

No.	Type	Risk Description	Level	Mitigation strategy
1	Institutional	Decision-making processes at the national and local levels are slow.	Low	-Project Implementation Unit will operate directly in the project area to promote decision-makers' involvement in the project and keep authorities and decision-makers informed about the development and achievements of the project. -Permanent political and technical support will be provided to the project and its stakeholders by the agencies of the Government that are involved in the project (MoE, DoE, MoJA), as well as coordination of actions with the project team and regional and local stakeholders.
2	Institutional	Coordinated efforts with DoE, MoE and MoJA in Tehran and in Fars Province might create delays during project implementations.	Medium	-Project Board (Steering Committee) will be structured to have representatives from national ministries and their counterparts from Fars Province to foster coordination. -Foster participation of national and provincial policy and decision-makers in workshops during the project preparation phase and consultation through various meetings and communications about the project's strategy, components, and expected outcomes. -Active participation of national and provincial policy and decision-makers in key moments during the life of the project (approval, inception, implementation, and mid-term and final evaluations).
3	Operational	There might be resistance from some stakeholders in adopting the proposed measures in target area.	Low	A Bakhtegan Basin Council will be established where community members, community leaders, civil authorities and other stakeholders will discuss locally important issues related to climate change and adaptation and interventions to be implemented in the Basin increasing the ownership and acceptance of interventions.
4	Financial	Delays in executing funding at the provincial level.	Low	-Project activities have been designed and paced to ensure a reasonable chance of completion after the timeframe of the project. -UNDP and MoE/MoJA/DoE will provide permanent support for the mobilization of funds, contracting, monitoring, and financial reporting. -UNDP will provide specific technical assistance and management support to each agency based on the results of such assessments.
5	Financial	Gov of Iran is not able to leverage sufficient financial resources for the sustainability of project actions.	Medium	-The project will strengthen the institutional basis for accessing public and private sources of climate change finance in the future to attract additional sources of funding. -UNDP will provide support to the GoI in securing and mobilizing climate change-related financing.
6	Political	Continued anthropogenic degradation in the Bakhtegan Basin, as a result of deforestation and conventional irrigation practices.	Medium	-Project activities will be aligned to national and provincial initiatives currently addressing deforestation and water-intensive irrigation practices. -Project coordinator will work closely with provincial staff from MoE, DoE and MoJA to take advantage of environmental and land use instruments in place to assure that the objectives sought in the AF proposal are not undermined. -Specific activities were designed to directly and indirectly address anthropogenic degradation while generating food security and generation of income in target communities.
7	Political	Pressures and tensions in the surroundings of national parks	Medium	-Project activities will be aligned to restore degraded lands in Protected Areas and outside and setting up a monitoring system with DoE. -Project Coordinator will work closely with provincial staff from DoE to monitor pressures on natural parks to make sure that the AF project objectives are met.

8	Political	Social upheaval related to water management	Low	-Project activities are aim at increase awareness about the impact of drought in the Bakteghan basin as an interconnected system and the need to reduce inefficient use of water. -Project will set up a Bakteghan Basin Council for all relevant stakeholders to seat at the table and discuss jointly efficient water management initiatives.
9	Political	Illegal wells digging and overexploitation of legal wells	Medium	-Project activities are aim at increase awareness about the impact of drought in the Bakteghan basin as an interconnected system and the need to reduce inefficient use of water. - Project coordinator will work closely with provincial staff from MoE, DoE and MoJA to develop strategies to better enforce legal framework around illegal wells and over exploitation of legal wells.

322. A comprehensive risk management strategy will be a core component of project management activities. This is in line with UNDP's stringent risk management approach which is corporate policy. The respective UNDP CO provides support to the project team and executing agency for constant and consistent risk monitoring, and the results are tracked and reported in UNDP's internal risk monitoring system. Risks will be entered into the UNDP's Atlas (project management system) and will be systematically monitored as part of the M&E process by UNDP staff carrying out their oversight related tasks. The results are also reported in the yearly evaluation undertaken for each project.

C. Measures for environmental and social risk management, in line with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

323. As noted in previous sections (Section II.K) in this document, the project falls under the B category as assessed by 15 criteria and principles established by the Adaptation Fund.

324. Risk mitigation and management measures are described under Section K, and in the UNDP Social and Environment Screening Document and in the Social and Environmental Management Framework attached to this proposal.

325. The ESMF outlines monitoring arrangements for implementation of environmental and social risk management, as well as procedures for addressing stakeholder concerns regarding the project's social and environmental performance.

D. Monitoring and Evaluation arrangements in compliance with the ESP and the Gender Policy of the Adaptation Fund, including budgeted M&E plan.

326. The project will be monitored through the following M&E activities. The M&E budget is provided in the table below.

Project start:

327. A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

328. The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

b) Based on the project results framework, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.

c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.

d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.

e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

329. The following will be undertaken on a quarterly basis:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.

- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP AF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

330. The project is required to submit a Project Performance Report (PPR) to the donor on an annual basis, one year after the start of project implementation (date of inception workshop) and the last such report should be submitted six months after project completion

    The PPR completed template should be submitted to the secretariat in English and that all financial figures provided in the template should be in US dollars (USD). There are 8 sections in the template, as follows:

    1. Overview
    2. Financial information
    3. Procurement data
    4. Risk assessment
    5. Ratings
    6. Project indicators
    7. Lessons learned
    8. Adaptation Fund results tracker

Periodic Monitoring through site visits:

331. UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no later than one month after the visit to the project team and Project Board members.

Mid-term of project cycle

332. The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation. The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; it 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. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-EEG. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

End of Project:

333. An independent Final Terminal Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and AF guidelines. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-EEG.

334. The Final Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

335. During the last three months, the project team will prepare the Project Final Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Audit

336. The audit would be performed under the UNDP financial regulations and rules applicable to audit policies on UNDP projects.

