ADAPTATION FUND

REQUEST FOR PROJECT/PROGRAMME
FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

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ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category: Regular project
Country/ies: Armenia
Title of Project/Programme: **Strengthening land based adaptation capacity in communities adjacent to protected areas in Armenia**
Type of Implementing Entity: NIE
Implementing Entity: "Environmental project implementation unit" SA
Executing Entity/ies: Ministry of Nature Protection of RA
Amount of Financing Requested: **2 506 000** (in U.S Dollars Equivalent)

Project / Programme Background and Context:

Provide brief information on the problem the proposed project/ programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

Introduction

1. Due to its climate and pronounced location in the South Caucasus with a mountainous landscape, fragile ecosystems and a vulnerable, agricultural based economy, the compounding effects of climate change and land degradation particularly affect livelihoods and economies of Armenia and its approximately 3 million inhabitants. In fact, climate trends over the previous 90 years have already indicated a significant warming trend. The summer season has become dryer and the number of extreme events, like hailstorms, has increased. Different climate change scenarios predict that this trend will continue to increase and substantially affect the marginal production areas. Crop and livestock production has already decreased in some areas, and if no additional climate adaptation measures were taken, will continue to decrease.

2. Notably areas and communities adjacent to protected areas and forests – like Khosrov Forest State Reserve and Dilijan National Park - are vulnerable due to a persistent pressure on the remaining land and pasture resources, weak rural infrastructure and the lack of alternative income opportunities. The existing capacity to adapt to a changing climate and its increasing impacts on the rural livelihoods and their production systems is low, calling for concerted efforts

to addresses the compounding challenges of land degradation and climate change impacts on rural livelihoods.

Country Context

3. The Republic of Armenia is a mountainous, landlocked country in the Southern Caucasus region neighboring Azerbaijan (East), Georgia (North), the Islamic Republic of Iran (South) and Turkey (West). The majority of its territory (76.5%) is situated on the altitudes of 1000-2500 m above sea level with the lowest point at 800m in the Ararat Valley and the highest point being Mount Aragats with 4090m. The country has an area of some 30,000 km^2 and a population of approximately 3 million. The climate is continental, with hot summers and cold winters. Landscapes are mainly plateaus and mountain ranges separating narrow plains.

4. The Republic of Armenia is a lower middle-income country that went through a transition to a market based economy and parliamentarian system since independence from the Soviet Union in 1991. Its economy is dominated by extractive industries and agriculture with Yerevan as its economic hub and capital city. Armenia has a per capita Gross National Income (GNI) of US$ 3770[1] and a poverty headcount ratio at national poverty lines of 29.8%; It ranked 85th in the 2015 UNDP Human Development Index.

5. Agriculture has traditionally been the backbone of Armenia's economy; While it's GDP contribution declined from 26% in 2000 to 18% in 2016 (World Bank, 2018[2]), the agriculture sector provides with 44.2% still the majority of the total employment (World Bank, 2018). Much of Armenia's population is poor and highly vulnerable to any event that affects the agricultural sector (Ahouissoussi et al., 2014[3]). The share of women engaged in informal employment in agriculture is about 82.1 % compared to 60.8% of informal workers in agriculture being men; There is a significant gender pay gap in agriculture with women average wages of approximately 65.9% of men's average wages (FAO, 2017[4]). Women head about 26.5 % of rural households, whereas most of the land is registered and managed by men limiting women's access to land.

6. The country's agricultural sector is mainly geared toward subsistence farming, but surplus production is marketed. Currently, the sector does not meet Armenia's food needs and is still

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[1] Current US$; Atlas method (World Bank, 2018: https://data.worldbank.org/country/armenia, accessed January 2018)

[2] World Bank, 2018: https://data.worldbank.org/country/armenia, accessed January 2018

[3] ibid

[4] FAO, 2017: Gender, Agriculture and Rural Development in Armenia; Budapest

reliant on government subsidies. The household farms sector, which includes a large number of peasant farms, but also includes rural and urban household farming and gardening companies, produces over 90 % of agricultural output (Ahouissoussi et al, 2014[5]). The prevailing farming system is mixed farming, where crops and livestock are equally important and in some regions, either crops or livestock could be dominant. It should be noted that given the spatial variability of soils and climate, and access to water, many areas of Armenia out- side of the lower-elevation areas are unsuitable for high-value vegetable production and produce more resilient, less input-intensive crops such as wheat, maize and forage in the more mountainous areas (Ahouissoussi et al., 2014[6]).

7. Armenia hosts exceptionally rich and globally significant biodiversity. 11.2% of the country's territory is covered with forests. Due to intensive nature use the level of anthropogenic changes of natural landscapes in Armenia is high. Overexploitation has resulted in pollution and reduction of wild biodiversity, loss of habitats of certain species and changes in the services provided by ecosystems. Currently 3 reserves, 4 national parks and 27 sanctuaries have been established in the Republic of Armenia, restricting the use of natural resources by the residents of surrounding communities. Residents of communities living near specially protected natural areas have limited possibilities to use of land and water resources, and as a result anthropogenic and natural pressure to natural ecosystems near communities significantly increases. Under these conditions, degradation of natural ecosystems adjacent to communities is progressing gradually reducing the capacity to adapt to climate change. Progressing climate change conditions (increase of temperature, decrease of precipitation, flood and hail frequency) reduce agricultural productivity.

8. Land degradation is a driver of vulnerability to climate change and, through the loss of soil organic carbon, contributing to climate change. Land degradation and the diminishing capacity of agro-ecological systems to adapt to climate change are closely related. The 2015 "National Strategy and Action Program to Combat Desertification in the Republic of Armenia" recognizes natural and anthropogenic desertification factors. Natural factors include: droughts that are frequent in the Ararat valley and some areas of Vayots Dzor and Syunik regions; Sandstorms are frequently observed in Ararat valley, Vayots Dzor and Syunik regions; Moisture deficit caused by unequal distribution of seasonal and regional rainfall, landslides and floods as well as salinization. Anthropogenic factors include: Urban development, agriculture practices, absence

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[5] Ahouissoussi, Nicolas, James E. Neumann, Jitendra P. Srivastava, Brent Boehlert and Steven Sharrow. 2014. *Reducing Vulnerability of Armenia's Agricultural Systems to Climate Change.* World Bank Studies. Washington, DC: World Bank. doi: 10.1596/978-1- 4648-0147-1

[6] ibid

or inappropriate application of crop rotation techniques, ineffective use of irrigation water and nutrients, overgrazing of pastures; Road construction; Illegal logging and soil contamination. Nearly half of the cropland and forest-land are affected by water erosion (220,000ha and 186200ha respectively), while approximately 170,000 ha are affected by overgrazing. Armenia has set in its **Land Degradation Neutrality**[7] National Strategy voluntary and ambitious targets to achieve land degradation neutrality, a process to which this project is contributing. It is estimated that interventions on 407.5 km2 are require with an investment need of US$ 210 million until 2040.

Climate and projected climate change impacts

9. Armenia has a highland continental climate with hot summers and cold winters. The mean temperature in Armenia is 5.5°C, with the hottest regions being the Ararat Valley with an average 12 to 14°C. Summers are warm with a mean temperature of 16 to 17°C; however, the hottest regions typically have a high around 24 to 26°C, and extremes there can reach 38 to 40°C (FAO, 2008). Average winter temperatures are approximately −7°C. On average, Armenia receives 592 mm of rainfall annually, but levels vary significantly by region. In the Ararat Valley and Meghri region, annual precipitation is only about 200 to 250 millimeters, while some mountainous regions can receive as much as 1,000mm each year.

Table 1. Annual mean temperature and precipitation changes in 1929-2012 changes relative to the 1961-1990 average (Yerevan)

Time period	Air temperature, ⁰C	Time period	Precipitation, mm (%)
1929-1996	+0.4	1935-1996	-35(-6)
1929-2007	+0.85	1935-2007	-41 (-7)
1929-2012	+1.03	1935-2012	-59 (-10)

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[7] United Nations Convention to Combat Desertification (UNCCD) defines land degradation neutrality as: "a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems"

10. Long-term trends over the previous nearly 90 years indicate a change in annual ambient temperature and precipitation in Armenia for various time periods. These results show that, in recent decades, there has been a significant temperature increase (table 1; figure 1). In the period of 1929-1996, the annual mean temperature increased by 0.40C and in the period from 1929-2012by 1.030C. The spatial distribution of changes in precipitation amounts is fairly irregular. Over various seasons of the year ambient air temperature changes exhibit different trends. Extremely hot summers have been observed over the last 17 years (1998, 2000, 2006, 2010) (figure 1). The comparison of changes in the assessment of precipitation amounts for different periods demonstrates that precipitation continues to decline. Observations showed that, in 1935-1996, there was a 6% decrease in annual precipitation, while in 1935-2012 it was close to a 10% decline (figure 2). The spatial distribution of changes in precipitation amounts is fairly irregular. Over the last 80 years, the climate in the northeastern and central (Ararat Valley) regions of the country has turned arid, while precipitation has increased in the southern and northwestern regions, as well as in the western part of the Lake Sevan basin.
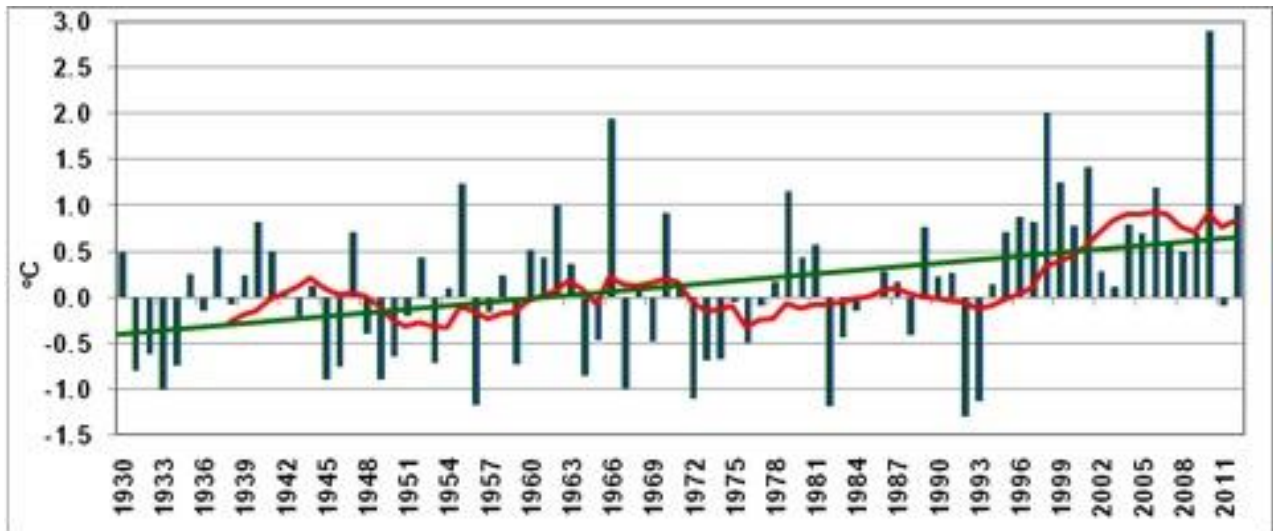

Figure 1. Deviations of average annual air temperature in the territory of Armenia from the average values for 1961-1990
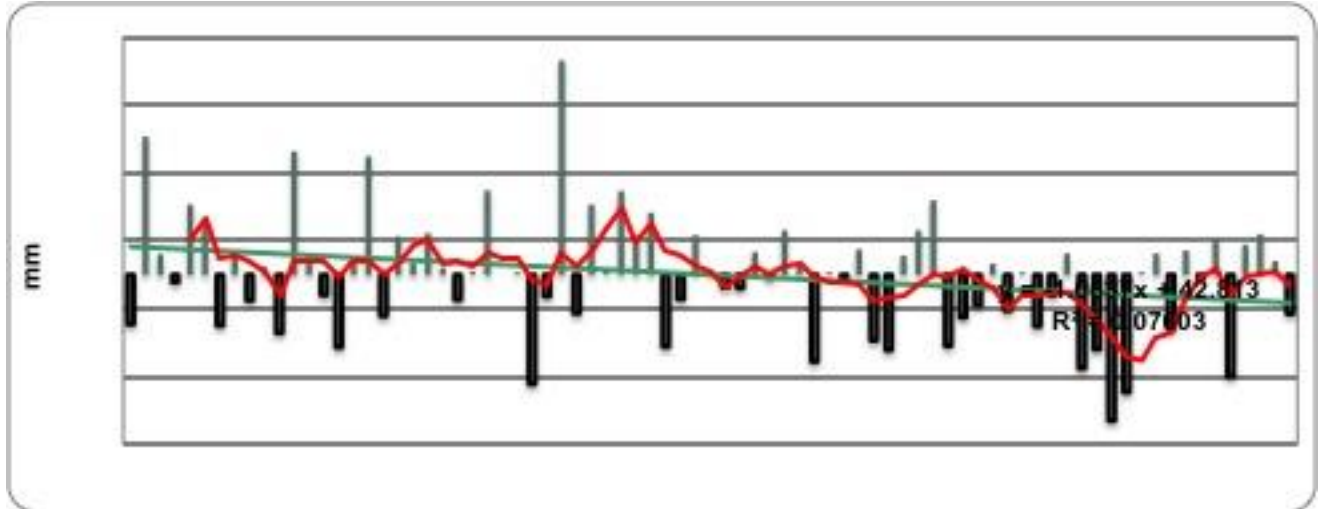
Figure 2. Deviation of annual average precipitation in the territory of Armenia from the average of 1961 -1990

11. In recent decades, the frequency and intensity of natural disasters has increased both in Armenia impacting economy and human lives. Extreme events (hail, frost, strong winds, heavy rainfall, floods, droughts, heat waves) may be contributing to the generation of natural calamities (or their escalation), such as landslides, avalanches, mudflows, forest wildfires, rock-falls, outbreaks of infectious diseases, etc. Between 1980-2012 most hazard events (frost, hail, strong winds, and heavy precipitation) were observed in 2004 (245). The amount of hail is greatest in Shirak valley; heavy precipitation is most common in Tashir and Ijevan regions; more frost events are observed in Ararat Valley and pre-mountainous regions. The number of frost events has increased significantly as the annual mean temperature increase in Ararat Valley mostly occurs in March, which triggers the earlier start of vegetation; the sharp temperature fall in April consequently increases the frequency of frost events. Also the number of days with heavy precipitation and hail has increased. This is due to the higher frequency of penetration of high cyclones generating heavy rain and hail clouds.

