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:

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN P4-400
Washington, D.C., 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: afbsec@adaptation-fund.org

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:	"Artik city closed stone pit waste and flood management pilot project"
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:	1 466 000 (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.

Shirak province (marz) administrative district where the project is envisaged to be implemented is located in the north-west of the Republic of Armenia bordering Turkey in the west and Georgia in the north. "Arpi lake" national park is located in the marz. The climate of the marz is temperate mountainous with cool summers and severe and long winters. Annual precipitation is 500-600mm. Here, the absolute minimum temperature in Armenia was recorded -46˚C:

Shirak marz in known for its tufa, pumice, limestone mines, especially Artik region which is located in the southern part of the marz. The region is located on the volcanic plateau and foothills and is known for its favorable conditions for grain crop and livestock development. For years exploited stone pits have had negative impact on the environment. Previously, more than 60% of the total volume of construction stone products of the Republic was produced in Artik and its adjacent communities. Many mines were closed due to reduction of construction stone consumption volumes, conservation and reclamation works of the mines have not been carried out thus causing many environmental problems. Hundreds of hectares of agricultural and natural landscapes were degraded and lost natural way of restoration due to such exploitation of mines. Dust through strong winds and solid remnants through snowmelt and rainfall spread over great distances polluting natural agro landscapes. As a result, there is a decrease in the yield of agricultural crops, crop quality and adaptation level of natural landscapes to climate change.

Another problem is the increasing frequency of severe floods in the last 20 years, which is due to the spring temperatures not typical for the region. If until 1980s the air temperature reached 20-25^{0}C within one and a half months, now it is rising quickly and unevenly. As a result this accelerates snowmelt causing the emergence of strong floods. The negative impact of such climate change is also lies in the fact that industrial waste of the mines are dumped into two storm canals passing through Artik territory significantly reducing their capacity. During intense spring snow melt and heavy rains flood waters overflow residential and public buildings, lands, gardens, streets and yards. This phenomenon is repeated every year. Flood that occurred in June 2016 caused more than 210 000 USD damage to Artik city infrastructures and population the elimination of the consequences of which can not be done only by means of the city budget.

The budget of the city and adjacent communities does not allow eliminating negative impact of repeated floods and stone pits to the environment.

CLIMATE CHANGE OBSERVED IN ARMENIA

Trends in ambient air temperature and precipitation changes

Changes in annual ambient temperature and precipitation in Armenia have been assessed for various time periods; the results were used in preparations for FNC and SNC. These results show that, in recent decades, there has been a significant temperature increase (see table 5-1 and figure 5-1).In the period of1929-1996, the annual mean temperature increased by 0.4^{0}C; in 1929-2007b y 0.85^{0}C; in 1929-2012by 1.03^{0}C.

1. Table 5-1.Annual mean temperature and precipitation changes in 1929-2012 changes relative to the 1961-1990 average

Time period	Air temperature, ^{0}C	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)