Learning and knowledge sharing:

337. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

338. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

339. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

340. The AF logo should appear on all relevant publications of the Project, included within other logos, project equipment and other acquisitions with AF funds. Any citation in publications regarding projects funded by the AF should give recognition to the AF. The logos of the implementing agencies and enforcement agencies will also appear on all publications. Full compliance is required with UNDP's Branding Guidelines. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html.

341. Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

M&E workplan and budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame	Source of fund
Inception Workshop and Report	▪ Project Manager ▪ UNDP CO, UNDP CCA	Indicative cost: 10,000	Within first two months of project start up	EE cost
Measurement of Means of Verification of project results.	▪ UNDP CCA RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.	IE fee
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation.	Annually prior to the annual report and in accordance with the definition of annual work plans	EE cost
Annual reports (PPR)	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually, after inception workshop	EE cost/IE fee
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly	EE cost/IE fee
Final External Evaluation (cost for Internationals and local consultants) including Project Final report	▪ Project manager and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: 60,000	At least three months before the end of project implementation	EE cost
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost per year: 3,000	Yearly	EE cost
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For AF supported projects, paid from IA fees and operational budget	Yearly	IE cost

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame	Source of fund
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 85,000 (+/- 5% of total budget)		

E. Strategic Result Framework

	Indicators	Baseline	End of project targets	Means of verification	Risks and assumptions
Objective of the Project To increase the resilience of communities and the natural environment of the Bakhtegan basin to climate variability and change through integrated watershed management	Number of villages (disaggregated by households) in the Bakhtegan Basin with increased resilience to climate variability and change. Number of direct and indirect beneficiaries (disaggregated by women and youth) [Adaptation Core Indicator]	The Bakhtegan Basin is within one of the most drought prone areas of Iran. The entire population of 854,093 people is increasingly exposed to the impacts of a 10-year extended dry period. Water resources are becoming increasingly limited and social and environmental costs are already evident. Lake Bakhtegan is almost dry and it affected daily livelihood of local communities living around the basin.	Direct project benefits to: - 15 villages adopting climate smart agriculture practices - 9 villages adopting alternative livelihoods - 6 villages with ecosystem conservation in forest and rangeland areas - 7 national park, protected areas and hunting prohibited areas with rehabilitation work At basin level and it target villages at least 900 women will be involved thorough alternative livelihood practices and more than 1500 will be involved in smart agriculture activities. At least 2700 youth will be benefitted from project activities by being involved in local technical cooperatives, smart agriculture and alternative livelihood projects. Indirect benefits to the entire population of the Bakhtegan Basin through communications and awareness raising	- Field reports - Climate-related databases - Project reports: annual reports; mid-term and final evaluations	The project is focused on addressing the impacts of drought and a decade of drier than average conditions, not the underlying issues associated with the mismanagement of water resources since the 1960s. Decision makers at all levels in the Bakhtegan Basin are willing to work together to ensure that climate change considerations are fully integrated into all planning decisions. Participating communities are willing to adopt and sustain the climate change adaptation measures introduced to them.
Outcome 1 **A data and information management system for decision support and communications is developed and implemented to support development of long-term climate**	1.1 Number of climate change scenarios developed to assess climate risks and climate change impacts in target area.	Published analyses of climate change in Bakhtegan Basin but no coherent study for the whole basin using up to date climate change scenarios	At least 3 Climate change scenarios for the Bakhtegan basin will be developed based on the tailored SimCLIM software. (Scenarios will be developed: 1) projection under the optimistic climate change scenario, i.e. RCP 2.6; 2) projection under the pessimistic climate change	A published report and generated results integrated into the GIS and the Information Portal System (TIPS) (Output 1.4).	Climate change impact and vulnerability assessments are completely in a timely manner to ensure that results are fully accounted for in all other project activities

resilience in the Bakhtegan basin			scenario, RCP 8.5; 3) projection under a mid-range scenario.)		Communities fully participate in the community based monitoring programme The GIS and TIPS are used by stakeholders to support enhanced governance and decision making that is informed by climate change considerations. Effective information for improved decision making relating to land use and water resources management is being used.
	1.2 Number of frameworks developed to support decision making that include climate change, land and water resources in the Bakhtegan Basin.	A comprehensive study on water and land resources was completed in 2007, with key results summarized in Annex 1 Researchers at the Water Resources Engineering Department, Tarbiat Modares University, Tehran have recently completed a baseline (current conditions) analysis for the Bakhtegan Basin using a modified version of the Soil and Water Assessment Tool (SWAT)	An integrated WLUP framework for the Bakhtegan Basin developed and used in decision making processes.	A published report and generated results integrated into the GIS and TIPS (Output 1.4)	
	1.3 Number of households and farmers regularly participating and using the community monitoring system.	There is currently no local community monitoring system focused on climate vulnerability and resilience in the Bakhtegan Basin	An operational community monitoring system is established. 40 villages, involving 13,011 households (Which 5,200 of them are Women) and 12,821farmers (which 3,900 are women) are involved in the monitoring system.	- Field reports - Climate-related databases - Project reports: annual reports; mid-term and final evaluations	
	1.4 Number of operational decisions support systems incorporating a customized GIS platform and development of the information portal system (TIPS) 1.5 Number of local and provincial plans that incorporate adaptation to climate change considerations based on the decision support system.	There is currently no system in place for collating and sharing relevant climate change impact, risk and vulnerability data and information	A decision support system is established to improve decision making and governance in the Bakhtegan Basin by customizing a GIS to collate all relevant data and information and a TIPS which is developed and operationalized (through Component 4) Five (5) plans that incorporate considerations for adaptation to climate change: Fars Province, Zone 1, Zone 2, Zone 3 and Zone 4 Plans	TIPS web page Number of visits to the TIPS web page Use of TIPS data and information in revised plans for the Bakhtegan Basin	