12. Ex ante climate change scenarios have been studied for Armenia in line with the Intergovernmental Panel on Climate Change (IPCC) recommended RCP8.5 and RCP6.0 scenarios for CO2 emissions. Therefore, as per the RCP6.0 scenario CO2 concentration is estimated at 670ppm by 2100 and at 936ppm according to the RCP8.5 scenario. Accordingly forecasts for the year 2100 for ambient air temperature and rainfall indicate that the temperature continues to increase in all seasons of the year (table 2). However, according to the RCP8.5 scenario, starting from the mid-21th century (2041-2100) the temperature will rise at a more rapid rate. It is very likely that by 2100 the average annual temperature in Armenia will be 10.20C, which exceeds the baseline (1961-1990) by 4.7 0C. Figure 2 presents spatial distribution maps for annual mean temperature for the 1961-1990 baseline and projections for 2071-2100.

Increased temperature in mountainous regions demonstrates an apparent retreat in negative temperatures (figure 2). For example in 2100 annual mean negative temperatures will be maintained only in the highlands of Aragats, Geghama, and the Zangezur mountains. In general, seasonal and annual temperature and precipitation change trends are similar. It should be noted that maximum temperature increase is observed during the summer.

Table 2. Projected changes in annual and seasonal average temperatures in the territory of Armenia compared to the average for 1961-1990, ^{0}C

Seasons	1961-1990 average	Scenarios	2011-2040	2041-2070	2071-2100
Winter	-5.3	RCP, 6.0	1.4	2.6	3.6
		RCP, 8.5	1.7	2.8	4.4
Spring	4.3	RCP, 6.0	1.3	2.4	2.7
		RCP, 8.5	1.4	2.7	3.9
Summer	15.7	RCP, 6.0	1.9	3.0	3.8
		RCP, 8.5	2.1	4.0	6.0
Autumn	7.2	RCP, 6.0	0.8	2.3	3.0
		RCP, 8.5	1.4	3.2	4.4
Year	5.5	RCP, 6.0	1.3	2.6	3.3
		RCP, 8.5	1.7	3.2	4.7

13. Although the results of different climate change models reproduce changes in temperature fairly well, there are large uncertainties in terms of precipitation. According to the RCP8.5 and RCP6.0 scenarios for the summer months there is an expected significant decrease in precipitation in all 3 periods in 2011-2040 summer precipitation is expected to decrease by about 23% compared to the baseline (1961-1990) period. The distribution of annual precipitation in Armenia will not undergo significant change; According to the model projections, summers will become drier and hotter, leading to a variety of problems in water resources, agriculture, energy, healthcare and other sectors.
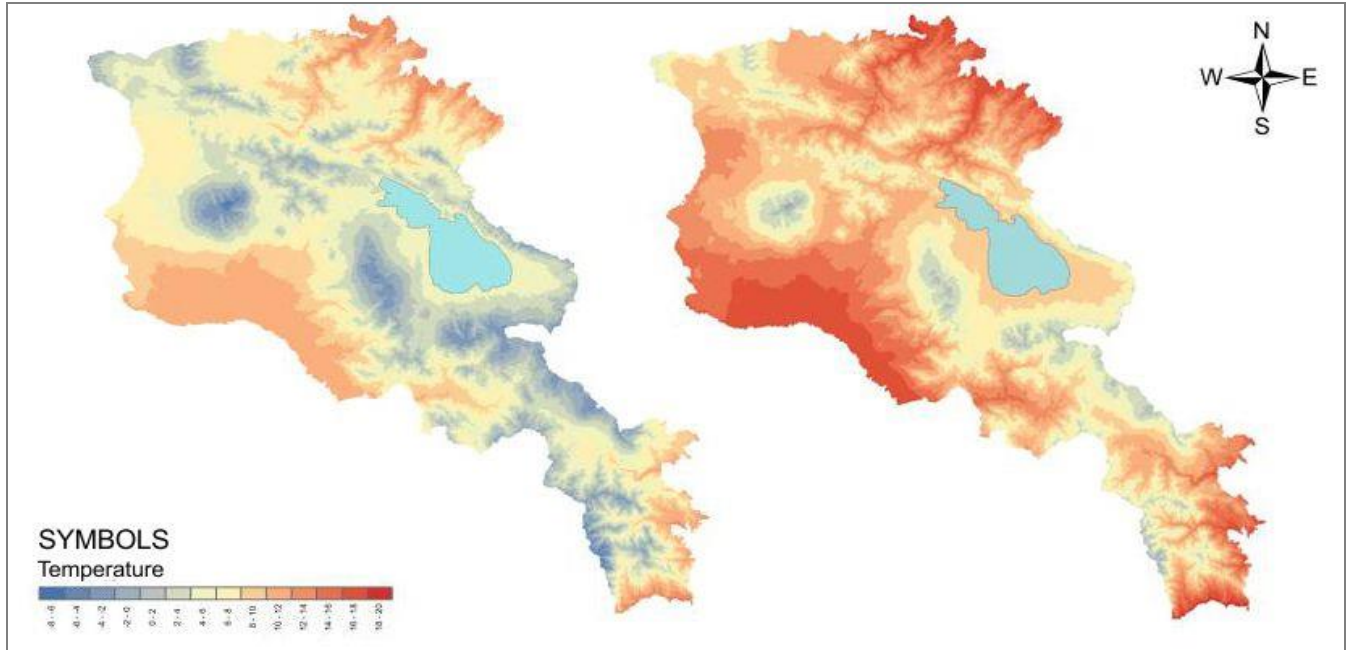
Figure 2. Distribution of annual average temperature in Armenia in (a) 1961-1990 and (b) projections for 2071-2100, RCP 8.5 scenario
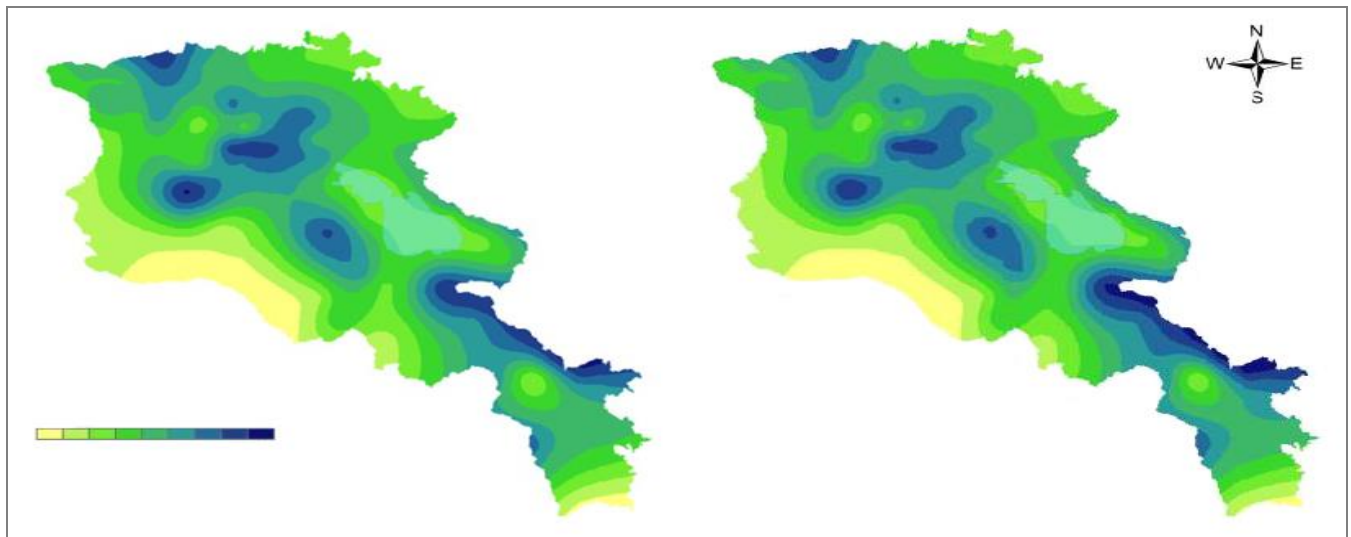

Figure 3. Distribution of annual average precipitation (mm) in Armenia in (a) 1961-1990 and (b) projections for 2071-2100, RCP 8.5 scenario

14. *Potential climate change impacts on different economic sectors*. Climate change is likely to impact different sectors notably the water, agriculture, forestry and livestock, health sector in numerous ways, with substantial impacts on the different sectors of Armenia's economy. Without implementing adaptation measures as part of the core development policy, strategies and plans, these consequences are likely to be significantly exacerbated over time. Table 3 summarizes the potential impacts of the main climate change effects and drivers.

i. *Agriculture*: Climate change may lead to a shift of agro-climatic zones, notably in the mountainous areas as well as agricultural land, pasture and grassland degradation. It is expected that that the climate impacts on precipitation and temperature (increased evapotranspiration) has impacts in increased soil salinity and reduction in crop and forage yields. The increased frost risk may particularly have impacts on horticulture and tree crop production;

ii. *Forestry*: In case of projected climate change scenarios the lower mountain belt forests (550-1200m) will be most vulnerable, where the conditions for forest growth will be sharply worsened. According to expert assessments (without adaptation measures), about 17,000 ha forests will disappear. Based on the biological peculiarities of leaf-eating insects, it can be assumed that the massive development of the area will be expanded by more than 2-fold and will reach 70-75000ha. Increase in forest fire intensity is also expected.

iii. *Natural ecosystems*: Boundaries of landscape zones are predicted to shift upward mountainous profile 200-300m. The surface of the desert-semi-desert belt will expand by 33%, and the surface of the steppe zone by 4%. The surface of subalpine belt will be reduced by 21%, while the alpine belt by 22%. In case of increasing temperature and falling precipitation projections, desertification processes are expected to accelerate. The total area of the pastures and their yield will be reduced by 4-10%, including the most valuable and yielding pasture areas of the subalpine and alpine zones by 19-22%. In this regard, it is expected that 30% and cattle breeding -by 28-33% will reduce the livestock.

iv. Health: Higher temperatures and the penetration of hot currents can contribute to the deterioration of people's health, especially among adults and children. Because of the direct impact of climate change (heat waves, thermal islands), the rate of increase in cardiovascular diseases will rise. Indirect effects will be expressed by the increase in epidemic and seasonal infections, as well as by the increase in the frequency and spread of diseases associated with inadequate supply of clean water and food safety. Since 1994 a trend of frequent imported malaria cases is observed. In Armenia from 1998-2001 due to high summer temperatures the largest number of malaria cases was recorded. Raising temperatures and prolonging of warm and hot periods will also contribute to the spread and increase in intestinal infections.

Table 3. Potential climate change impacts in Armenia

Climate change effects	Potential Impacts
Overall increased temperatures - Reduction of negative temperatures in mountainous areas; - Higher peak temperatures in	- Increase in evapotranspiration; - Earlier snow melts; - Increased salinization of ground water resources; - Increased agricultural water stress in summer season

Climate change effects	Potential Impacts
summer;	with increased demands for irrigation; - Decreased crop productivity (crop yields), particularly heat intolerant crops (perennial, annual crops) - Decreased of forage production due to the early arrival of spring and increase in temperatures; - Decreased livestock productivity due to impacts on heat intolerant livestock species; - Higher energy consumption for air conditioning, cooling, pumping of water, etc; - Decreased forest cover and vegetation shift to dryer steppe type ecosystems; - Stressed aquatic ecosystems; - Increased health risks due to heat waves and air pollution; and increased malaria risks due to higher temperatures;
Decrease in precipitation during summer - Dryer and warmer summers	- Increased agricultural water stress with increased demands for irrigation; reduced water availability; - Reduced growing season and decreased agricultural productivity, impacts on drought intolerant crops; - Decreased of forage production due to limited water availability and reduced growing season; - Increased water demand for livestock; - Impacts on aquatic ecosystems and shift of ecosystems; - Decreased forest cover and shift of forest ecosystems;
Potentially marginal increase in precipitation in mountainous regions	- Potential increase in run-off and increased flood risk - Changing patterns in mountainous ecosystems;
More extreme weather and climate events - droughts - floods - hail storms - frost event	- Increase of frost events due to an earlier start of the crop growing season and potential sharp falls in temperature after the start of the growing season (e.g. April); - Increased number of days with heavy precipitation and hail due to the higher frequency of penetration of high cyclones generating heavy rain and hail clouds; - Increased peak run-offs in rivers leading - Increased erosion and land slide risk;

Priority areas for climate change adaptation

15. Armenia is affected by the compounding effect of climate change and land degradation and its impact on livelihoods and local economies. The project focuses therefore on the two hotspots of land and forest degradation and will address the intertwined issues related to climate change adaptation, land degradation and bio-diversity. Communities adjacent to protected areas and forest reserves are hotspots for land degradation and their rural livelihoods and production systems thus particularly vulnerable to climate change impacts due to resource overexploitation and limited alternative income opportunities.