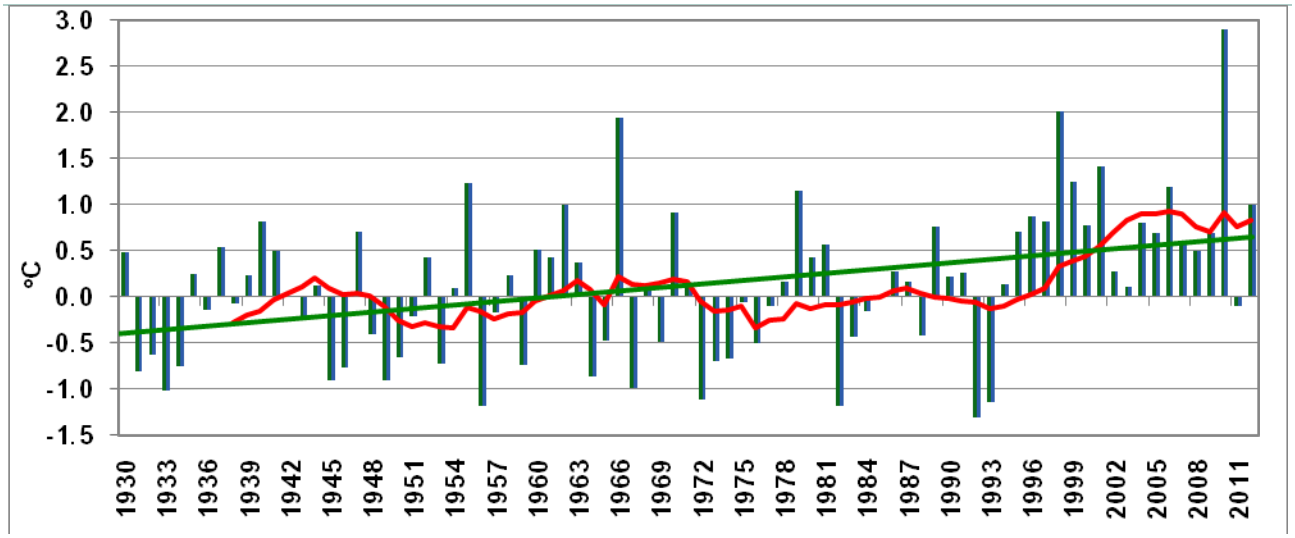

Figure 5-1. Deviations of average annual air temperature in the territory of Armenia from the average values for 1961-1990

On 31July 2011 the absolute maximum temperature43.7^{0}C for the whole period of observations in Armenia was recorded in Meghri region, which exceeded the previous record by 0.7^{0}C.Over various seasons of the year ambient air temperature changes exhibit different trends. In 1935-2011 the summer average temperature increased by about 1.1^{0}C, and extremely hot summers have been observed over the last 17 years (1998, 2000, 2006, 2010) (see figure 5-2a). Winter temperature changes look different: seasonal mean temperature increases are insignificant at0.4^{0}C (see figure 5-2b).