Outcome 2 **The environmental, social and economic resilience of the Bakhtegan Basin is strengthened through implementation of sustainable agro-ecological practices and alternative livelihoods**	2.1 Number of farmers with climate smart agriculture practices. 2.2 Area (ha) of farmland with climate resilient agriculture practices	Research has been undertaken at the Marvdasht Agricultural Research Centre on improved water use efficiency for rice cultivation but has not yet been disseminated to farmers. There is no active research of climate smart agricultural systems for the Bakhtegan Basin. In the 11 target villages farmers are currently adapting autonomously with the following practices: • Growing saffron (7 ha in 1 village), safflower (1 village) and other crops (4 villages) • Reducing water consumption (3 villages) • Using natural fertilisers (1 village) The Central Zagros Mountains project implemented a sustainable agriculture program in Bakan village in 2012-2013, which was extended to 6 villages: Sarbast, Hossein Abad, Abbas Abad, Bakyan, Chogha, Mansour Abad. Achievements of the project were introduced to other villages in the Kor and Kamfiroz districts (39 villages)	4,425 farmers and gardeners (1,325 women) from the 15 target villages will be practicing climate smart agriculture 21,910 hectares of cropping land will be converted to climate smart production systems 1,726 hectares of horticultural land will be converted to climate smart production systems	- A published report on the market potential, including value chain analysis, of different climate smart agriculture crops, practices and systems - A published report on results from action research on climate smart agriculture - Project monitoring, including community based monitoring (Output 1.3) - Measured reductions in water use of at least 30 percent with participating farmers - Field reports	The market research will be successful in identifying economically viable climate smart crops, practices and systems Participating farmers and farmers more widely will be willing to adopt and sustain climate smart agriculture and reduce their water consumption Participating households and women will be willing to adopt and sustain alternative livelihoods

	2.3 Number of households and women practicing alternative livelihoods	In the 9 target villages for Output 2.2 (2 in Zone 1, 2 in Zone 2, 1 in Zone 3, 4 in Zone 4) there are currently 368 households practicing alternative livelihoods and 193 women receiving support from the Rural Women's Trust Fund. Details of the current alternative livelihood practices of each target village are provided in Annex 4.	In the15 target villages for Output 2.2 there will be 766 households practicing alternative livelihoods and 900 women by receiving small-grants support. Most of the beneficiaries will be in the four Zone 4 villages where a total of 508 households will be practicing alternative livelihoods and 540 women by receiving small-grants support.	- Project monitoring - Project reports	
Outcome 3 **The resilience of the natural environment of the Bakhtegan Basin is strengthened**	3.1 Area (ha/M^3) of rangeland and forest with soil and water conservation practices implemented. [Adaptation Core Indicator]	The following measures have been implemented more widely in the Bakhtegan Basin over the last 18 years: -22 embankments -1,712 masonry check dams 61 groundwater artificial recharge projects 106,700 ha revegetated 65,000 ha with livestock excluded	-160 ha of arable land and about 500 ha of the downstream rangelands, dependent livestock and the vulnerable people in Charghalat and Kenare villages in Arsanjan county that are distributed in seven counties located in Zone 1 and 4. -250 ha will be covered by the rainfall trapping with pitting. -Participatory forest rehabilitation by seeding and development of medicinal herbal plantation in degraded rangelands about 300 ha. -Participatory combat desertification in zone 4 about 400 ha.	-Contractor reports -Project reports	The introduced soil and water conservation practices will lead to tangible and measurable improvements in the environment and help conserve water and reduce soil erosion The rehabilitation work in national parks, protected areas and hunting prohibited areas will provide measurable benefits to the environment and wildlife
	3.2 Area (ha) of wetlands rehabilitated. [Adaptation Core Indicator]	The Bakhteghan Integrated Management Plan has been developed with a participatory approach but not yet implemented. The Central Zagros Mountains project included: development of an integrated rangeland management plan in the Kor catchment area of Sepidan County; implementation of a school plant nursery programme; equipping and	30,000 ha will be rehabilitated in target area (Kamjam, Tashk and Bakhtegan) through the following activities: - At least 50% of Bakhtegan Wetland water rights will be achieved. - At least 50% of sand and dust storm resources of wetland bed has been biologically stabilized. -Rehabilitation action plan for selected wetland areas has	Project monitoring Contractor reports Project reports	

	3.3 Area (ha) of protected areas being monitored and rehabilitated. [Adaptation Core Indicator]	activity the Mountain Biodiversity Resource Centre; planting of 2000 oak seedlings; drought tolerant tree cultivaton; planting 850 ha with seedlings in Neyriz County Kamjan Marshes: local people acted independently to divert water from the arable lands drainage system into the Kamjan Marshes, and after some tension are now working cooperatively with local DOE staff to improve their local environment Bakhtegan National Park: The Bakhtegan Wetland has been completely dry for the last decade with significant impacts on migrant birds Bamou National Park: Environmental degradation of the national park fauna and flora resulted from drought Margoun waterfall protected area: Drought threats on the waterfall and the landscape Tang-e-Bostank protected area: endangering the wild life and endangered biodiversity due to drought Basiran hunting prohibited area: Lack of the artificial watering and feeding during the dry periods facilities/ accommodations system KouhSiah-e-Arsanjan hunting prohibited area: Lack of the artificial watering and feeding during the dry periods facilities/accommodations system	been developed and implemented which lead to rehabilitation of at least 30% of Bakhtegan wetlands. At least 70% of the total ha of target protected areas will be monitored through the following: -Bakhtegan basin protected areas ecosystems monitoring is established. -Rangers and game stations in targeted PAs has been equipped with monitoring equipment. -At least 25% of the total ha of protected areas will be rehabilitated. -Climate resilience activities for at least 5 key species have been implemented 20 artificial watering built in targeted PAs -In Bakhtegan and Bamous National Parks, wildlife habitats activities implemented in the dryland section.		