16. The project will therefore focus on areas adjacent to two remaining and protected forest areas: **Khosrov Forest State Reserve** in the Ararat Marz in south western Armenia (south east of the capital Yerevan) and **Dilijan National Park** in Tavush Marz in north-eastern Armenia. While the two protected sites are protected natural ecosystems, the adjacent communities are facing high rates of poverty and resource constraint livelihoods with limited capabilities to address land degradation, sustainably manage bio-diversity of the region and adapt the production systems and communities to the impacts of climate change. More specifically the project will target the **Urtsadzor community** located on the foothills of the western part of the Ararat valley close to Khosrov Forest State Reserve and **Dilijan, Margahovit** and **Fioletovo communities** located in the vicinity of the Dilijan National Park. "Khosrov Forest" State Reserve and "Dilijan" National Park and their adjacent ecosystems are important migratory routes for the main species registered in the Red Book of Armenia and the involvement of communities in the management of routes will significantly improve the efficiency of species conservation.

    i. "Khosrov Forest" State Reserve occupies a territory of 23,359 ha. Reserve area is isolated from the basic infrastructure and only from south- west it borders the densely populated Ararat valley. The area is characterized by unique semidesert, phryganoid, sparse forest mountain-steppe landscape symbioses. Intrazonal wetland ecosystems are also represented in the area of the reserve along the riverbanks, as well as in vicinities of Mankuq and Gyolaysor dwellings. 1948 species of vascular plants and 1783 species of animals of which 1500 species of invertebrates and 283 species of vertebrates are preserved in the reserve.

    ii. "Dilijan" National Park occupies a territory of 33,765 ha typically covered with forests. Dilijan National Park is a unique site of Armenia's wildlife, which stands out by the wealth of original biodiversity, mesophile woodlands, separate ecosystems of scientific, educational and economic interest, as well as by its patrimonial, environmental, cognitive, curative and recreational assets. 1200 species of vascular plants and 1660 species of animals of which 1431 invertebrates and 229 species of vertebrates are preserved in the area.

17. Community adjacent to Khosrov Forest State Reserve - Urtsadzor community is located in the foothills of the western part of Ararat valley and consists of three rural settlements Urtsadzor (3320 inhabitants), Lanjanist (175 inhabitants) and Shaghap (1030 inhabitants). The combined population of 4525 inhabitants in 2017 (approximately 1000 households) is mainly engaged in cattle breeding, plant cultivation and fruit growing. Table 4 provides an overview of the main characteristics of the community. Farmers are engaged in horticulture, cattle breeding, crop production, vegetable growing, beekeeping and fodder production.

   i. The summers are warm, and the winters are moderately cold. Winters begin mid-December, average January temperature ranges from -3 to -5 ° C. Summer is long, from May to October, the average monthly temperature of the air reaches 24 to 26 ° C and maximum 39-40 ° C. Often heats with strong winds are observed that are causing considerable damage to agriculture. The annual precipitation is 250-300 mm. The rivers belong to the Caspian basin (Arax River).

   ii. Natural landscapes are semi-deserts that have been transformed into a cultivated-irrigated landscape. From the agro-climatic point of view, the community lies in the absolute irrigation zone as the average annual precipitation does not exceed 32-36 mm in summer.

   iii. The arable land in the community administrative area is 758ha, remote pastures are 550ha, community pastures 7767ha, perennial herbs 121ha, gardens 40ha and 163ha of land plots. In 1991, during the privatization of the lands in the country the size of one plot of land privatized in the community settlements made 0.45 ha. Crop production in the community is possible only with irrigation. On average between 2013 and 2017 250-300ha of fall wheat was produced, 40-60ha of spring barley, 40ha of cigarettes and 70ha of vegetables and melons.

   iv. As of 2017 data, the community residents keep 3299 heads of cattle and 3760 heads of small cattle, 90 pigs and hens. Compared to 2013, the number of cattle decreased slightly. The average milk yield of one 1 cow decreased by 300 liters reaching from 2000 liters to 1700 liters.

   v. Since the crops are cultivated only in irrigated areas of the community, their yield is mainly conditioned by the quantity of irrigation water supplied and natural hazards. The analysis of the collected data shows that during the previous 5 years no increase has been observed in harvesting, though the farmers have maintained the rules of cultivation of agricultural machinery. This is mainly due to the lack of irrigation water and efficiency of the deteriorated irrigation system, where 80% of water losses occur in the primary and secondary irrigation channels. Irrigation is done openly (irrigation dykes), the majority of which are disturbed and large water losses (see photo). Another factor is frequent hails, spring frosts, high summer temperatures, hot winds.

vi. Residents of rural communities live in socially unfavorable conditions. About 45% of the total annual income is received from salaries, 10% from farming, 5% from livestock, 33% from other sources (pensions, allowances, transfers from other countries, etc.).

18. Communities adjacent to Dilijan National Park – Dilijan, Margahovit and Fioletovo communities are located in the south-western part of Tavush Marz. Dilijan community was established in 2016 and comprises Haghartsin, Aghavnavanq, Gosh, Khachardzan and Teghut rural settlements. The total population of Dijilan and the rural communities belonging to it was 6813 people, 3551 people in the Margahovit community and 1279 people in the Fieletovo community.

i. The climate is moderately warm and humid. Dilijan, Margahovit and Fieletovo and adjacent rural communities are located in moderately damp areas with warm summers and mild winters. The rivers belong to the Caspian basin (Kura river).

ii. The average monthly temperature in January is -2 ° C and 18.2 ° C in July. Air dryness is particularly evident in the winter and spring months. The relative air humidity is 65-70%, the precipitation is 600-650 mm. Winters begin in early December. It is moderate hot in summer. The average temperature in July is + 18 ° C and the maximum is 32-33 ° C. Occasionally, there are hot springs which can cause some damage to agriculture.

iii. The territory of the community is almost entirely surrounded by a forest, from the upper boundaries of which the mountainous pastures begin. The area is distinguished by the great diversity of flora and fauna. Mixed forests occupy 61% of the total surface, which are distinguished by the diversity of flora and fauna.

iv. The climatic conditions of the area (mild, mineral healing water, forests, highlands rich with herbs) are extremely beneficial for the recreation of the population, restoration of health and international tourism. The territory is rich in historical and cultural monuments, monasteries, fortresses, khachkars (cross-stones), bridges, tombs, monuments, and memorials.

v. Farmers are engaged in horticulture, livestock breeding, crop production, bee-keeping and feeding. The area is relatively poor with minerals but is rich in mineral water. There are two mineral water plants operating in Dilijan. From the agro-climatic point of view, the community lies in the moderate irrigation zone as the average annual precipitation does not exceed 250-300 mm in summer.

vi. Autumn and spring wheat and barley can be cultivated in the community under dry conditions. Whereas the cultivation of orchards and vegetables and melons is only possible in case of irrigation. The analysis of the collected data shows that the yield of all crops is considerably lower than the national average, mainly due to the insufficient quantity of irrigation water supplied and natural hazards (e.g. hail storms). This is mainly due to the lack

of irrigation water as the irrigation network is completely demolished. Another factor is the frequent recurrent hails, spring frosts, high summer temperatures, and hot winds.

- Dilijan community has vast areas of remote pastures (5879ha) and community pastures (1330ha), whereas the community keeps largely cattle, small ruminants and poultry and pigs. Compared to 2013 the number of cattle has substantially decreased by more than 40% in 2017, whereas average annual milk production decreased by 150 liters with an average between 1250 liters and 1100 liters annually.
- Margahovit community has vast areas of remote pasture (2840ha) and community pastures (990ha), hay meadows, plots and horticultural land cultivating predominately potatos, melons, and vegetables. In the highlands of the community only autumn and spring wheat and barley can be grown in dry conditions. The community keeps mainly cattle and small ruminants, whereas the number of cattle has decreased since 2013 by about 14%. The average milk yield of one 1 cow decreased marginally by 20 liters reaching from 1520 liters to 1500 liters.
- Fioletovo community is the smallest of the priority communities and has remote pastures (90ha) and community pastures (194ha) and has a relatively large crop and horticultural production area dominated by potatoes, cabbage, beet and other annual and perennial crops. Cattle are predominately kept by the community and has seen a slight increase (approximately 5%). The average milk yield of one 1 cow amounts to 1,700 liters.

vii. The presented data indicate that in all communities there are high poverty level and low birth rates, which are close to the republic's average level. Socially vulnerable target groups make up about 25 percent of the population.

Table 4: Key indicators for priority communities

Key indicators	Aragat Marz	Tavush Marz		
	Adjacent to Khosrov Forest State Reserve	Adjacent to Dijilan National Park		
	Urtsadzor	Dilijan	Margahovit	Fioletovo
Socio-economic indicators				
Permanent residents	4525	6813	3551	1279
Male	2096	3423	1794	646
Female	2429	3390	1757	633
Preschool age (0-6 years)	383	299	315	108
School age (7-17 years)	604	890	835	154
Middle age (18-63 years)	3195	4389	2297	890
Over 63 years	389	760	525	127
Number of the households	1027	1995	1376	365

Agricultural indicators				
Arable lands [ha]	758	743	440	25
Pastures total [ha]	8317	7209	3830	135
Remote pastures [ha]	550	5879	2840	950
Community pastures [ha]	7767	1330	990	194
Land plots [ha]	163	388	387	119
Hay meadows [ha]	2000	1125	1800	50
Cattle [heads]	3299	1686	1901	1640
Small ruminants [head]	3760	343	1575	280
Pigs [head]	90	933	295	-
Municipal / Community finance indicators				
2016 budget [US$]	249,624	1,280,898	172,894	112,545
2016 budget, gov. subsidy [US$]	86,566 (34.7%)	903,483 (70.5%)	65,060 (37.6%)	42,778 (38%)
2017 budget [US$]	250,554	1,469,888,	123,345	97,267
2017 budget, gov. subsidy [US$]	131,741 (33.7%)	901,235 (63.3%)	50,919 (41.3%)	42,778 (43.9%)
% directed to salaries	52.9%	17.3	30.2%	39.6%
% directed to environment	3.7%	10.3	2.7%	-

Projected climate change effects in the priority areas and adaptive capacity

19. Current long term climate trends for the Ararat Marz, where Khosrov Forest State Reserve is located, and Tavush Marz, where Dilijan National Park is located, point at increased summer temperatures and reduced overall precipitation in line. This is expected to further increase in line with the overall projected climate trends for Armenia for the year 2100.

i. Communities adjacent to Khosrov Forest State Reserve. From 1935 to 1996 average annual temperature increased by 0.40C, from 1935 to 2007 0.85 0C, from 1935 to 2016- 1,030C. Whereas in 1935-2016, the average summer temperature rose to around 1.10C and the winter was 0.40C. From 1935 to 1996 6% of the average annual precipitation was recorded, and by 10% in 1935-2016. Late spring and early autumn frosts, strong frosts observed in winter and strong winds are mainly due to Scandinavian anticyclone, the frequency of which has increased by 71%, which indicates that the repeatability of hazardous meteorological phenomena also increases in the area. The number of cases of Iranian anticyclone formation has increased by about 63% in the area. As a result heat waves repeatability increased as well as the average duration of dry spells.

ii. Communities adjacent to Dilijan National Park. From 1935 to 1996 the average annual temperature has increased by 0.30C, from 1935 to 2007 - 0.650C, during 1935-2016 - 0.950C. Whereas in 1935-2016, the average summer temperature has risen to around 0.850C, and the

winter temperature - 0.20C. In 1935-1996 the average annual precipitation has decreased by 5%, and from 1935 to 2016 about 9%. Late spring and early autumn frosts, strong winter frosts, strong winds are mainly due to Scandinavian anticyclone, whose frequency has increased by 31%, which indicates that there is a certain increase in the area's repeated meteorological phenomena. The average number of dry days following each other has increased by 3 to 21 days.

20. The vulnerability of the target communities to climate change is driven by (i) land and bio-diversity degradation and marginal production systems, (ii) weak infrastructure, water inefficient irrigation systems and limited climate technology adoption and (iii) poverty, lack of alternative income opportunities putting additional pressure on natural resources. Community pastures are 3-9 km away from the community, which are used by cattle breeders from March to late November. Shift grazing is not used at all. In many areas there are no watering points, as a result of which animals have to cross-large areas for drinking water. Since remote pastures are often not used due to the poor condition of the roads and the inadequate social conditions of the majority of the residents, the whole load falls on the community pastures. Due to global warming, low rainfall in summer and prolonged high temperatures the pastures are not able to recover after grazing. This is by the fact that from early spring to late autumn continuous grazing does not allow plants to undergo generative development and restore the area through seeds. Pastures near the community are extremely degraded. Topsoil with high soil organic carbon has diminished and the vegetation got poorer. In these conditions many types of dry-resistant plants are intensively spreading that are not eaten by animals. Animals have to cross vast areas and additionally contribute to the strengthening of degradation. The adaptive capacity of pastures has severely diminished and is expected to be further reduced with progressing climate change. Without any further pasture management measures it is expected that 5 % of community pastures may be further degraded and transformed into unproductive landscapes. In the course of the next 10 years nearly 30% of community pastures will likely lose their adaptation potential to climate change and will turn into semi-desert ecosystems if surface improvement measures are not undertaken.