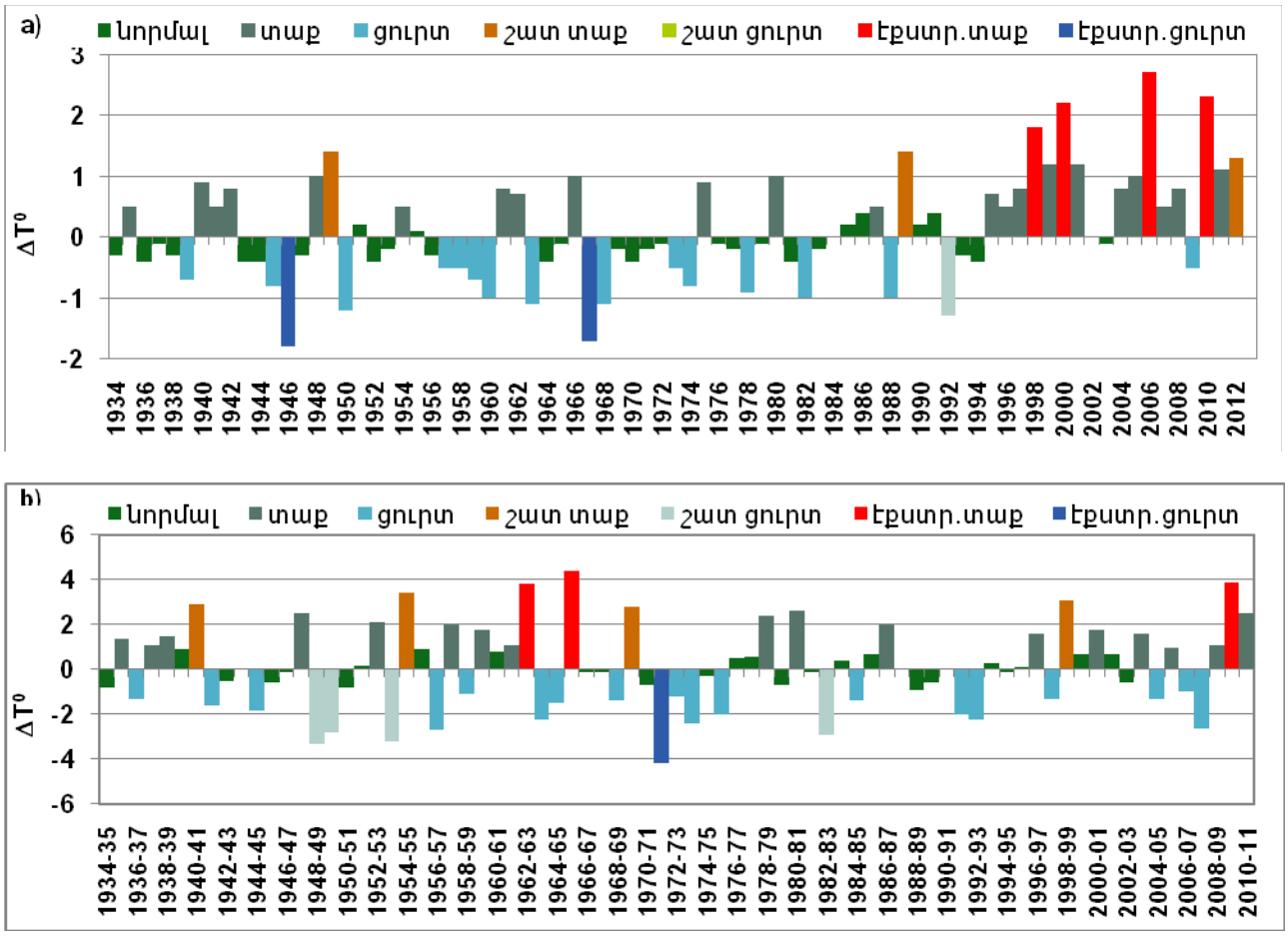

Figure 5-2.Deviation of summer (a) and winter (b) temperatures in the territory of Armenia in1935-2012 from the average values for 1961-1990

The comparison of changes in the assessment of precipitation amounts for different periods demonstrates that precipitation continues to decline. Observations showed that, in1935-1996, there was a 6% decrease in annual precipitation, while in 1935-2012 it was close to a 10% decline (see figure 5-3).

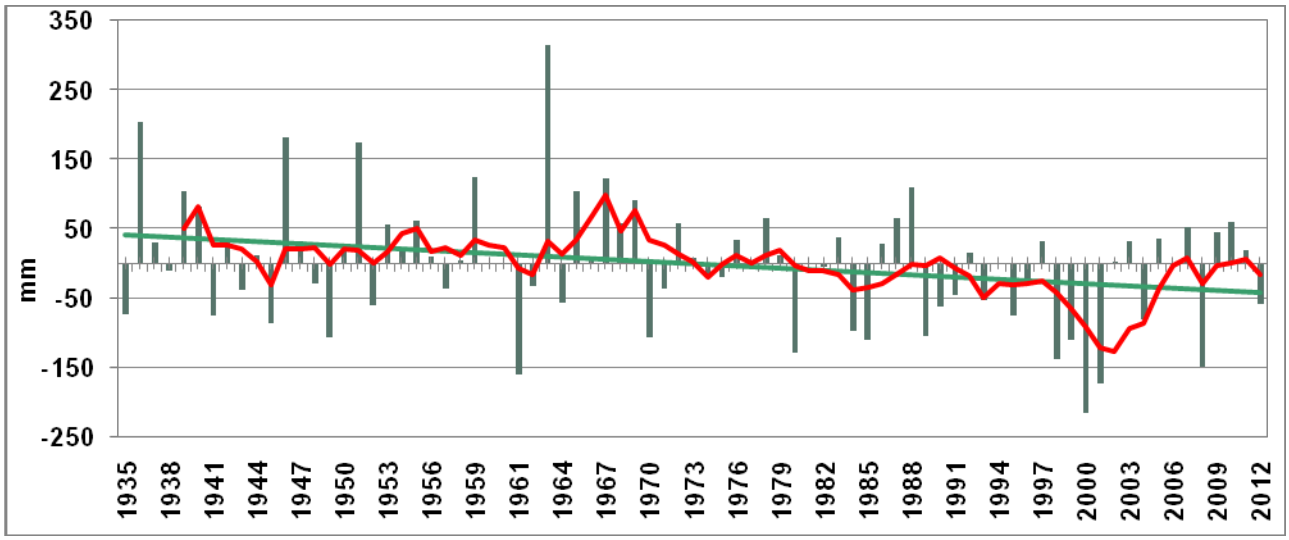

Figure 5-3. Deviation of annual average precipitation in the territory of Armenia from the average of 1961 -1990

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.