Outcome 4 Institutional capacity at the local, regional and national level is strengthened for mainstreaming climate risk management and adaptation measures into planning and decision-making processes.	4.1 Number of key beneficiaries and decision makers aware and trained by the project on wetland ecosystem services and climate change- related drought (disaggregated by gender).	Zero	Participatory communication, education, public awareness (CEPA) plan is developed and implemented by the following: -At least two (2) public awareness campaigns on wetland ecosystem services and climate change- related drought. (Women are main target group for these campaign) -At least 20 training material on climate change adaptation for different target groups developed and distributed. -At least 200 government expert/staff trained on climate change impacts and adaptation strategies (at least 100 women).	- Records of the quantities produced, published and disseminated of resource materials, training materials, videos, brochures and posters - Workshop participant lists - Records of SMS messages sent - Recording of the national TV programme - Attendance numbers for the arts events	Communities throughout the Bakhtegan Basin will be more informed about the situation in the basin, its underlying causes and the impacts of climate change. As a result of being more informed communities in the different Zones will be more willing to work together for the long-term benefit of the Bakhtegan Basin and its people. The spatial plan for the Bakhtegan Basin will be widely adopted and implemented. The Bakhtegan Basin Council will be supported by communities, local authorities, provincial government and national government agencies in ensuring that the project is a success and that its outcomes are sustained into the future
	4.2 An integrated, multi-sectoral, spatial plan for the Bakhtegan Basin that fully considers climate change risks and needs for building resilience developed.	Water and environmental issues, including the restoration of wetlands, are identified as national priorities in the Sixth Development Plan. The draft National Strategic Plan on Climate Change identifies the need to: -Establish and improve climate smart agriculture to combat the negative effects of climate change and develop sectoral plans -Integrate climate change considerations into the management structure for natural resources and biodiversity -Strengthen the sectoral and multi-sectoral management and	An integrated, multi-sectoral, spatial plan for the Bakhtegan Basin is developed, taking full account of climate change, with full participation of all stakeholders including local communities	-A published spatial plan for the Bakhtegan Basin -Monitoring of project activities to ensure their alignment with the plan	

		institutions for cooperation on water management			
	4.3 Number of governance structures in the Bakhtegan Basin strengthen by the project.	The existing governance structure in Fars Province involves the Provincial Government, Country and City Authorities and Village Islamic Councils. There is no specific governance structure in place to address issues in the Bakhtegan Basin	Establishment of a Bakhtegan Basin Council within the context of the existing governance framework for Fars Province. (at least 30% of members are women)	-Official record documenting establishment of the Bakhtegan Basin Council and its membership -Minutes of Council meetings	

F. Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

Project Objective(s)[67]	**Project Objective Indicator(s)**	**Fund Outcome**	**Fund Outcome Indicator**	**Grant Amount (USD)**
To increase the resilience of communities and the natural environment of the Bakhtegan Basin to climate variability and change through integrated landscape management.	Number of villages (disaggregated by households / women) in the Bakhtegan Basin with increased resilience to climate variability and change.	Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas.	6.1 Percentage of households and communities having more secure (increased) access to livelihood assets.	9,092,766
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 1: A data and information management system for decision support and communications is developed and implemented to support development of long-term climate resilience in the Bakhtegan basin.	1.1 Number of climate change scenarios developed to assess climate risks and climate change impacts in target area.	Output 1.1: Risk and vulnerability assessments conducted and updated	1.1. No. of projects/programmes that conduct and update risk and vulnerability assessments (by sector and scale)	$179,962
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 1: A data and information management system for decision support and communications is developed and implemented to support development of long-term climate resilience in the Bakhtegan basin.	1.2 Number of frameworks developed to support decision making that include climate change, land and water resources in the Bakhtegan Basin.	Output 7: Improved integration of climate-resilience strategies into country development plans.	7.1. No., type, and sector of policies introduced or adjusted to address climate change risks.	$900,315

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

	1.3 Number of households and farmers regularly participating and using the community monitoring system. 1.4 Number of operational decisions support systems incorporating a customized GIS platform and development of the information portal system (TIPS). 1.5 Number of local and provincial plans that incorporate adaptation to climate change considerations based on the decision support system.			
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 2: The environmental, social and economic resilience of the Bakhtegan Basin is strengthened through implementation of sustainable agro-ecological practices and alternative livelihoods.	2.1 Number of farmers with climate smart agriculture practices. 2.2 Area (ha) of farmland with climate resilient agriculture practices	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1.No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies	$1,414,130
Outcome 2: The environmental, social and economic resilience of the Bakhtegan Basin is strengthened through implementation of sustainable agro-ecological practices and alternative livelihoods.	2.3 Number of households practicing alternative livelihoods.	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability.	6.1.1.No. and type of adaptation assets (physical as well as knowledge) created in support of individual or community-livelihood strategies.	$1,635,170
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 3: The resilience of the natural environment of the Bakhtegan Basin is strengthened	3.1 Area (ha/M3) of rangeland and forest with soil and water conservation practices implemented	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1.No. and type of adaptation assets (physical as well as knowledge) created in support of individual or community-livelihood strategies.	$1,594,010
Outcome 3: The resilience of the natural environment of the Bakhtegan Basin is strengthened	3.2 Area (ha) of wetlands rehabilitated 3.3 Area (ha) of protected areas being monitored and rehabilitated.	Output 5: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability.	5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and	$1,978,620

			change (by type of assets)	
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 4: Institutional capacity at the local, regional and national level is strengthened for mainstreaming climate risk management and adaptation measures into planning and decision-making processes.	4.1 Number of key beneficiaries and decision makers aware and trained by the project on wetland ecosystem services and climate change- related drought (disaggregated by gender). 4.2 An integrated, multi-sectoral, spatial plan for the Bakhtegan Basin that fully considers climate change risks and needs for building resilience developed. 4.3 Number of governance structures in the Bakhtegan Basin strengthen by the project.	Output 2.1: Strengthened capacity of national and regional centres and networks to respond rapidly to extreme weather events.	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events	560,720