21. This has in return significant effects on the population's living standards. Reduction in incomes from agriculture and cattle breeding does not allow part of the residents to use enough gas and electricity for household needs. Wood and dried manure is used as a fuel. Under these conditions there are two main negative results.

   • The pressure on the forest ecosystem increases, as a result of which the climatic and water absorbing properties of the forest decrease. As a result of felling clearings, light forests, not valuable shrubs non-specific to ecosystem emerge where the sprouting of seeds of special tree

species and the development of the new forest are worsening. The ecosystem is gradually weakening and losing its adaptive capacity to climate change.

- The use of organic fertilizers in agriculture decreases. Gradually, the quality of soil degrades and often they are out of cultivation, turning into semi-desert or very sparse grasslands.

22. At the same time there are some conflicts between the two protected areas situated in the impact zone of the community (illegal logging, grazing, gathering of useful plants), which is mainly due to the high levels of poverty and low level of knowledge on the values of protected areas. As a result of this and other actions prohibited by the law degradation of vegetative cover is caused which results in the decrease of ecosystem resilience to climate change. Since the specially protected nature areas are important areas for enhancing ecosystem and landscape resilience to climate change and have environmental, social, health and great scientific value, the establishment of effective cooperation and further development between the communities and organizations implementing protected area management is highlighted and will increase the adaptation level of protected natural ecosystems. At the same time it is clear that it is not possible to enhance efficiency of specially protected nature areas without improving social conditions of communities' population and implementation of operations on increasing community awareness on the importance of protected areas. Communities must be considered not as impeding but contributing factors to protected area.

23. Community self-governing bodies are unable to provide adequate financial resources to promote and implement adaptation measures as well as energy efficient technologies and value chain diversification (solar water heaters installation, construction of modern greenhouses with lightweight constructions of fruit and vegetable seedlings, solar water heaters, etc.) and support measures for sustaining agriculture and livestock production (irrigation system repairs, diversification of agriculture, reconstruction of waterway roads, construction of watering points in pastures, etc.) enhancing the stability of natural ecosystems and agricultural landscapes and increase of product volumes. Table 4 provides an overview of the 2016 and 2017 budget situation of the communities. Analyzing the budgets of the all communities in the project, it shows that the budgets are composed of communities' own revenues and government subsidies.

Project / Programme Objectives:

List the main objectives of the project/programme.

24. The objective of the project is to reduce the climate risk vulnerability of local communities living adjacent to the "Khosrov Forest" and "Dilijan" National Park by strengthening the

adaptive capacity of the agricultural sector and reinforcing their institutional and planning capacity for climate change adaptation.

25. The project has three expected outcomes:

Outcome 1: Community based, climate smart agricultural practices are implemented in degraded areas to reduce climate risks vulnerability of production systems and sustain protected areas;

Outcome 2: Value chains for climate smart agriculture are strengthened and climate smart technologies are accessible for vulnerable rural communities;

Outcome 3: Awareness, planning, monitoring and decision making capacity on climate smart agriculture production methods and land degradation neutrality has increased in target communities;

Project / Programme Components and Financing:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.

Project Components	Expected Outcomes	Expected concrete outputs	Amount (US$)
Component 1: Community based, climate smart agricultural practices in degraded areas and buffer zones	Outcome 1: Community based, climate smart agricultural practices are implemented in degraded areas to reduce climate risks vulnerability of production systems and sustain protected areas;	Output 1.1: Irrigation water supply systems are rehabilitated increasing water use efficiency; Output 1.2: Water efficient drip irrigation systems are installed in selected community orchards; Output 1.3: Existing field tracks to remote pastures degraded lands are rehabilitated; Output 1.4: Sowing areas of perennial plants are created reducing rangeland degradation; Output 1.5: Community pastures and hay meadows are rehabilitated and improved their adaptive capacity; Output 1.6 Livestock watering points are constructed; Output 1.7: Degraded slopes are rehabilitated by belt planting of perennial, drought resistant plants;	1 410 000
Component 2 Strengthening value chains and climate smart technology transfer for vulnerable communities	Outcome 2: Value chains for climate smart agriculture are strengthened and climate smart technologies are accessible for vulnerable rural communities;	Output 2.1: Solar hot water supply systems are installed in priority community areas Output 2.2: Non-heated, lightweight greenhouses are constructed in priority community areas Output 2.3: Solar dryers are installed in priority community areas Output 2.4: Community management and business plans are formulate for climate smart agricultural value chains.	500 000
Component 3 Awareness raising, capacity building, monitoring and decision making for climate smart agricultural practices	Outcome 3: Awareness, planning, monitoring and decision making capacity on climate smart agriculture production methods and LDN has increased in target communities;	Output 3.1: Farmer field schools and extension services have been provided to share best practices of climate smart agriculture and LDN for the targeted communities; Output 3.2 Best practices examples and training material on climate smart agriculture are formulated, disseminated and made accessible; Output 3.3 Community based adaptation planning is conducted for target communities; Output 3.4 Strategies for sustaining climate smart agriculture and LDN in target areas have been formulated. Output 3.5: A monitoring system for land based adaptation measures and land degradation neutrality has been established for the target communities;	200 000

3. Total components			2 110 000
4. Project execution cost*			200 000
5. Total Project Cost			2.310,000
6. Project Cycle Management Fee charged by the Implementing Entity (if applicable)			196 000
Amount of Financing Requested			2 506 000

* Copyright and technical supervision includes midterm and final external monitoring of the project, midterm and final external audit, midterm and completion missions of the AF experts.

Projected Calendar:

Indicate the dates of the following milestones for the proposed project.

Milestones	Expected Dates
Start of Project/Programme Implementation	2018
Mid-term Review (if planned)	2019
Project/Programme Closing	2020
Terminal Evaluation	2020

The total duration of the project is 3 years (36 months).

PART II: PROJECT / PROGRAMME JUSTIFICATION

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

Approach and objectives

26. The **objective** of the project is to reduce the climate risk vulnerability of local communities living adjacent to the "Khosrov Forest" and "Dilijan" National Parks by strengthening the adaptive capacity of the agricultural sector and reinforcing their institutional and planning capacity for climate change adaptation by implementing adaptation measures in selected communities.

27. The proposed project will develop adaptive strategies in response to climate change effects on the . It will sustainably strengthen livelihood of affected communities without further land degradation by introducing climate smart agricultural technologies, improving the value chain of

targeted products and strengthening their planning capacity to increase the adaptive capacity of the local communities. The project brings together the concepts of land degradation neutrality and climate change adaptation.

28. The project would focus on three main adaptive strategies: (i) adaptation of agro-ecological landscapes and maintaining agricultural productivity under increasing climate change, (ii) sustaining climate smart agricultural value chains through the promotion of low cost, energy saving technologies and (iii) improved planning capacity of local communities and reinforcing their local adaptive capacities. The project would thereby be an important building block toward land degradation neutrality (LDN).

29. The project is organized into three main components with three primary outcomes. Component 1 of the project will focus on community-based interventions for strengthening the adaptive capacity of the agricultural sector. Component 2 will support climate smart agricultural value chains, Component 3 covers topics regarding capacity building, awareness, local training, as well as knowledge and information management, and to facilitate information to strengthen national strategy and policies on climate change adaptation. The main project interventions will be implemented in the adjacent communities of "Khosrov Forest" State Reserve and "Dilijan" National Park.

30. The project concept has been developed taking into consideration both the Adaptation Fund policies and the best international practices. During the formulation of the concept note, community consultations were held in all target communities allowing a participatory planning and formulation of priority interventions for climate change adaptation. Questionnaires and other data were collected and community meetings held to identify the key factors that could adversely affect the adaptation of natural ecosystems and agricultural landscapes and to formulate the priority interventions for each community. Ecosystems and communities' adaptability measures are primarily aimed at adapting to climatic emergencies (high and low temperatures, dry and hot winds, spring and autumn frosts, strong hails and rains, increased air temperature, etc.).

31. It is a pilot or incubator project, which is aimed to be scaled-up along vulnerable areas and buffer zones of protected areas and forests in Armenia and test relevant models. The project follows thereby a bottom up and community focused approach, with local action defined, prioritized and implemented by the vulnerable communities.

Project Components

32. **Component 1: Community based, climate smart agricultural practices in degraded areas and buffer zones:**

The component aims to increase the adaptive capacity through promoting climate smart agriculture and developing activities that promote restoration of natural ecosystems, water and soil conservation, organic agriculture, low cost technologies, and improved livestock forage quality. It further aims to strengthen the adaptive measures that improve livelihood and the social conditions of the target population. This component targets all local producers (mainly micro and small scale producers) located in the project areas that are highly vulnerable to extreme hydro-meteorological events and to gradual climate change effects. The interventions are supported by local capacity building (authorities, farmer associations, civil society organizations, and the private sector) in climate risk management, through community based adaptation and empowerment of local producers by increasing their capacity to deal effectively with the impacts of climate change. 1.

33. **Outcome 1: Community based, climate smart agricultural practices are implemented in degraded areas to reduce climate risks vulnerability of production systems and sustain protected areas:**

Component 1 addresses critical adaptation issues in the crop, livestock and forestry production systems and natural habitats in the target communities adjacent to Khosrov Forest State Reserve (1 community) and Dilijan National Park (3 communities). (Details on the production systems, livelihoods and adaptation challenges in the target communities are provided above.) The project will establish demonstration sites (on community land, schools and community champions) in the four targeted communities, provide training on specific farming practices through training of trainers and community champions, provide farm inputs and material (e.g. seed and seedlings of drought tolerant crops), rehabilitate community infrastructure notably and directly support the most vulnerable communities. All activities will be planned and implemented in a participatory, bottom up approach by the local communities with the support of extension services and external partners, where necessary. It is expected that the activities will be further rolled out in all parts of the communities and other vulnerable communities adjacent to protected areas in Armenia.

34. Taking into account current and projected climate change scenarios a project concept aimed at increasing the level of adaptation of natural ecosystems and agricultural landscapes has been developed based on the following interrelated chain of events:

1. Adaptation level of degraded natural ecosystems could be raised by restoring their integrity,
2. The level of adaptation of natural ecosystems can be increased by reducing anthropogenic pressure on them,
3. The level of adaptation of natural ecosystems can be increased by their proper exploitation and conservation,
4. The level of adaptation of agricultural landscapes can be increased through efficient irrigation water management and the introduction of the latest technologies in agriculture,

5. The level of adaptation of natural ecosystems and agricultural landscapes is more effective when it is combined with measures to improve the livelihoods of the population,

6. Increasing the effectiveness of the conservation of specially protected natural areas is possible by improving the socio-economic situation of the adjacent communities.

7. The adaptation of ecosystems and agricultural landscapes to climate change contributes to multiple benefits, including its commitment to land degradation neutrality

Summarizing the results of studies and proposals from communities the program has focused on the main activities that the majority of the population believes can contribute to achieving the program objectives. Clearly, during the concept development phase it was impossible to calculate and discuss all alternative measures that would contribute to the conservation of project's outcomes.

The project will focus on developing a broader spectrum of actions as a number of professionals of the sector will be involved in this stage. It is expected that there will be new more effective proposals, as well as innovative changes for already proposed actions.

It is clear that anthropogenic pressure on other areas will increase causing decrease in ecosystem adaptation to climate change. This will spread by a chain reaction principle on other ecosystems and landscapes reducing their sustainability and adaptation potential.

In its turn land degradation will lead to a decrease in water resources and a reduction in adaptability of other agricultural sectors.

Adapting ecosystems and landscapes to the adverse effects of climate change can only be achieved through the implementation of complex measures. This should include not only improvement of the social conditions of the population, enhancement of agricultural productivity, foreseeing of financial resources for environmental measures in the community budget, planting of heat-tolerant crops considering the optimal use of irrigation water, but also enhancing adaptability to disturbed ecosystems.

35. The project aims at implementing a number of activities and would introduce the following adaptation measures:

- **Increase water use efficiency** to address projected climate change induced reduction in water availability and makes crop production systems less vulnerable to climate change impacts, through the rehabilitation of irrigation systems, introduction of drip irrigation and promotion of water and climate smart agricultural practices.

    - Renovation of main irrigation water supply systems, where water loss reaches up to 80%. The demand of water for irrigation is a critical element to maintain important crops along the marz. Besides the area is highlighted by the scarcity of water. The anticipated change will save water, the irrigated area will be expanded, will promote diversified agriculture and crop yield will be increased thus increasing the incomes of the population.

    - Establishment of drip irrigation intensive orchards in communities. This system will also save water, new orchards will be created, soil degradation will be prevented, saved water will be used for the irrigation of new lands, new fruitful orchards will be established thus increasing populations' income

- **Increase soil organic carbon** through (i) promotion mulching, reduced tillage, compost management, prevention of soil erosion and rehabilitation of soils and measures for reducing soil erosion (ii) the establishment of agroforestry systems on degraded slopes and (iii) prevention of erosion of slopes by the planting of dry-resistant species, as well as berries of high demand in the market.