Trends in atmospheric circulation changes

Atmospheric circulation is a key factor for climate formation which, in the territory of Armenia, is expressed as an influence of Western air streams peculiar to sub-tropical zones. There have been changes of general circulation processes in the atmosphere as a result of the global climate change. Climate risks and the frequency of hazardous hydro-meteorological phenomena have increased over the last decade as a result of changes in global atmospheric circulation. For this purpose, a study was conducted on the regional daily, monthly and annual thermo baric fields for 1948-2008; 14 types of processes determining the climate of Armenia have been identified.

Cyclones penetrating into the territory of Armenia mostly come from the Mediterranean Sea, Asia Minor regions (from Syria and northern Iraq), and sometimes from northeastern Africa. Cyclones transiting the country create more clouds and more intensive winds at velocities up to 25-30m/sec.

The entrance of southern cyclones into the territory of Armenia is accompanied by thunderstorms, heavy precipitation and more intensive south winds. The average amount of penetration of southern cyclones has increased by 24%, which has increased the number of days with intensive rainfall in the entire territory of the country. The number of events with heat depression has increased by 107%, therefore increasing recurrence of summers with high thermal background and scarce rainfall.

Late spring and early autumn frosts, strong winter frosts, and strong winds are mainly due to Scandinavian anticyclones, the frequency of which has increased by 71%. This shows that the recurrence of hazardous atmospheric phenomena in the territory of Armenia caused by these anticyclones is expected to grow. The occurrence of formation of Iranian anticyclones in the territory of Armenia has increased by over 63%, resulting in the increased recurrence of heat waves. The occurrence of weakly expressed steady pressure fields not leading to any hazardous meteorological phenomena has decreased by 26% in Armenia.

Hazardous hydrometeorological phenomena

In recent decades, climate change has significantly increased the frequency and intensity of natural disasters both in Armenia and globally. The marginal values so far recognized characterizing these phenomena have also changed. Damage caused by hazardous hydrometeorological phenomena to the economy and to human life has increased. 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.

To reveal trends in extreme hydrometereo-logical events the dynamics of phenomena most frequently observed in Armenia from 1980-2012 were analyzed, including: frost, hail, strong winds, and heavy precipitation. The maximum aggregate number of 245 hazardous events was observed in 2004;the minimum number of 106 events in 2006. The amount of hail was greatest in Shirak valley; heavy precipitation was most common in Tashir and Ijevan regions; more frost events were observed in Ararat Valley and pre-mountainous regions.