G. Detailed budget with budget note

Award ID:	TBA				**Project ID:**	TBA						
Award Title:	Iran AF PIMS 6190: Reducing vulnerability to climate change in the Lake Bakhtegan Basin											
Business Unit:	IRN10											
Project Title:	Reducing vulnerability to climate change in the Lake Bakhtegan Basin											
PIMS no.	6190											
Implementing Partner (Executing Agency)	Department of Environment (DoE)											
Components	**Responsible Party / Implementing Agency**	**Fund ID**	**Donor Name**	**Atlas Budgetary 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)**	**Total (USD)**	**Budget Note**
OUTCOME 1: A data and information management system for decision support and communications is developed and implemented to support development of long-term climate resilience in the Bakhtegan basin.	DoE	62040	AF	71300	Local consultants	40,000	60,000	75,000	75,000	50,890	300,890	1
				71400	Contractual Services - Individuals	7,850	8,175	8,500	8,825	9,150	42,500	2
				71600	Travel	4,000	3,000	3,000	2,500	3,550	16,050	3
				72100	Contractual services - Companies	25,000	90,750	110,750	110,750	99,087	436,337	4
				72200	Equipment and furniture	90,000	50,000	20,000	20,000	9,500	189,500	5
				74500	Miscellaneous Expenses	6,000	6,000	6,000	6,000	6,000	30,000	6
				75700	Training, Workshops and Conferences	20,000	15,000	12,000	7,000	11,000	65,000	7
				Sub-total Outcome 1		**192,850**	**232,925**	**235,250**	**230,075**	**189,177**	**1,080,277**	
OUTCOME 2: The environmental, social and economic resilience of the Bakhtegan Basin is strengthened through implementation of	DoE	62040	AF	71200	International consultants	30,000	80,000	80,000	75,000	40,500	305,500	8
				71300	Local consultants	20,000	12,000	8,000	7,000	3,000	50,000	9
				71400	Contractual Services - Individuals	23,850	25,175	26,500	27,825	29,150	132,500	10
				71600	Travel	10,000	10,000	8,000	7,000	5,760	40,760	11
				72100	Contractual services - Companies	147,000	285,000	285,000	285,000	135,740	1,137,740	12

sustainable agro-ecological practices and alternative livelihoods				72300	Material & goods		75,000	75,000	75,000	75,000	300,000	13
				72600	Grants	-	212,500	212,500	212,500	212,500	850,000	14
				74500	Miscellaneous Expenses	9,560	9,560	9,560	9,560	9,560	47,800	15
				75700	Training, Workshops and Conferences	59,000	49,000	24,000	19,000	34,000	185,000	16
				Sub-total Outcome 2		**299,410**	**758,235**	**728,560**	**717,885**	**545,210**	**3,049,300**	
OUTCOME 3: The resilience of the natural environment of the Bakhtegan Basin is strengthened.	DoE	62040	AF	71300	Local consultants	64,750	64,750	64,750	64,750	64,954	323,954	17
				71400	Contractual Services - Individuals	23,850	25,175	26,500	27,825	29,150	132,500	18
				72100	Contractual services - Companies	467,000	592,000	703,000	526,000	307,361	2,595,361	19
				72200	Equipment and furniture	77,500	127,500	67,500	17,500	10,000	300,000	20
				74500	Miscellaneous Expenses	8,000	8,000	8,000	8,000	8,000	40,000	21
				75700	Training, Workshops and Conferences	60,000	50,000	30,000	15,000	25,815	180,815	22
				Sub-total Outcome 3		**701,100**	**867,425**	**899,750**	**659,075**	**445,280**	**3,572,630**	
OUTCOME 4: Institutional Capacity at the local, regional and national level is strengthened for improved governance and decision making in relation to climate risk management and effective implementation of adaptation measures	DoE	62040	AF	71200	International consultants	8,000	12,000	13,000	8,000	4,000	45,000	23
				71300	Local consultants	25,000	25,000	35,000	45,000	32,000	162,000	24
				71400	Contractual Services - Individuals	7,850	8,175	8,500	8,825	9,150	42,500	25
				74200	Audiovisual & Print Production Costs	10,000	12,000	15,000	10,000	15,850	62,850	26
				74500	Miscellaneous Expenses	2,100	2,100	2,100	2,100	2,100	10,500	27
				75700	Training, Workshops and Conferences	35,974	50,474	50,474	50,474	50,474	237,870	28
				Sub-total Outcome 4		**88,924**	**109,749**	**124,074**	**124,399**	**113,574**	**560,720**	
Project Execution cost	DoE	62040	AF	71200	International consultants					32,000	32,000	29

				71300	Local consultants	10,000	-	-	-	28,000	38,000	30
				71400	Contractual Services - Individuals	51,100	53,300	55,500	57,700	59,900	277,500	31
				71600	Travel	1,000	1,000	6,000	1000	6,000	15,000	32
				72100	Contractual services - Companies	1,440	1,440	1,440	1,440	1,440	7,200	33
				72200	Equipment and furniture	28,000	5,000	5,000	2,000	2,000	42,000	34
				72400	Communications	250	250	250	250	250	1,250	35
				72500	Supplies	1,000	1,000	1,000	1,000	1,000	5,000	36
				72800	IT Equipment	8,000	3,000	1,000	1,000	1,000	14,000	37
				74100	Professional services (Audit)	3,000	3,000	3,000	3,000	3,000	15,000	38
				74200	Audiovisual & Print Production Costs	4,800	4,800	4,800	4,800	4,800	24,000	39
				74500	Miscellaneous Expenses	250	250	250	250	250	1,250	40
				74500	Service to Project - GOE	75,716	83,517	82,683	67,040	48,683	357,639	41
				Sub-total PMU		**184,556**	**156,557**	**160,923**	**139,480**	**188,323**	**829,839**	
				TOTAL PROGRAMME COST		**1,466,840**	**2,124,891**	**2,148,557**	**1,870,914**	**1,481,564**	**9,092,766**	