- Introduce and promote more **heat and drought resistant pasture crops** and **climate smart livestock management** while providing better access to remote pastures (including rehabilitation of rural community field track) to **reduce pressure on community pastures**, increase pasture rotation and rehabilitation of livestock watering points. Rehabilitation of community pasturelands and grasslands by means of surface improvement and construction of livestock watering points. This activity will undertake improvement of the management of natural grasslands and hay meadows in the project area, including rehabilitation of hay meadows, indigenous reseeding, rotational grazing and restoration of degraded pasturelands, construction of livestock watering points and re-introduction of forage legumes into crop rotations. Stock watering points will be located to make better use of pasture resources to utilize pastures, which are underused because of lack of drinking water for lives.

- **Improve fodder management** through the establishment of sowing areas of perennial plants (lucerne, sainfoin) to create a sustainable base for fodder. This activity will extend the wintering period of livestock and will promote degradation of adjacent pasturelands, as well as this will increase the fertility of the soil.

- Improve **agricultural micro-climate** through the promotion and rehabilitation of agro-forestry systems in targeted degraded slopes areas. Prevention of erosion of slopes by the planting of dry-resistant species, as well as berries of high demand in the market.

- Promote more **drought and salinity tolerant crop/pasture** varieties and **establish seed banks** with drought tolerant crop seeds and easy access of local communities to those seeds;

- Promote information sharing, **farmer field schools** and the promotion of global best practices;

- Strengthened monitoring system for climate smart agriculture, land degradation neutrality, forest and ecosystem adaptation;

36. The following concrete outputs have been formulated for this component.

Output 1.1:   Irrigation water supply systems are rehabilitated increasing water use efficiency;

Output 1.2:   Water efficient drip irrigation systems are installed in selected community orchards;

Output 1.3:   Existing field tracks to remote pastures degraded lands are rehabilitated;

Output 1.4:   Sowing areas of perennial plants are created reducing rangeland degradation;

Output 1.5: Community pastures and hay meadows are rehabilitated and improved their adaptive capacity;

Output 1.6 Livestock watering points are constructed;

Output 1.7: Degraded slopes are rehabilitated by belt planting of perennial, drought resistant plants;

Component 2: Strengthening value chains and climate smart technology transfer for vulnerable communities

37. Component 2 will complement the adaptation measures in the crop, livestock and forestry production systems by supporting the livelihoods and income earning opportunities of the target communities. Sustaining climate smart agricultural practices and reducing the pressure on natural forests, rangelands and protected areas (Khosrov Forest State Reserve and Dilijan National Park) will be enhanced by through agricultural value chain development and the introduction new climate smart technologies to the target communities. The goal of this output at community level is to strengthen population's livelihood by creating new jobs, diversify agriculture, and decrease energy costs in the community and farmers' budget. In the result the overexploitation of agricultural and natural ecosystems will decrease and the resilience and adaptive capacity of landscapes on which the communities strongly depend will thus be enhanced. This component is based on the idea that ecosystem adaptation to climate change is possible to enhance by decreasing the pressure on them and their vulnerability and building alternative methods of resilience to climate change.

The presented data indicate that in all communities there are high poverty level and low birth rates which are close to the Republic's average level. Socially vulnerable target groups make up about 25 percent of the population. Based on community social and demographic situation and the preliminary consultations with community leaders, we have created a chain of activities each link of which will solve important social and environmental issue. The project highlights energy saving activities enabling communities to direct the saved funds to ensure the continuity of the project results. For this purpose it is envisaged to install solar water heaters in public sector(kindergartens, medical centers) which will save will save a large amount of electricity which paid from the community budget. This event will also improve working conditions of public sector employees serving as a good example for the population to acquire solar water heaters for their own.

Similar programs implemented both in Armenia and in other countries were studied. Our consultations with community leaders mentioned those main activities that under climate change conditions can contribute to ecosystem resilience. Naturally, the program cannot solve all the problems, but these measures can significantly reduce the anthropogenic pressure on protected areas and natural ecosystems adjacent to communities.

38. **Outcome 2: Value chains for climate smart agriculture are strengthened and climate smart technologies are accessible for vulnerable rural communities;**

It is expected that the project would facilitate the adoption of new technologies and strengthen climate smart agricultural value chains. The proposed activities will promote income generation of the population, improvement of livelihood, and thus decrease of anthropogenic pressure on natural ecosystems and in the result increasing the adaptation capacity to climate change in the agricultural sector. The component will focus on the dissemination of best practices in the farm enterprise and public sector, which will improve their opportunities and as a result will contribute to the reduction of anthropogenic pressure on ecosystems under climate change

- Installation of alternative hot water supply systems for the public sector.

39. Community budget study with the project shows the financing of kindergarten and community outpatient clinic is carried out from community budget. The amounts allocated to this public sector are only enough to pay salaries. The specificity of this public sector requires the use of large quantities of energy or other fuels which is very difficult to provide with limited community budgets. Climate change mitigation and adaptation technologies enable the use of solar energy and make significant savings in community budgets. Based on the results of community-based discussions, the program focused on the efficiency of application of solar water heaters the public sector. One solar water heater with a capacity of 250 liters can save $ 600-1000 electricity or other fuels per year. Solar water heaters will significantly improve working and hygienic conditions. Since more than 95% of women are employed in this sector, women are expected to improve their working conditions.

It's worth mentioning that communities are willing to donate funds to protect project outcomes and to carry out community-based environmental activities that will contribute to enhancing the adaptation of landscapes.

Benefits:

- Improved working and hygienic conditions,
- Improved child care conditions,
- Improved of sanitary conditions,
- Savings from the use of electricity and other fuels,
- Improved project outcome maintenance,
-Implementation of community-based environmental activities.

Beneficiaries- staff of kindergarten and community outpatient clinic , children up to 7 years old, community population.

This activity will first of all promote energy saving, decrease the use of gas and wood, decrease the number of greenhouse gas emissions, improve working conditions of women employees, and free up resources from the community budget.

- Construction of non-heated greenhouses with lightweight constructions.

40. The effectiveness of most climate change adaptation measures is largely conditioned by improving the social conditions of the residents, obtaining additional income and agriculture diversification.

During the discussions of project activities in communities, it was a common belief that lightweight constructions of greenhouses and solar dryers would best meet the community's adaptability to climate change.

Lightweight construction of greenhouses

The greenhouses will enable growing vegetable crop seedlings in spring and selling them to residents at low prices. The residents can grow seedlings of such crops that are not traditional for the country but are of high demand in the market. It will be possible to purchase new dry resistant and heat-resistant varieties and hybrid seeds from specialized stores and seed research centers. In the summer and autumn the greenhouse has the potential to grow vegetable crops, part of which will be provided to the community kindergarten. The other part of the harvest will be sold in the market and will provide financial resources for future operation of the greenhouse. If desired, the residents can also heat up the greenhouses until late autumn and grow vegetables that are sold at a relatively high price in the market.

In Armenia the cost of 1 square meter of greenhouse construction with glass, zinc-coated structures is $ 94-110 and and in the case of polycarbonate- $83-100. High-quality polyethylene membranes are currently imported to Armenia with the price ranging from $1.1-1.2 per square meter. This type of membranes are mainly used for the construction of non-heated greenhouses. The greenhouses can be covered with either one-layer or double-layer polyethylene membranes. The cost of construction of one-layer polyethylene membrane greenhouse is ranging from $ 20.8-27.1, while in case of double-layer $ 27.1-31.3.

This activity will promote production of seedlings, increase in crop areas, introduction of non-traditional crops and which will create an opportunity for early crop yield, as well as creation of new jobs for women.

- Construction of solar dryers for fruits, berries, vegetables and herbs.

41. These types of structures are very important for communities as during the massive maturing of the crops their market price equal to the production costs. Since Armenia's nature is rich in wild berries, herbs, plants used in teas and in food, most of which are dried and used in other seasons of the year, it is very important to have solar dryers in the communities. In this case, the residents will be able to quickly and accurately dry crops and plants/herbs and sell them in the market or to the processing industry in the future. The use of solar dryers reduces the raw material loss by 10 to 30 percent compared to home-based drying, and the product comes in much higher quality. Demand for the use of chemical preservatives and disinfectants also disappear. In the conditions of efficient drying of raw materials, the volumes of wild species gathering will be reduced, which will enhance the efficiency of their protection.

The cost of one square meter of solar dryers ranges from 31.3 to 41.7 US dollars in Armenia.

Benefits:

- Additional jobs,
- Additional income opportunities,
- Diversification of fresh and recycled crops,
- Involvement of women in works,
-Improvement of working and hygienic conditions of women,

- Provision of additional food to kindergarten,
- Improvement of sanitary condition and quality of products,
- Tangible savings for the use of electricity and other fuel,
-Improving the maintenance of project outcomes,
- Provision of part of the profit to the implementation of community-based environmental works
Beneficiaries-community residents.

Major purpose for these activities would be the reduction of crop loss, storage improvement and creation of new jobs for women. In this way climate smart agricultural value chains will be developed for products such as dried apricots, other fruits, berries and herbs, which would help to increase and sustain income opportunities for the farming communities. The project will therefore partner with community organizations, schools and local administration to install and promote solar driers. Training will be provided on these value chains and the marketing of products on the regional and national market.

- Community development, management plans and support for the formulation of climate smart agricultural business plans will be provided to target communities and champions.

42. The following concrete outputs have been formulated for this component.

    Output 2.1:   Solar hot water supply systems are installed in priority community areas;

    Output 2.2:   Non-heated, lightweight greenhouses are constructed in priority community areas;

    Output 2.3:   Solar dryers are installed in priority community areas;

    Output 2.4:   Community management and business plans are formulate for climate smart agricultural value chains;

43. **Component 3 Awareness raising, capacity building, monitoring and decision making for climate smart agricultural practices and land degradation neutrality**

    This component aims to support awareness raising and capacity building (authorities, farmer associations, civil society organizations, and the private sector) in climate smart agriculture as well as land degradation neutrality and support the decision-making and planning process in the target communities. As such component 3 bundles all capacity building, awareness raising and monitoring and evaluation activities supporting the interventions proposed under component 1 and 2. The component supports furthermore the community based planning and monitoring of climate smart agriculture and land degradation neutrality practices and interventions and supports the development of an LDN monitoring framework..

44. Component 3 has one main outcome.

Outcome 3 Awareness, planning and decision making capacity on climate smart agriculture production methods and LDN has increased in target communities;

45. The project will provide training and awareness raising on efficient management of water resources, climate smart agriculture and land degradation neutrality and other relevant issues related to climate change adaptation. Capacity building and awareness raising will be conducted through the training of trainers or community champions, structured information exchanges on best practices, farmer field schools and traditional lecturer-listener models of knowledge transfers. To increase work efficiency highly qualified specialists will be involved both from higher education institutions and regional centers of agricultural assistance. Guidance and training material will be developed through the project, which will be targeted to the local communities and support community groups and local self government board to adapt the training program. Structured evaluations of the learning events will be conducted after each training course and thereby support the continuous improvement of the training program.

46. A dissemination strategy to capture lessons learnt and make them available to other communities will be developed during the project. Information will be disseminated through public information leaflets and booklets in the communities of the Marz and across the country to roll out climate smart agriculture and land degradation neutrality in other parts of the Marz and the country. This output will focus on the dissemination of best practice through mass media and local self-government bodies. Modern information dissemination tools will be used for this. Regular information on the progress and outcomes of activities will be provided through the websites of the Ministry of Nature Protection, regional administrations and Environmental Project Implementation Unit (EPIU). Grievance redress mechanisms and effective governance measures will be in place of Ministry of Nature Protection, regional administrations and EPIU will make it possible rapidly respond to all complaints with the participatory problem solving approach.

47. In line with the national legislation, policies and national targets[8], the project would support initiatives for sustaining climate smart agriculture and in this context support the process for promoting land degradation neutrality in line with the voluntary targets set. More specifically, this project component would support the establishment of a dedicated **monitoring system for**

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[8] The main goal of the LDN strategy, proposed for the period until 2040, is to reestablish the loss of soil organic carbon in the period from 2000 to 2010, and an increase of carbon sequestrated by 2.8%. To achieve this goal, the following actions will be taken.

land degradation and land related climate change indicators and support the enabling environment for sustaining sustainable land management practice. More specifically the following interventions are planned and will be implemented with technical support from the international community, such as UN Convention on Combatting Desertification (UNCCD) and its Global Mechanism (GM):

- Strengthen target setting and monitoring systems for land degradation neutrality and land related climate change indicators to support the monitoring of land degradation and land related climate change indicators, such as soil carbon and vegetation cover conform international standards and applying state of the art techniques, such as remote sensing. Monitoring sites would be established and the currently available baseline information would be updated to support the contribution to climate change adaption and LDN target setting process;
- Strengthen capacity building for climate smart agriculture and sustainable land management practices with activities specifically addressed to the needs of female headed households, women groups, etc.;
- Support the development of climate smart agriculture and LDN investment strategies, which would allow farmer groups, unions of producers, small and medium enterprises, NGOs and other related stakeholders to provide private investments for sustaining climate smart agricultural practices and thereby sustaining the proposed interventions. The project would support the targeted capacity building activities, e.g. for micro, small and medium enterprises and may support small prefeasibility studies in support of these interventions.