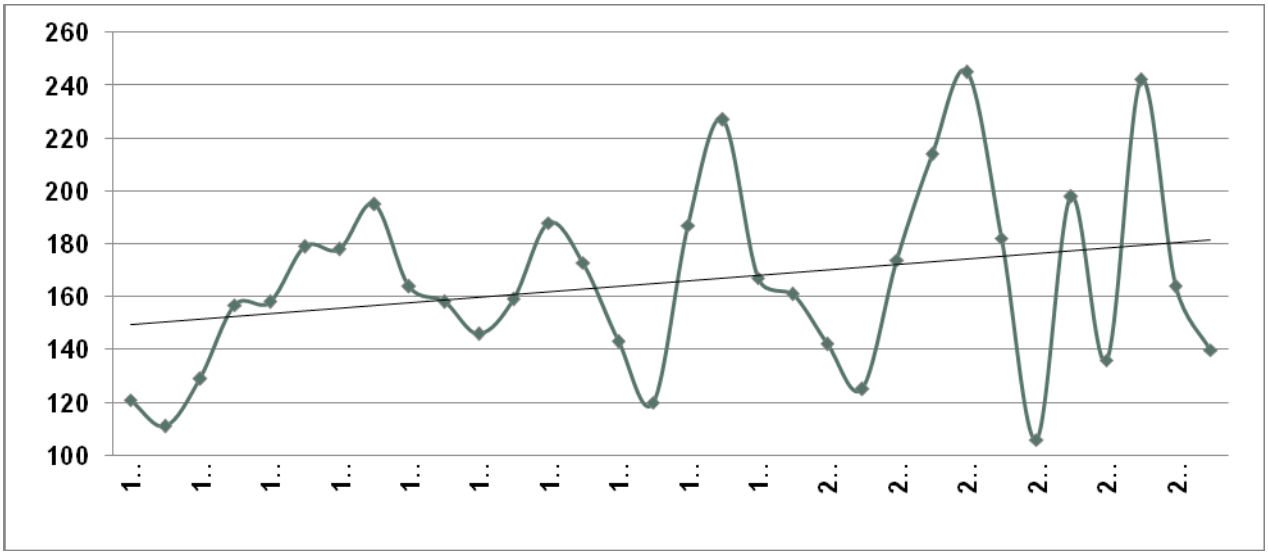

Figure 5-4.Number of extreme hydrometereological events (frost, hail, heavy rainfall and strong winds) observed in the territory of Armenia in 1980-2012

The analysis showed that:

- The number of frost events has increased significantly, which may have the following explanation: 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;
- 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.

Extreme Climate Indexes

The increase in the frequency of extreme climatic phenomena is one of the main indicators of climate change. 30 indexes recommended by the WMO for the entire territory of Armenia for 1935-2012 have been assessed. These indexes can be applied to several sectors such as: public health, agriculture, water resources, etc.

The number of summer days (Tmax> 25^{0}C) has significantly increased, particularly in arid semi-desert and steppe zones (3.9-4.9 days/10 years); the number of tropical nights (4.6 days/10 years) has increased in the dry desert zone. For the same period, the number of cold days (1.1-3.5 days/10 year) has decreased, while there has been a reduction in the number of frosty days (0.4-3.1 day/10 year). The duration of heat waves has increased from 1.6-5.4 days/10 year, while the duration of cold waves has fallen to 0.3-2 days/10 years.

The average number of consecutive dry days is particularly high in Meghri and Ararat (61 and 58 days respectively). The average number of dry days in Yerevan is 42; the maximum of 63 days was recorded in 2010.

In 1935-2012 the number of dry days increased in almost all zones: the maximum of 3 days/10 years was recorded in the dry sub-tropical zone.

Given the particular importance of the effect of hot and cold waves on public health and agricultural crops,a deviation of±3^{0}C fromthe norm of the daily maximum ambient air temperature for the maximum (minimum) daily average of five and more consecutive days was estimated in 1961-1990.

The average value of heat waves in the different climatic zones of Armenia varies between 12-26 days, while the maximum value is 34-70 days. The average value of cold wavesranged from 10-20 days, and the maximum value is 31-70 days.

It should be noted that the maximum number of cold waves in Armenia was recorded in 1982; the maximum number of heat waves were in 1998, 2000 and 2010. An analysis of annual change trends in the aggregate quantity of hot days in several settlements proves that the duration of heat waves has significantly increased over the last 30 years. For instance, in Yerevan in 1981-2013 the heat-wave average has increased by about 40 days, while the duration of cold waves has decreased by 1.4 days for the same period.

CLIMATE CHANGE PROJECTIONS

Climate change in Armenia is assessed using the CCSM4 model in accordance with the IPCC recommended RCP8.5 and RCP6.0 scenarios for CO_2 emissions. Therefore, as per the RCP6.0 scenario (equivalent to the SRES B2 scenario) CO_2 concentration will be 670ppm by 2100 and it will be 936ppm according to the RCP8.5 scenario (equivalent to the SRES A2 scenario). Future change forecasts for ambient air temperature and rainfall have been developed up until 2100. The results indicate that the temperatures will continue to increase in all seasons of the year (see table 5-2). However, according to the RCP8.5 scenario, starting from the mid-21thcentury (2041-2100) the temperature will rise at a more rapid rate. According to the RCP8.5 scenario, it is very likely that, by 2100, the average annual temperature in Armenia will be 10.2^{0}C, which exceeds the baseline (1961-1990) by 4.7 ^{0}C.