Budget Notes

Outcomes/Outputs	Note	ATLAS Number	ATLAS Budget Description	5 year Total (USD)	Description of Expenditures
OUTCOME 1: A data and information management system for decision support and communications is developed and implemented to support development of long-term climate resilience in the Bakhtegan basin. Total: 1,080,277 USD					
1.1 An integrated model for climate risk and climate change	1	71300	Local consultants	44,500	Contract for national experts to develop and undertake analyses with SimCLIM for the Bakhtegan Basin (Output 1.1)
				45,500	Contract for national experts to conduct training in the use of WLUP (Output 1.2)

assessment supports medium and long term decision making 1.2 A land and water use planning framework is developed and implemented to support decision making 1.3 Community engagement, empowerment and ownership in decision making is supported through local community monitoring 1.4 A GIS based data and information management system and an information portal system are developed to facilitate more informed, effective and timely decision making				44,520	Contract for national experts to develop and undertake analyses with WLUP (Output 1.2)
				44,570	Contract for local consultants to facilitate workshops with targeted villages on development of vulnerability and resilience indicators and a local community monitoring programme following GAAP recommendations (Output 1.1)
				96,800	Contract for local consultants to pay quarterly visits to project target villages to ground truth the local community monitoring platform (Output 1.3)
				25,000	Contract with a local consultant to integrate all relevant data into the GIS platform and TIPS (Output 1.4)
	2	71400	Contractual Services - Individuals	12,500	Tehran Coordinator - 25% of contract charges to Output 1
				13,000	Communication expert - 20% of contract charges to Output 1
				9,500	National Project Manager (NPM) - 10% of contract charges to Output 1
				7,500	Deputy National Project Manager (DNPM) - 10% of contract charges to Output 1
	3	71600	Travel	16,050	Travel costs for quarterly visits to project target villages (Output 1.3)
	4	72100	Contractual services - Companies	73,477	Contract for development and provision of a customised version of SimCLIM (Output 1.1)
			Contractual services - Companies	23,860	Contract for international experts to conduct training in the use of SimCLIM (Output 1.1)
			Contractual services - Companies	39,500	Contract for development and provision of a customised version of WLUP (Output 1.2)
			Contractual services - Companies	163,000	Development of a comprehensive plan for allocating water and land resources in a sustainable and climate resilient manner (Output 1.2)
			Contractual services - Companies	56,500	Development of a participatory platform for use by participating villagers on agreed vulnerability and resilience indicators (Output 1.3)
			Contractual services - Companies	65,000	Contract to develop a customised GIS platform for integrating all results from Component 1 (Output 1.4)
			Contractual services - Companies	15,000	Contract to develop the Information Portal System (TIPS) for sharing results from Component 1 (Output 1.4)
	5	72200	Equipment and furniture	189,500	Equipment costs for monitoring water use changes with participating farmers (Output 1.3)
	6	74500	Miscellaneous Expenses	30,000	Miscellaneous costs associated with the climate change and climate risk assessment; the land-use change and land-use planning assessment; the local

					community monitoring programme; data and information sharing (Output 1.1-1.4)
	7	75700	Training, Workshops and Conferences	32,500	Workshops and meetings to define the scope of the climate change and climate risk analyses to be undertaken following GAAP recommendations (Output 1.1)
			Training, Workshops and Conferences	32,500	Workshops and meetings to define the scope of WLUP analyses to be undertaken following GAAP recommendations (Output 1.2)
OUTCOME 2: The environmental, social and economic resilience of the Bakhtegan Basin is strengthened through implementation of sustainable agro-ecological practices and alternative livelihoods **Total: 3,049,300 USD**					
2.1 Climate smart agriculture practices are adopted in target areas 2.2 Alternative livelihoods are adopted by vulnerable households in target villages	8	71200	International consultants	160,000	Contract with international consultants to undertake market research, including value chain analysis, on climate smart alternative crops, cropping systems and added value products, including organically certified crops and products (international markets) (Output 2.1)
				80,000	Contract with international organic certification agency to support the extension of climate smart organically certified agriculture (Output 2.1)
				65,500	Contract with international consultants for market participatory planning, market research, vocational training support for alternative livelihoods.(Output 2.2)
	9	71300	Local consultants	50,000	Contract with local consultant for training of facilitators (Output 2.1)
	10	71400	Contractual Services - Individuals	9,500	National Project Manager (NPM) - 10% of contract charges to Output 2
				13,000	Communication expert - 20% of contract charges to Output 2
				7,500	Deputy National Project Manager (DNPM) -10% of contract charges to Output 2
				90,000	4 Field Coordinators - 50% of contract charges to Output 2
				12,500	Tehran Coordinator - 25% of contract charges to Output 2
	11	71600	Travel	40,760	Cost of farmer field visits to extend results to other farmers (Output 2.1)
	12	72100	Contractual services - Companies	112,000	Contract with local consultants for development of Climate Smart Agriculture Plans (Output 2.1)

				90,000	Contract with national consultant to undertake market research, including value chain analysis, on climate smart alternative crops, cropping systems and added value products, including organically certified crops and products (national markets)(Output 2.1)
				62,500	Contract with national consultants to extend existing knowledge and research results on alternative crops and cropping systems that are more climate smart (Output 2.1)
				200,000	Contract for the development of an applied research programme on climate smart agriculture at the Marvdasht Research Station based on the results of the market research (Output 2.1)
				99,870	Contract with national consultants to extend the results of the applied research programme on climate smart agriculture to participating farmers (Output 2.1)
				64,500	Contract with national consultant to support extension of existing organically certified agriculture initiatives to participating villages, focused on climate smart practices (Output 2.1)
				40,370	Contract with national consultants for market participatory planning, market research, vocational training support for alternative livelihoods. (Output 2.1)
				400,000	NGOS to support the development the selected livelihoods in the targeted villages/households in Zone, 1, 2, 3 and 4. (Output 2.2)
				68,500	Contracts with national consultant to assess lessons learned from the Rural Women's Trust Fund (Output 2.2)
	13	72300	Material & goods	300,000	Cost of seed, seedlings and biologically friendly inputs for participating farmers in Zone 1, 2, 3 and 4 to implement climate smart agriculture systems.(Output 2.1)
	14	72600	Grants	850,000	Implementation of alternative livelihoods plans in Zone, 1, 2, 3 and 4.(i.e. sewing, carpet weaving, dried fruit processing, traditional aviculture, etc.),(Output 2.2)
	15	74500	Miscellaneous Expenses	47,800	Miscellaneous costs associated with the development, extension and communication of all climate smart agriculture activities and alternative livelihood activities (Output 2.1-2.2)
	16	75700	Training, Workshops and Conferences	100,000	Cost for facilitation of workshops to develop Climate Smart Agriculture Plans following GAAP recommendations (Output 2.1)
				85,000	Workshops and meetings with targeted households and villages to identify opportunities and capacities for livelihoods diversification at the local level following GAAP recommendations (Output 2.2)