48. The following concrete outputs have been formulated for this component.

    Output 3.1: Farmer field schools and extension services have been provided to share best practices of climate smart agriculture and LDN for the targeted communities;

    Output 3.2 Best practices examples and training material on climate smart agriculture are formulated, disseminated and made accessible;

    Output 3.3 Community based adaptation planning is conducted for target communities;

    Output 3.4 Strategies for sustaining climate smart agriculture and LDN in target areas have been formulated.

    Output 3.5: A monitoring system for land based adaptation measures and land degradation neutrality has been established for the target communities;

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

49.   As highlighted above, the many environmental services and benefits that will be derived from this project will go beyond the country level and will contribute to a number of global environmental benefits. By promoting greater coordination, collaboration and enhancing capacity, the project will promote an exemplary enabling policy environment which will reduce many of the barriers to the successful mainstreaming of ecosystem resilience to climate change adverse effects. This will be done by developing principles for effective capacity building and institutional frameworks for sustainable management of natural and agricultural ecosystems. The protection of Armenia's rich portfolio of globally important wild relatives, and associated evolutionary processes represents a global good of vital importance to the future of the planet and its inhabitants. Such unique germplasm harbours important genetic traits that can help the world cope with climate change and contribute to future food security. In this respect it will identify and test 'best practices' which strengthen adaptability, stability and resilience of the natural resources. By generating local income and economic development that rewards the provision of ecosystem services in some of the most impoverished areas of Armenia the project will contribute to reducing poverty and enhancing well-being and thus reduce future pressure on vulnerable ecosystems.

50.   The project will create age and social groups endowed with the necessary amount of knowledge was upon completion of the program will be able to disseminate their knowledge in other communities concerned.   The project will strengthen the capacity of local media and environmental NGOs.

The programme will provide significant economic, social and environmental benefits to selected communities. Armenia faces multiple hazards and shows a wide variety of vulnerabilities to climate change, which will result in rural communities and ecosystems negatively affected. Rural vulnerability is due to low human and infrastructure conditions related to poverty.

An important analysis was made, in order to choose the most vulnerable regions in the country regarding each of the components selected. Aspects such as: poverty, provision of basic services, basic dimensions of human development, productive activities, important biodiversity spots, and current-future vulnerability. As a result, vulnerable groups benefiting from this programme include:

Beneficiaries

51. The target communities were selected in a participatory manner focusing on poor and vulnerable communities as well as women and women headed households. The beneficiaries of the project are amongst the most vulnerable population of the country: rural communities with low human development indicators, highly dependent on natural resources taking into account restrictions of protected areas. It's expected through the project to integrate appropriate considerations of climate change and variability into daily practices among beneficiaries. The project will particularly target:

- Rural communities: The livelihoods on livelihoods are highly dependent on climate, particularly for those communities that are considered the most vulnerable. Support to the development of agricultural value chains and energy saving technologies will help sustaining and improving income opportunities for local communities.

- Small scale farmers: The project will help improving their production systems using a low cost/organic/nontraditional approaches that would contribute to increase their productivity, maintain their income and their resilience to climate change.
- Women: specifically women-headed households will benefit from improvements on the supply of irrigation water, implementation of sustainable and organic measures for agricultural sectors.
- Civil society organizations: Civil society and community based organizations, such as farmers' organizations and associations of local producers, women groups and schools as well as local government administration will benefit from the project through capacity building support and training, as well as support to better plan, manage and monitor climate smart agricultural interventions.

52. The number of direct and indirect project beneficiaries is estimated as follows:
- Total number of beneficiaries (direct and indirect): 16000 people
  - Beneficiaries in communities adjacent to Khosrov Forest State Reserve: 4500 people
  - Beneficiaries in communities adjacent to Dilijan National Park: 12500 people
- Beneficiaries benefitting from targeted capacity building: 300 people

Social benefits

53. The project has clear social benefits due to its holistic approach on supporting climate smart agricultural practices and supporting the livelihoods of the local communities through improved income opportunities.
- Increase of capacities and adaptation capacity in all the components of the project. It is expected to train more than 300 beneficiaries on adaptation measures (50% women).
- Active community participation. At least 4 communities and 11 rural settlements are beneficiaries of the adaptation measures implemented. Each of the activities involves the participation of organizations at the local level.
- Capacity building among social groups. The project will improve the levels of understanding of climate risk and adaptation to climate change to:
  - More than 200 stakeholders
  - 4 community representatives (traditional leader, women and young groups)
- Improvement of food and nutritional security in rural communities, through support to family farms, small and micro scale farms;
- Efficient management of water resources for the benefit of the community;
- Better income opportunities in the target communities through the promotion of solar drier and solar heaters in combination with training on the marketing of the products on local and national markets by creating value chains for agricultural products and effective training to

the local communities. The selection of pilot sites and beneficiaries will follow a pro-poor approach and particularly target women headed households.

- The proposed interventions are expected to have an impact on production yields of crops and fodder and thus provide additional income to the farming communities.

54. It is expected that the project will not have any negative social effects such as the resettlement of some communities, impact on the access to land and water resources or any discrimination due the participation (or exclusion) in project activities. The project will follow a consultative approach to the selection of stakeholders and beneficiaries, whereas a social and environmental management framework will be developed during the preparation of the project.

Economic benefits

55. Climate smart agriculture and sustainable land management projects - like this project - have different economic benefits, but in many cases some higher production costs than traditional agricultural projects. The quantification of the economic costs and benefits from sustainable land management are difficult to determine as the valuation of land, soil, forest, water resources and bio-diversity is challenging notably in data constraint environments. To capture the full economic value of land, soil, water resources and bio-diversity beyond the direct agricultural and production functions (e. crop and livestock related yields) their supporting and regulatory functions should be taken into account. Different initiatives from UNCCD, Global Environmental Facility and the Economic of Land Degradation project (ELD Initiative, 2013[9]) have tried to establish comprehensive cost benefit analysis for sustainable land management projects and have pointed at highly positive economic cost benefit rations. An economic cost benefit analysis would be conducted during project preparation. All in all economic benefits will arise from:

- Yield increase for fodder, crops, livestock and related products. Without any intervention measures, it is expected that yields will further decrease by 10% in the next decade. A reduction in crop and milk yields (5% for milk yield in the target areas) has already been recorded in the previous decades.
- Reduced production costs for example due to the reduced need of agricultural inputs;
- Reduced costs for processing and value addition of agricultural products, e.g. through solar driers for fruit, vegetables and berries substantial energy savings and possibly higher market prices.

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[9] ELD Initiative (2013). The rewards of investing in sustainable land management. Interim Report for the Economics of Land Degradation Initiative: A global strategy for sustainable land management. Available from: www.eld-initiative.org/

- Increased efficiency of the production system, e.g. through the rehabilitation of parts of the irrigation system and thus reduced operating costs.
- Secondary economic benefits for example from increased local tourism potential and increased bio-diversity in the communities adjacent to Khosrov Forest State Reserve and Dilijan National Park.

Environmental benefits

56. The environmental services and benefits that will be derived from this project will go beyond the country level and will contribute to a number of global environmental benefits. Notably the protection of Armenia' rich and globally important bio-diversity will be an important environmental benefit. By support the livelihoods of communities adjacent to natural reserves and protected areas the land use pressure on the protected areas (such as uncontrolled grazing and wood collection) would reduce and help protecting the pristine biodiversity. Capacity building and awareness raising activities will contribute to a sustainable management of the protected areas. Environmental benefits include:

- Soil preservation: One of the most important environmental benefits in the agricultural sector is soil conservation and decreased erosion, this will contribute to a reduction loss and increase of soil organic carbon.
- Improved pasture management will increase the biodiversity in community and remote pastures.
- Improved availability of water resources (groundwater and surface water) through an increased water use efficiency and reduced water losses in the irrigation system. Improvement of the protection of ecosystems protected areas;
- Increased biodiversity and reduced pressure on biodiversity and land at Khosrov Forest State Reserve and Dilijan National park
- Carbon sequestration through the conservation and increase of soil organic carbon.
- Contribution to the voluntary target for land degradation neutrality;

57. Article 30 of the Constitution of the Republic of Armenia adopted in 2015 defines the equality of men and women. Article 86 of the Constitution defines that the main purpose of the state policy is to promote equality between men and women.
UNDP Armenia Country Office has developed Gender Equality Strategy (2016-2020) document. The objectives of this document are two fold:

i) introduce in UNDP Armenia a formal, standardized system to apply gender mainstreaming (GM) across programme and operations, in line with corporate gender equality policies and benchmarks; and

ii) "de-mystify" for the staff the practical application of "gender mainstreaming", "gender equality", and other gender-related concepts and policies.

The current gender mainstreaming policies are mandatory for the implementation by UNDP Armenia all staff in country office and projects, regardless contractual modalities, time in post, and/or any other factors that may apply. The document comes in conjunction with Country Office three other documents, i) UNDP Armenia Programme and Operations Standard Operational Procedures, ii) UNDP Armenia Gender Mainstreaming Action Plan, and iii) UNDP Armenia M&E Plan, that present the implementation steps and intended results through the programme, project, and the year cycles. The document is fully in line with Country Programme Document 2016-2020 and its Action Plan, UN – Armenia Development Assistance Framework (UNDAF) 2016-2020, UNDP's vision and principles of 2014-2017 Strategic Plan, 2014-2017 Gender Equality Strategy, Gender Seal benchmarks, Higher Quality Programming, Quality Assurance, Results-Based Management and Institutional Effectiveness, as well as a number of other key national strategic development frameworks promoting sustainable human development, in general, and gender equality and women's empowerment, in particular.

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

Cost-effectiveness

58. A strong focus on capacity building that involves the participation of relevant stakeholders at several levels, from government officials to technical experts and the communities itself will support the adoption of new technologies in the target communities and will thus ensure a cost effective implementation of the project. Multiplier effects and the training of trainers or community champions will make it possible to have a relevant impact on a wider number of people who are indirectly involved in the project: especially through the dissemination of information, structured as a methodological tool, a wide number of citizens and civil society organizations will acquire new skills to better participate in the life of the community. Farmer field schools and peer-to-peer learning, that is a powerful way to share, replicate, and scale up what really works, by learning from the practical experiences of those who have gone through similar challenges. As an important knowledge management approach, knowledge exchange mechanisms are promoted among communities and organizations as well as capacity building, which will ensure adaptation on local planning processes as well as better decision-making by involving local stakeholders on topics such as climate change, resilience and adaptation in agriculture, water management. At the same time, the exchange of knowledge will lower the operational costs and increase benefits due the opportunity of replicating best practices and lessons learned amongst communities.

59. The project will be implemented in a highly cost effective manner through the application of competitive procurement of goods and services where this would be required (e.g. the competitive procurement of agricultural inputs such as seeds and tools) conform the rules for public procurement of the government and guidance for fiduciary management of the

Adaptation Fund. More importantly, the project will mainly involve community works, the local sourcing of input and labor and will limit, where this would be feasible, the costs for international consultants or import of material. The installation of locally produced light weight green house, and local construction of solar driers are cost effective and positive value for money on the local market. A detailed analysis will be conducted during project preparation.

Table 5: Benefits from proposed interventions, alternatives and reasons for not adopting

Benefits from the proposed intervention	Alternative measures and reasons for not adopting
Component 1 • The mentioned interventions can build climate resilience through managing competing land-use systems, while at the same time reducing poverty, enhancing biodiversity, increasing yields and lowering greenhouse gas emissions as well as, increases nutrient cycling, water redistribution, provides shade, controls erosion, increases carbon stocks. • Capacity building for diversifying agriculture, food production through practices such as agroforestry, drip irrigation system for orchards, sustainable base for fodder, improvement of crop yield of pastures and hay-meadows etc., which will increase agricultural productivity. • The participatory approach involving local people in managing natural resources and adaptation planning will lower management costs and will sustain the outcomes over time. • Renovation of main irrigation water supply systems which has several benefits: -Reduction in the water leakages in the system -Crop yield increase -Production cost price reduction -Reduced cost for the maintenance -Increased water use efficiency	• Conventional farming systems share many characteristics: - Large capital investments in order to apply production, investments that local communities are not able to apply. - Lack of financial resources for the improvements of lands and soil quality etc - External energy inputs; among others - Conventional techniques increased problems as the growing pressure on land, and rapid deforestation. - Surface irrigation increases water usage and losses - Contributes to soil erosion
Component 2 • Introduction of energy saving technologies such as solar water heaters, solar dryers and non-heated greenhouses include the following benefits: - promote energy saving, decrease the use of gas and wood, decrease the number of greenhouse gas emissions - They are efficient. Approximately 80% radiation is turned into heat energy. - Reduction in the costs for electric energy, community and population's budget - Promotion of job creation for women	• Conventional methods by the use of gas and electric energy, wood etc. are 4-5 times expensive; • The implementation of conservation measures through a top town approach limiting for example grazing without the provision of alternative income opportunities has proven not to be successful in the past.

Benefits from the proposed intervention	Alternative measures and reasons for not adopting
- Reduction of crop loss, storage improvement	
Component 3 • The participatory approach involving local people in managing natural resources and adaptation planning will lower management costs and will sustain the outcomes over time. • Strengthening the farmers and community groups' organizational capability and increasing their knowledge on issues related to climate change and variability will allow the beneficiaries to adapt to new climate scenarios if needed and ultimately reduce their dependence on external interventions.	• Top down introduction of new technologies has proven not to be successful in most farming communities. Instead of a prescription of different farming methods, the training, participatory planning and provision of different options for the farmers to choose from would very likely be more successful.