Table 5-2. Projected changes in annual and seasonal average temperatures in the territory of Armenia compared to the average for1961-1990, ^{0}C

Seasons	1961-1990average	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

Seasons	1961-1990average	Scenarios	2011-2040	2041-2070	2071-2100
		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

Figure 5-5 presents spatial distribution maps for annual mean temperature for the 1961-1990 baseline, and projections for 2071-2100. It is expected that, by 2100, temperatures will increase in most regions of Armenia. Increased temperature in mountainous regions demonstrates an apparent retreat in negative temperatures (blue-coloured areas, see figure 5-5b). For instance, 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 growth is observed during the summer.

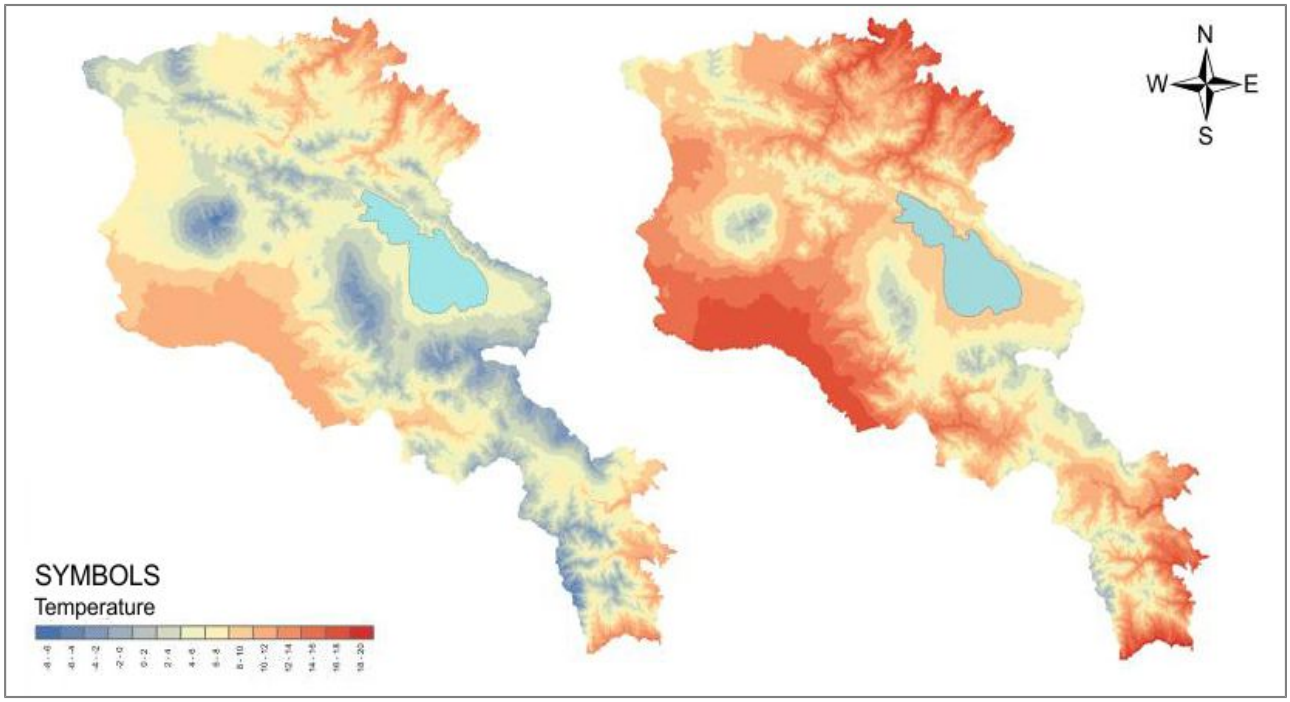

Figure 5-5. Distribution of annual average temperature in Armenia in (a) 1961-1990 and (b)projections for 2071-2100, RCP 8.5 scenario

Evaluation results for precipitation change show that, according to the RCP8.5 scenario, there might be 16.3% increase in annual precipitation in Armenia by themid-21stcentury. There will be no changes in precipitation according to the RCP6.0 scenario. However, according to both 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.