OUTCOME 3: The resilience of the natural environment of the Bakhtegan Basin is strengthened Total: 3,572,630 USD					
3.1 A range of watershed management measures are implemented in target areas aimed at increasing resilience to drought risks 3.2 Landscape rehabilitation to restore functionality of ecosystem services to increase climate resilience.	17	71300	Local consultants	88,954	Contract with national consulting companies to develop analysis at the target sub-basins based on IWM approach (Output 3.1)
				80,000	Cost of monitoring Output 3.1 activities in target watersheds (Output 3.1)
				155,000	Develop and implement a climate resilience action plan for the key species (Output 3.2)
	18	71400	Contractual Services - Individuals	9,500	National Project Manager (NPM) -10% of contract charges to Output 3
				13,000	Communication expert -20% of contract charges to Output 3
				90,000	4 Field Coordinators -50% of contract charges to Output 3
				7,500	Deputy National Project Manager (DNPM)-10% of contract charges to Output 3
				12,500	Tehran Coordinator -25% of contract charges to Output 3
	19	72100	Contractual services - Companies	356,000	Contracting to design and construct water harvesting ponds and terracing (Output 3.1)
				229,760	Contracting for the water artificial recharge projects in target sub-basins (Output 3.1)
				136,401	Capacity building and training for local people to work as the contractors to construct water harvesting ponds, terracing, contouring, strip-cropping, etc. following Best Management Practices (BMPs), (Output 3.1)
				21,700	Rehabilitation of the rangelands (Output 3.1)
				120,000	Extension and implementation of the medical plants (Output 3.1)
				45,000	Development and protecting the Zagros forest area (Output 3.1)
				258,500	Vegetation rehabilitation to combat desertification (Output 3.1)
				225,000	Biodiversity monitoring in target areas (Output 3.2)
				185,000	Biological treatment of drainage & reforming the wetland (Output 3.2)

				120,000	Cost of construction and reconstruction of wildlife artificial watering troughs in the summer (Output 3.2)
				120,000	Cost of feeding wild life during the dry summers (Output 3.2)
				378,000	Rehabilitation of the wildlife habitats in the dryland ecosystem naional parks (Output 3.2)
				350,000	Protecting wildlife hunting prohibited areas (Output 3.2)
				50,000	Commission a study for the water rights and re allocation of water rights withintarget area (Kamjan, Tashk, Bakhtegan), (Output 3.2)
	20	72200	Equipment and furniture	300,000	Equipping DoE's monitoring stations to improve monitoring at basin level (Output 3.2)
	21	74500	Miscellaneous Expenses	13,680	Miscellaneous costs associated with the all ecosystem conservation activities(Output 3.1)
				26,320	Miscellaneous costs associated with the development, extension and communication of all rehabilitation and conservation in target areas (Output 3.2)
	22	75700	Training, Workshops and Conferences	59,375	Participatory workshops and meetings to define the scope of IWM results & measures to be undertaken following GAAP recommendations (Output 3.1)
				49,300	Participatory workshops to raise awareness of local people surrounding Bamou and Bakhtegan National Parks following GAAP recommendations (Output 3.1)
				72,140	Comprehensive extension, communication and education programme following GAAP recommendations (through Output 4.1), (Output 3.1)
OUTCOME 4: Institutional Capacity at the local, regional and national level is strengthened for improved governance and decision making in relation to climate risk management and effective implementation of adaptation measures Total: 560,720 USD					
4.1 A comprehensive communications, education and capacity building programme on climate resilience is implemented 4.2 A Bakhtegan Basin Council is formed to facilitate	23	71200	International consultants	45,000	Internationl consultant/facilitator to support establishment of Bakhtegan Basin Council (Output 4.2)
	24	71300	Local consultants	75,000	National consultant/facilitator to support establishment of the Bakhtegan Basin Council (Output 4.2)
			Local consultants	87,000	Contract with a research center to study existing national frameworks and policies relating to climate change adaptation and land and water resources planning and management to establish a “national spatial strategy plan” to be trialed in the Bakhtegan Basin.(Output 4.2)
	25	71400	Contractual Services - Individuals	9,500	National Project Manager (NPM) -10% of contract charges to Output 4

the long-term sustainable and climate resilient management of the Bakhtegan Basin				12,500	Tehran Coordinator -25% of contract charges to Output 4
				7,500	Deputy National Project Manager (DNPM) -10% of contract charges to Output 4
				13,000	Communication expert -20% of contract charges to Output 4
	26	74200	Audiovisual & Print Production Costs	62,850	Cost of visual aids of trainings (Output 4.1)
	27	74500	Miscellaneous Expenses	10,500	Miscellaneous costs associated with the development, extension and communication related to education, capacity building and communications (Output 4.1- 4.2)
	28	75700	Training, Workshops and Conferences	159,170	Cost of public awareness campaings which includes training video, publications, brochures, posters, TV programs (Output 4.1)
				58,000	Cost of rolling out trainings to ensure the relevant activities will be linked directly to Output 2.1, 2.2, 3.1 and 3.2 following GAAP recommendations (Output 4.1)
				20,700	Miscellaneous costs associated the establishment of the council (Costs of organizing the Bakhtegan Basin Council meetings during 5 years) (Output 4.2)
Project Execution Total: 829,839 USD					
Project Execution cost	**29**	71200	International consultants	32,000	International expert for final review of the project
	30	71300	Local consultants	13,000	Local experts for final review of the project
				25,000	Support to inception and final review workshops and technical meetings
	31	71400	Contractual Services - Individuals	57,000	National Project Manager (NPM) - 60% of contract charges to PMU
				45,000	Deputy National Project Manager (DNPM)/M&E - 60% of contract charges to PMU
				13,000	Communication expert - 20% of contract charges to PMU
				65,000	Finance expert
				57,500	Administrative Assistant
				40,000	Driver/clerk
	32	71600	Travel	15,000	Transport for Project Management Unit
	33	72100	Contractual services - Companies	7,200	Contractual Service to support communication (Website Maintenance)
	34	72200	Equipment and furniture	42,000	Office Equipments & Furniture
	35	72400	Communications	1,250	Communications
	36	72500	Supplies	5,000	Supplies
	37	72800	IT Equipment	14,000	IT equipment