D. *Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.*

60. The aims and objectives of the program are fully consistent with the 3rd Communication on Climate Change and the Intended Nationally Determined Contributions (INDC) of the Republic of Armenia under the UN Framework Convention on Climate Change[10] as well as the government's National Strategy and Action Plan on Biodiversity Conservation, Protection, Reproduction and Use, as well as the National Strategy and Action Plan to Combat Desertification in Armenia. 14 main strategic and other documents have been developed in Armenia, which are directly connected with biodiversity and agro-biodiversity conservation and to which the proposed project intervention relate:

i. 1.Republic of Armenia 2014-2025 Strategic Program of Prospective Development. The objective of the strategy in environmental sector comprises improvement and modernization of the legislative and regulatory framework for environmental policy, reduction of corruption risks in the field of environmental management, prevention of current negative trends in land degradation, carrying out works on improving the management system of the SPNAs, development and implementation of the National Forest Program, development of

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[10] UNFCC Protocol Decision No 41, 10 September, 2015

baseline water resources management plans and decentralization of management processes, identification of common approaches and standards for the improvement of the environmental monitoring system.

ii. 2.Program of the Government of the Republic of Armenia (2017-2022). The objective of the strategy in environmental sector is that the activities of the Government of Armenia for the coming 5 years will mainly focus on continuous improvement and enhancement of the environmental management system, reduction of corruption risks, protection and sustainable use of water resources, atmospheric air, soil and underground resources.

iii. 3.Second National Environmental Action Programme of the Republic of Armenia (2008), which includes a number of actions concerning biodiversity conservation (inventory of biodiversity valuable areas, establishment of biodiversity monitoring system and database, assessment of the resources of the most significant flora and fauna species, genetic resources management etc.);

iv. 4. Strategy of the Republic of Armenia on Conservation, Protection, Reproduction and Use of Biological Diversity (2015), the main goal of the strategy is to ensure conservation, sustainable use and regeneration of the landscapes and biological diversity of the Republic for sustainable human development;

v. 5. Strategy and state program of conservation and use of specially protected nature areas of the Republic of Armenia (2014). The main objectives of the in-situ conservation of biodiversity have been enlarged and clarified here. The action plan covers 5 chapters: improvement of legal field / legislation, improvement of management system, enlargement of PNAs network, improvement of financial- technical mechanisms, and improvement of staffing;

vi. 6. National Action Programme to Combat Desertification in Armenia (2014), which will address pressures from habitat loss, land use change and degradation, and unsteady water use, reduced. Minimise the rate of loss and degradation of natural habitats. Promote, conserve and restore the main forest ecosystems. Promote, conserve and restore the main wetland ecosystems. Restore the landscapes and their biodiversity degraded due to industrial activity;

vii. 7. Community Agricultural Resource Management and Competitiveness Project (2015-2020), which aims to support the improvement of productivity of pasture and livestock systems in selected 100 mountainous and border communities, to support the capacity building of local producers and processors involved in the value chains of important agricultural products for the country, improve agricultural advisory and animal health services.

viii. 8. "National Strategy on Human Rights Protection (2012)". The strategy has the following main objectives: a) protection and development of human rights and fundamental freedoms,

b) ensuring efficient mechanimsm for the protection of each person's rights and freedom under the jurisdiction of the Republic of Armenia c) Improvement of existing legislation and proper application ensuring in line with international standards d) public awareness rising on human rights and their protection methods, e) promoting the protection of one's own rights.

ix. 9. Social-Economic Development Program of the RA Ararat marz (2015-2018), RA Lori marz (2014-2017) and RA Tavush marz(2017-2025). The objective of these 3 programs is to ensure the continuous development of 3 marzes with modern approaches. Project implementation will contribute to facing the challenges by rural and urban communities of marzes and will ensure the solution of priority issues. Strategic directions of marzes' economy, their development mechanisms, prospects for development and expected outcomes are clearly outlined in the programs. Programs will serve as platforms to link all investors, stakeholders, international and local donor organizations in the marzes.

x. 10. GEF-6 National Portfolio (2015) – Country priorities have been clarified on which project package have been developed which is planned to be implemented under STAR and out of the system of transparent allocation of resources (STAR).

xi. 11. Technology Need Assessment (TNA) (2015-2017). Armenia is actively involved in that should ensure adequate technological support and create a favorable environment for technology development and transfer. The process of TNA is the continuation of systematic research on climate change in the RA. The TNA Project provided a great opportunity for RA to perform country-driven technology assessment to identify environmentally sound technologies that might be implemented with a substantial contribution in addressing climate change mitigation needs of the country. The reports "Technology Action Plan for Mitigation Technologies" and "Technology Action Plan for Adaptation Technologies" have been developed.

xii. 12. Gender Equality Strategy (2016-2020) UNDP Armenia Country Office. - The objectives of this document are two fold: (i) introduce in UNDP Armenia a formal, standardized system to apply gender mainstreaming across programme and operations, in line with corporate gender equality policies and benchmarks; and (ii) "de-mystify" for the staff the practical application of "gender mainstreaming", "gender equality", and other gender-related concepts and policies.

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

61. There are no relevant national technical standards for tree planting, forest restoration or conservation agriculture related to climate change in Armenia. However, in the stage of the

complete program elaboration, the Standardization Sphere Codes and Names should be based on the Armenian Standards Classifier. The following sections are included in the preliminary study program.

Standardization codes and names according to Armenian Standards Classifier

Code 13. Environment protection. Human protection from environmental impact. Security

Group Code	Name
13.020	Environmental protection
13.030	Waste
13.040	Air quality
13.060	Water quality
13.080	Soil quality, agronomics
13.100	Safety of professional activity. Industrial hygiene
13.120	Everyday life security

Code 65. Agriculture

Group Code	Name
65.020	Farming and forestry
65.020.30	Livestock and animal breeding
65.040.30	Greenhouses and other structures
65.060	Agricultural machinery, property and equipment
65.080	Fertilizers
65.120	Animal feed

Code 67. Food technology

Group Code	Name
67.020	Processes in food industry
67.040	Food in general
67.050	General methods for food checking and analysis
67.080	Fruits, vegetables
67.100	Milk and dairy products
67.220	Spice. nutritional supplements

As such, international best practice standards will be followed throughout the proposed project. Environmental impact assessment or social and environmental management frameworks will be formulated during project preparation in accordance with the law of the republic of Armenia. No items requiring significant mitigation measures were noted. Interventions designed to provide

technology transfer, training or that include local community participation will be conducted in adherence with Armenia's labour codes and gender equality targets.

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

62. There is no duplication of project funding with activities or projects support by other funds or the government. Communities were asked questions about previous and ongoing support received from government and non-government organizations. The proposed project will not duplicate efforts, but rather capitalize on lessons learned and platforms created for uptake of the eco-agriculture approach.. The project aims however to build possible framework for land based adaptation measures in Armenia, which could be taken further by development partner, government or climate funds (such as Green Climate Fund). During project preparation consultations will be held with other government departments and development partners to avoid any risk of overlapping or weak coordination of activities.

63. In Armenia the GEF SGP officially started in November 2008 with appointment of the GEF SGP National Coordinator. In May 2009 the SGP country programme Strategy and Operational Frameworks were developed and adopted. For the current operational phase (2015-2018) the country programme addresses the following GEF thematic areas:

- Conservation and sustainable use of biological resources;
- Combating land degradation;
- Mitigation of climate change;
- Protection of international waters;
- Phase out of POPs and other harmful chemicals.

The SGP Armenia accepts applications from registered national NGOs without foreign founders regularly throughout the year. Maximum size of the grant cannot exceed US$50,000 equivalent. The GEF SGP does not provide core funding of a project, i.e. – any grant provided by the Programme should be additional, incremental in nature. It is a commitment on the part of SGP to the GEF Council to ensure 1:1 co-funding ratio, evenly divided between cash and in-kind (work, use of own machinery, materials etc.). Applications can be submitted from all regions of Armenia. These programs can only address local environmental issues that are presented in thematic areas. The SGP does not address complex measures to increase the adaptability of ecosystems and landscapes in climate change. The concept presented by us can not be repeated or similar to the GEF SGP programs as it incorporates complex activities that are targeted at enhancing the adaptability of ecosystems, natural and agricultural landscapes. To achieve this goal, various activities will be undertaken to improve the socio-economic situation of the population, to strengthen the capacity of knowledge, public organizations, energy efficiency in the public sector, diversification of agriculture and adaptation of degraded territories.

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

64. Component 3 of the project is related to the increase of knowledge and awareness of various target groups of the population. During the preparation of a full pledged project document the target groups will be finally specified along with their capacity building needs on which training programs will be developed. Particular attention will be paid on the dissemination of knowledge during and upon completion of the project. For this purpose individual target groups will be formed in each community whose members (mainly teachers, specialists of regional agricultural support centers, municipal employees) will be able to disseminate their knowledge among other interested groups. For other target groups the training program will focus on the clarification of the practical problems that are more interesting and are most in-demand for wide layers of the population. After each training course evaluations will be carried out by participants and experts. Positive and incomplete aspects of the trainings will be revealed based on which recommendations will be developed to improve the effectiveness of such courses.

- Knowledge and awareness component will also focus on the dissemination of best practice through mass media and local self-government bodies. This event will be supported by the elaboration, publication and dissemination of public information leaflets and booklets in the communities of the marz. Since the program provides a wide variety of events, which ultimately should increase the level of adaptation of ecosystems to climate change specialists on agriculture, energy, sustainable management of natural and agricultural ecosystems will participate in the trainings whose involvement in the project will contribute to summarizing and disseminating best practice in other regions of the Republic.

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

65. EPIU along with the Ministry of Nature Protection, as well as Climate Change Information Center, UNDP Armenia office have worked in close coordination for the formulating this project concept. During the development of this concept proposal, the various stakeholders have been consulted and consensus has been reached with regard to specific needs on adaptation actions for each of the sectors selected. In each of the four target communities – Urtsadzor, Dilijan, Margahovit and Fioletovo – project preparation meetings and stakeholder consultations were conducted in 2017 with the local population. The heads of Eco-education and donor funded project implementation division of EPIU visited the possible project areas to present in the communities the goals of the Adaptation Fund, to have discussions on topics such as needs at the community level, the most vulnerable areas, the current actions regarding these issues and general information about the country's climate threats and the country's vulnerability. The majors and the community leaders

assigned their assistants and advisors to maintain contacts and consultations with project partners throughout the project design in order to feed into technical design and to refine outputs and activities, as well as provide any information needed to EPIU for the design of the project. The consultation process started since the beginning of the concept proposal formulation. This first bottom-up approach allowed the NIE to establish the main adaptation activities that were considered effective and possible with the available funds.

66. The components of the concept proposal were selected at the National level, by the Third National Communication on Climate Change and the Intended Nationally Determined Contributions (INDC) of Armenia and the geographical scope was selected considering the vulnerability, adaptation capacity and other important aspects.

By the order of EPIU director dated May 18, July 6 staff of EPIU headed by the Deputy director have been sent to communities to have consultations and discussion with all the stakeholders, vulnerable groups that are directly related to project objectives. Stakeholders involved in the consultation process were given drafts of the programme concept proposal, so that comments and suggestions of improvement were collected and addressed in the final draft.

67. All meetings, discussions, and presentation of project conceptual provisions were made in a way that all stakeholder groups in that community were represented. It became possible because we had previously studied the statistics of all communities and had a clear understanding of the social and demographic situation. Equal representation of women was also a mandatory condition. Except for women's equal involvement, we have paid great attention to their suggestions which clarified a number of actions in the concept of the project. We have researched the Environmental and Social Policy and Gender Policy of the Fund and at this stage of the concept development, we have tried not to go beyond the fund's policy.

Selection of stakeholders

68. Based on consultations with community leaders, socio-economic development programs of the Tavush and Ararat marzes, National Statistical Service data, the population structure of communities, as well as based on lessons learnt from the projects implemented by EPIU and other organizations initial stakeholder groups initial stakeholder groups were identified and identified. The final list of target groups will be determined by the results of the needs assessment.

- *Community administration employees:* In conformity with the law of the Republic of Armenia on Local Self-government community administrations have rather extensive rights to carry out environmental, reconstruction, health protective, construction and other activities within their administrative boundaries. The program believes that raising the level of the knowledge of the municipal councils and staff members is a priority issue and will contribute to the effective implementation of the activities envisaged by the projects, outcome conservation and experience dissemination. At the same time decision-makers having the relevant knowledge will not make decisions in the future that would cause damage to the environment and in the result to community's interests.

- *Farm households:* The impact zone of the project is mainly agricultural which is carried out relatively on small plots/1200-2500m2. There are very few large farms, which are able to organize awareness and knowledge raising events for their employees. The selected target group is the most polynomial and vulnerable as unsatisfactory social conditions restrict their opportunities to get sufficient knowledge on urgent environmental problems and effective measures to solve them.

- *Teachers and high school students:* This target group is highlighted by the fact that they are the direct bearer and transmitter of knowledge. Teachers endowed with sufficient environmental knowledge (focusing the objectives of the project) can form stable mindset among students on the importance of environmental events and biodiversity conservation, while among high school students both to disseminate knowledge and to decide on getting professional education.

- *Media:* Great is the role of this target group on the dissemination of information on the project, coverage of events, outcome analyses, propagation of positive experience, transparency and mobilization of stakeholders. Special training program will provide mass media with the necessary knowledge and printed material for distribution ensuring continuity of the project.