Table 5-3.Changes in annual and seasonal precipitation in the territory of Armenia compared to the average of 1961-1990, mm

Season	1961-1990 average	Scenarios	2011-2040	2041-2070	2071-2100
Winter	114	RCP, 6.0	5.3	5.8	6.2
		RCP, 8.5	-5.7	16.3	2.9
Spring	211	RCP, 6.0	1.2	4.2	2.6
		RCP, 8.5	4.2	-8.0	2.4
Summer	148	RCP, 6.0	-10.1	-10.8	12.8
		RCP, 8.5	-23.0	-3.4	-13.0
Autumn	119	RCP, 6.0	5.0	3.2	1.2
		RCP, 8.5	2.5	8.6	13.6
Year	592	RCP, 6.0	5.3	5.8	6.2
		RCP, 8.5	-5.7	16.3	2.9

The distribution of annual precipitation amount seen Armenia will not undergo significant change; however, in pre-mountainous and mountainous regions there will be a slight increase by the mid- 21st century.

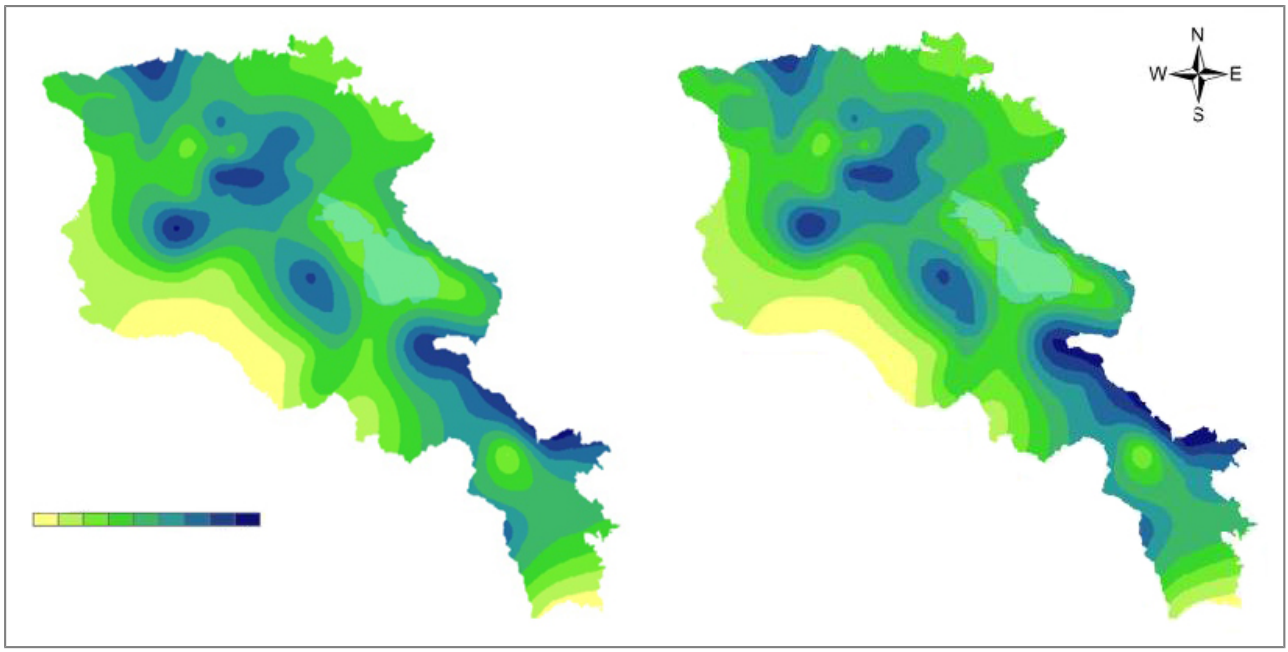

Figure 5-6. Distribution of annual average precipitation (mm) in Armenia in (a) 1961-1990 and (b) projections for2071-2100, RCP 8.5 scenario

Summers in most of the regions of the country are usually characterized by hot and dry weather conditions. According to the model projections, these conditions will worsen, leading to a variety of problems in water resources, agriculture, energy, healthcare and other sectors.