	38	74100	Professional services (Audit)	15,000	NIM Audit
	39	74200	Print and Publication	24,000	Print and Publications
	40	74500	Miscellaneous Expenses	1,250	Miscellaneous
	41	74500	Service to Project - GOE	357,639.23	Financial and administrative services provided by UNDP (DPC)

A Breakdown of the IE Management Fee for support to Adaptation Fund Project

Category	Services Provided by UNDP	UNDP Fee (8.5%)
Identification, Sourcing and Screening of Ideas	• 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.	$38,644
Feasibility Assessment / Due Diligence Review	• 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.	$115,933
Development & Preparation	• 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.	$154,577
Implementation	• 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.	$347,798

Category	Services Provided by UNDP	UNDP Fee (8.5%)
	• Receipt, allocation and reporting to the AFB of financial resources. • Oversight and monitoring of AF funds. • Return unspent funds to AF.	
Evaluation and Reporting	• 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	$115,933
Total		$772,885

Implementation Schedule

	Year 1				Year 2				Year 3				Year 4				Year 5				TOTAL Budget (USD)
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
OUTCOME 1: A data and information management system for decision support and communications is developed and implemented to support development of long-term climate resilience in the Bakhtegan basin.																					
1.1 An integrated model for climate risk and climate change assessment supports medium and long term decision making		22,618			37,743				42,923				40,423				36,255				179,962
1.2 A water and land use planning framework is developed and implemented to support decision making		37,834			71,962				84,361				81,992				71,496				347,645
1.3 Community engagement, empowerment and ownership in decision making is supported through local community monitoring		120,682			97,692				77,429				77,028				54,839				427,670
1.4 A GIS based data and information management system and an information portal system are developed to facilitate more informed, effective and timely decision making		11,716			25,528				30,537				30,632				26,587				125,000
SUB - TOTAL:		**192,850**			**232,925**				**235,250**				**230,075**				**189,177**				**1,080,277**
OUTCOME 2: The environmental, social and economic resilience of the Bakhtegan Basin is strengthened through implementation of sustainable agro-ecological practices and alternative livelihoods.																					

2.1 Climate smart agriculture practices are adopted in target areas		177,162		354,539	335,251	326,845	220,333	1,414,130
2.2 Alternative livelihoods are adopted by vulnerable households in target villages		122,248		403,696	393,309	391,040	324,877	1,635,170
SUB - TOTAL:		**299,410**		**758,235**	**728,560**	**717,885**	**545,210**	**3,049,300**
OUTCOME 3: The resilience of the natural environment of the Bakhtegan Basin is strengthened.								
3.1 A range of watershed management measures are implemented in target areas aimed at increasing resilience to drought risks		310,447		360,522	397,027	307,629	218,385	1,594,010
3.2 Landscape rehabilitation to restore functionality of ecosystem services to increase climate resilience.		390,653		506,903	502,723	351,446	226,895	1,978,620
SUB - TOTAL:		**701,100**		**867,425**	**899,750**	**659,075**	**445,280**	3,572,630
OUTCOME 4: Institutional Capacity at the local, regional and national level is strengthened for improved governance and decision making in relation to climate risk management and effective implementation of adaptation measures.								
4.1 A comprehensive communications, education and capacity building programme on climate resilience is implemented				48,730	64,125	67,282	62,438	68,445	311,020

4.2 A Bakhtegan Basin Council is formed to facilitate the long-term sustainable and climate resilient management of the Bakhtegan Basin	40,194	45,624	56,792	61,961	45,129	249,700
SUB - TOTAL:	**88,924**	**109,749**	**124,074**	**124,399**	**113,574**	**560,720**
PROJECT MANAGEMENT / EXECUTION COSTS:	**174,556**	**156,557**	**195,923**	**139,480**	**163,323**	**829,839**
GRAND TOTAL:	**1,456,840**	**2,124,891**	**2,183,557**	**1,870,914**	**1,456,564**	**9,092,766**

H. Disbursement schedule

	Upon signature of Agreement	**One Year after Project Start [a)]**	**Year 2[b)]**	**Year 3**	**Year 4 [c)]**	**Total**
Scheduled date	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	
Project Funds	1,466,840	2,124,891	2,148,557	1,870,914	1,481,564	9,092,766
Implementing Entity Fees	383,963	108,369	109,576	95,417	75,560	772,885
Total	**1,850,803**	**2,233,260**	**2,258,133**	**1,966,331**	**1,557,124**	**9,865,651**

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

A. Record of endorsement on behalf of the government[68]

H.E. Mr. Seyyed Ali Mohammad Mousavi *Director General for International Environmental and Sustainable Development* *Affairs of the Ministry of Foreign Affairs and National Designated Authority*	Date*: August 3rd, 2018*

B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.

Pradeep Kurukulasuriya,
Executive Coordinator a.i.,
Global Environmental Finance
Bureau for Policy and Programme Support
United Nations Development Programme
Implementing Entity Coordinator

Date: *4 January 2019*	Tel. and email: +66 87 017 8667; pradeep.kurukulasuriya@undp.org
Project Contact Person: Reis Lopez Rello	
Tel. And Email:+6623049100 ext.5286; reis.lopez.rello@undp.org	

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