- *The staff of protected natural areas:* The program emphasizes the importance of increasing awareness of this group and fruitful relationship with the surrounding communities. The training program will focus on solving conflicts between SPNA and community, their solution ways, participatory management and benefit distribution issues. This target group is directly connected with the surrounding communities and has all the possibilities to widely disseminate the results of the project and best practice. When drafting the preliminary draft project concept a number of meetings were held the employees of "Khosrov forest" State Reserve, "Dilijan" National Park and majors of adjacent communities and community council members.

69. There are a number of NGOs in the project area mainly in Urtsadzor community, Dilijan city and Margahovit community. During the meetings with some of these organizations, opportunities for their involvement in the process of developing and implementing the full project proposal were discussed. All non-governmental organizations have expressed their desire to support the implementation of the project and to ensure sustainability of project results after its completion.Several questionnaires have been developed to collect reliable data on communities that have been submitted to the communities during visits or electronically the results of which are summarized in the Annex 2. In all discussions the principle of gender equity was ensured.

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

70. The total funding required for this project is US$ 2, 528, 000 including project management and project execution fees. The funding requested is based on the available estimates of the cost of proposed technologies for climate smart agriculture, technology transfer and capacity building activities in four communities. Funding is being requested for the implementation of interventions to reduce the vulnerability and improve the resilience of the local populations of "Khosrov Forest" State Reserve and "Dilijan" National Park adjacent communities, by focusing on critical sectors (degraded natural ecosystems, infrastructures, agriculture, water resources, energy efficiency, additional incomes and etc) in order to reduce the negative impacts of climate change including:

- Increasing the adaptation capacity to climate change in the agricultural sector (including agriculture and livestock),
- Improving the capacity of communities, producers, institutions, and other relevant stakeholders regarding adaptation to climate change

Table 4 (see above) provides further details on the financial resources available that the local administrative and community level indicating the very limited availability of resources at this level calling for a full provision of resources

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

Sustainability

71. It is expected to impact the geographical areas selected and more than 18,000 inhabitants. The capacity building process of the project allows training local leaders who will be able to build capacity within the communities themselves.

- The project promotes initiatives that will continue to provide results beyond the year of implementation. As an example, the restoration and improvement of irrigation water systems, infrastructures, pastures and hay-meadows have long-term lifespan. However, those initiatives require regular maintenance after the implementation. The participation of local organizations, community administrations, NGOs and specially the commitment of local beneficiaries (individuals and organizations) make possible to preserve and even continuously improve the initiatives. In the agricultural sector, the sustainability of the proposal depends on the new knowledge provided by the adaptation initiatives, the use of innovative cost-effective technologies, and the monitoring of the effects of climate change and its variations. In these cases, the fulfillment of the objective may be observed in terms of productivity and the profits of the agricultural sector, by having successfully included adaptation actions. Efforts will be made to capture the long-term sustainability of the proposed sustainable land management and adaptation measures by supporting an adequate monitoring system.

- Sustainability will be further supported through mainstreaming and cross-sectoral, multi-stakeholder recognition of the role that increasing public awareness and knowledge to farmers, community leaders, relevant district and provincial officers on climate change and alternate adaptation measures in agriculture and water management can play in addressing many of the development challenges Armenia faces. In line with the many activities including awareness raising on climate change, there are more measures will be undertaken to change people's attitude and practices in sustainable adaptation to climate change. The project will furthermore strengthen the sustainability of the proposed interventions by supporting the land related policies and legislation and facilitating further investments in support of sustainable land management and climate smart agriculture.

- In order to sustain project activities beyond the project implementation date Community management plans will be developed which will clearly define the responsibilities of all actors engaged in the implementation of the project at community level. Upon completion of the project delivery-acceptance acts will be signed with EPIU and relevant community leaders to transfer the project outcomes and relevant agreements will be signed with the community leaders for the further maintenance and management of project outcomes. Moreover, the savings generated from energy, gas etc in public sector will be used for this purpose. Additionally, communities' budgets will include additions from public sector in the articles of the environmental protection and incomes from other activities.

- Agreements on the maintenance of the sustainability of project outcomes will be developed and signed with all stakeholders during the full project development phase.

- Agreements will be signed with stakeholder groups as well for the mutual use and maintenance of project outcomes. The laws of the Republic of Armenia, lessons learnt from similar projects, measures necessary for the community, awareness of the population about the importance of ecosystem adaptation to climate change, network of non-governmental organizations and their capacity building, independent media and relatively high level of education of the population are basis for ensuring sustainability of project outcomes.

- Lessons learnt from WB, UNDP, UNEP, UNIDO and many other projects have been observed.   In all programs, the sustainability of the results is largely due to:
  o Ensuring participatory approach,
  o The implementation of activities that are accessible to large groups of population
  o Involvement of non-governmental organizations and capacity building;
  o Close cooperation with community leaders and community members,
  o Public awareness on progress and outcomes of the project,
  o Raising population's awareness on the objective, results and maintenance benefits,

o The existence of a legally binding agreement with communities on the maintenance and sustainability of project results.

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

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	All activities of the project are in line with RA laws and normative acts and there is no need for additional assessment of conformity	No further assessment required for compliance
Access and Equity		Further assessment is required as the project may not be sufficiently accessible to all groups.
Marginalized and Vulnerable Groups	Project activities does not have negative impacts on vulnerable and marginalized groups	
Human Rights	Human rights in natural resources use, equity, education, health, and other relevant sectors are protected by constitution and other relevant laws. The project does not foresee any violation of human rights.	
Gender Equity and Women's Empowerment		Further assessment is required, to ensure equal participation of women in interventions and decision making too.
Core Labour Rights		Further assessment is required, to ensure that the labor rights are protected by Civil Code of the RA and equal participation of women
Indigenous Peoples	Main population of the area is Armenians, the percentage of indigenous peoples (Russians) identified in the project area is	

	very few.	
Involuntary Resettlement	Project interventions does not provide for resettlement of residents	
Protection of Natural Habitats		Further assessment is required to ensure that the interventions will cause no harm to natural habitats.
Conservation of Biological Diversity	Project activities will not have a negative impact on biodiversity conservation as within project design activities will ensure that the flora and fauna within the project area is conserved.	
Climate Change	The project does not have a negative impact on climate change. No project interventions are expected to contribute to release of gases responsible for CC and thus are not expected to contribute to GHG emissions.	
Pollution Prevention and Resource Efficiency	Project is not expected to generate any environmental pollution and aims for higher resource efficiency for better management of available natural resources.	
Public Health	The stability of ecosystem balance will contribute to the improvement of public health. Thus no adverse impact on public health related issues is envisaged.	
Physical and Cultural Heritage Implementation of the program contributes to the preservation of natural and cultural heritage	The activities envisaged by the Project are not implemented in such sites where there are physical and cultural heritage	
Lands and Soil Conservation	Project interventions will not create any damage to land and soil resources.	

72.   Following the initial screening process the proposed project concept is expected to be possibly in Category B in accordance with the Adaptation Fund's ESP as it has very limited adverse environmental or social impacts.

- There are not any cultural, traditional, religious or any other grounds in the Republic of Armenia and particularly in the project area that might result in differential allocation of benefits between men and women and naturally there is no need for further assessment.

- As a member of the Council of Europe, the Republic of Armenia has ratified all the conventions and treaties on gender equality and human rights.
- The number of other nationalities living in the project area is very few. Mainly ethnic Russians live in Fioletovo community and as project stakeholders they have been involved in the initial meetings and discussions on the Adaptation Fund, climate change adaptation and the program peculiarities held by EPIU. The objectives and activities of the project have been assessed positively by the community leaders and residents.
- It is envisaged by the project to renovate already existing field roads that are in a very poor condition. These activities will have limited negative impact on natural habitats, do not pollute the environment and do not harm the soil. It should be noted that, as a result of the activities, the greenhouse gas emissions from machinery and agricultural machinery will be reduced, and in case of improved roads, the cars will not bypass them and the natural habitat and landscapes of the area will not be harmed. The most damaged parts of the existing irrigation network will be repaired, in the result of which the land erosion, salinization and boggling processes the adjacent areas will diminish. Solar water heaters will be placed on the roofs of the public sector buildings. Installation will have no impact on environmental pollution. Non-heated greenhouses and solar dryers will be constructed in areas that will not cause any harm to natural and agricultural landscapes.
- The project envisages application of new technologies and lightweight constructions, during which the soil will not be damaged and the environment will not be polluted. Activities will be identified during the preparation of the fully-developed project proposal to allow for adequate risk identification and impact mitigation and prevention, as well Environmental and Social Management Plan (ESMP) will be developed.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

73. The project will be implemented over a three-year period, beginning in September 2018. The implementing entity (IE) for the project will be EPIU, as the National Implementing Entity for the Adaptation Fund. Replicating the longstanding work and experience of EPIU in working directly with national stakeholders (public and private organizations, academy, NGO's), and considering past success of EPIU implementing programs and projects at national and international level, the Government of the Republic of Armenia has explicitly endorsed this AF project to be executed by EPIU.

- The Project Management Board (PMB) will be responsible for making management decisions for the AF project. In addition, the board will: i) undertake project assurance (monitoring and evaluation); ii) ensure performance improvement; and iii) ensure accountability and learning; iv) approve and closely monitor the multi-year and annual work plan to ensure its fulfillment and that it contributes to achieving project objectives; (vi) approve the annual report, multi-year and final report.
- The PMB will comprise of designated representatives from relevant ministries and representatives from local self-government bodies and EPIU staff. The Project Management Board will choose a member from its composition to serve as secretary to the PMB. The PMB will approve annual work plans and procurement plans, and review project periodical reports as well as any deviations from the approved plans.
- The overall management of the AF project will be executed by EPIU staff as NIE. The following implementation services will be provided by EPIU for the AF project:
  - overall coordination and management of EPIU's NIE functions and responsibilities, and the facilitation of interactions with the AFB and related stakeholders;
  - oversight of portfolio implementation and reporting on budget performance;
  - quality assurance and accountability for outputs and deliverables at the project development phase, during implementation and on completion;
  - receipt, management and disbursement of AF funds in accordance with the financial standards of the AF;
  - information and communication management to track and monitor progress (financial and substantive) of project implementation;
  - oversight and quality assurance of evaluation processes for project performance and ensuring that lessons learned/best practice are incorporated to improve future projects; and
  - monitoring project activities, including financial matters, and preparing monthly and quarterly progress reports, and organizing monthly and quarterly progress reviews;
  - supporting the PB in organizing PB meetings;
  - managing relationships with project stakeholders including donors, NGOs, government agencies, and others as required.

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

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

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

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

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

Project Objective(s)[11]	Project Objective Indicator	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)

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

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

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

A. **Record of endorsement on behalf of the government**[12] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Mr. Artsvik Minasyan, Minister of Nature Protection of the Republic of Armenia	Date*: August-04-2017*

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

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans ("Intended Nationally Determined Contributions of the Republic of Armenia under UN Framework Convention on Climate Change", "Second National Environmental Action Programme of the Republic of Armenia, "Biodiversity Strategy and Action Plan of Armenia", "National Strategy and Action Plan of the Development of Specially Protected Nature Areas of Armenia (SPNAs)", "National Action Programme to Combat Desertification in Armenia", "the Land Degradation Neutrality National Strategy", "Community Agroresources Management and Competitive Project (2010-2020)") and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Name & Signature Mr. Meruzhan Galstyan Implementing Entity Coordinator	
	Tel. and email: : +37410 651631; info@cep.am
Project Contact Person: Samvel Baloyan, Anush Lokyan	
Tel. And Email: sbaloyan09@rambler.ru, anush.loqyan@gmail.com	

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

Annex 1-5
Community

	Common lands									
	Lands of agricultural importance									
	Arable lands	Hay meadows		Pastures		Perennial herbs		Orchards		Homestead lands
	ha	ha	Average crop yield/tonne.	Adjacent to Communities	Remote	ha	Average crop yield/tonne	ha	Average crop yield	ha
2015										
2016										
2017										

	Actual cultivated lands ha							
	Fall wheat		Fall barley		Spring wheat		Spring barley	
	ha	Average yield/cents	ha	Average yield/cents	ha	Average yield/cents	ha	Average yield/cents
2015								
2016								
2017								

		Orchards										
		Apple		Pear		Grape		Other				
Year	ha	Average yield tonne/ha	ha	Average yield tonne/ha	ha	Average yield tonne/ha	ha	Average yield tonne/ha	ha	Average yield tonne/ha	ha	Average yield tonne/ha
2015												
2016												
2017												

		Cattle-breeding						
		Cattle		Small cattle	Pig	Hen	Colony of Bees	Horse	Other
	Head	Average milkiness in liters	Head	Head	Head	Hive			
2015									
2016									
2017									

	Number of families	Population				Pensioners		Socially insecure families	Families receiving benefits	Disabled persons	Single mothers	Pupils	Kindergarten children
		Total	Men	Women	Children	Total	Single pensioners						
2015													
2016													
2017													

Degraded steppe slopes, where adaptation is expected to be increased by the establishment of agroforest

Degraded community adjacent pastures

Main canals where water loss is great

Domestic irrigation canals

Urtsadzor municipality

Urtsadzor school

Margahovit municipality

Margahovit school

Fioletovo municipality

Adjacent pastures to Fioletovo

An example of non-heated greenhouse

An example of solar driers

An example of solar heater