Although the results of the CCSM4 model reproduce changes in temperature fairly well, there are large uncertainties in terms of precipitation. Additionally, the resolution of the model for the mountainous terrain of Armenia is insufficient.

Summary

The analyses of the documents "Second National Communication on Climate Change under UNFCCC" country report 2009 and "Climate Risk Management in Armenia, country report 2013 show that after 1994 annual air temperature deviations were only positive.

Climate change in Armenia was estimated by the use of PRECIS, a regional climate modelling system.According to it the annual temperature in Armenia is expected to incraese by 1 ^{0}C in 2030, 2 ^{0}C in 2070, while in 2100 by 4^{0}C, as well as a decrease in atmospheric precipitation, respectively 3%, 6% and 9%.

In recent decades intensification and rapid growth of dangerous meteorological phenomena trends is observed in Armenia. The total number of cases in 30 years is increased by 1.2, while in the last 20 years to 2.1 per year.

In Armenia climatic hazards are mainly expressed by floods, droughts, landslides, hail and frost. Gradual increase in floods and their consequences is observed in the country. The economic damage from floods in 1994-2007 amounted to 41 million US dollars, of which more than 31% (13 million dollars) goes to the Shirak marz, where the number of downpour alert districts is 8, 41% of the surface area of the marz.

Mudflows and floods temporal distribution by years can be considered to identify the link between those phenomena and climate change. The frequency of mudflow in 2002 and 2007, as well as the frequency of floods of 2003, 2004 and 2007 coincide precisely at a time when the average annual precipitation amount was relatively high.

In Armenia hydro meteorological service information management is carried out by Hydrometeorological Service of the Ministry of Emergency situations of the Republic of Armenia, which

carries out systematic observations of 47 meteorological stations, including 3 professional and 34 agro-meteorological, 94 hydrological stations in 7 river basins (including 4 lake and 4 resrvoir sites).

Project / Programme Objectives:

List the main objectives of the project/programme.

The project objective is to:
1. to increase adaptation level of natural and agricultural landscapes,
2. prevent floods and eliminate their consequances,
3. To restore the natural landscape of the area affected by climate change and anthropogenic impacts, at the same time to demonstrate the possibilities of adaptation level increase of degraded natural landscapes,
4. Improve the adaptation potential of community producers, institutions, and other relevant stakeholders regarding to climate change under current climate change conditions.

The project will help local communities and marz(province) authorities to develop and implement sustainable economic development taking into account the adaptation potential.

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/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
1. Restoration, management and increase of adaptation potential of natural landscapes of the area affected by climate change and anthropogenic factors.	1.1. Natural and agro landscape adaptation and sustainability to climate change increased	1.1.1. Restored soil cover of mine 1.1.2. The restored soil layer will be protected against the winds and intense rains adverse effects 1.1.3. The area will be provided with irrigation water 1.1.4. Sustainability of the adjacent natural landscapes to climate change impacts increased 1.1.5. crop yield and crop quality of the adjacent agro landscapes increased 1.1.6 Adverse effects on the health of the population of	**785 000**

		adjacent communities decreased 1.1.7. Reduced flood risk 1.1.8. Favorable conditions created for the recreation of the residents 1.1.9 Forested area	
2. **Prevention and management of floods**	2.1 Flood risk threat to Artik city is minimized	2.1.1 Restored storm canals conveying heavy snowmelt and rainwater 2.1.2 The storm canals protected from household garbage jams 2.1.3 Improved sanitary condition of Artik city 2.1.4. Reduced risk of epidemics	350 000
3. **Raising awareness and knowledge level of population for the management of stone pit wastes and floods**	3.1Raising awareness and knowledge level of population on the recovery of agro landscapes and flood risk reduction	3.1.1. The level of knowledge on effective recovery methods of degraded natural and agro landscapes increased 3.1.2 The knowledge level of the population on natural and agro landscape adaptation to climate change increased 3.1.3 Increased knowledge level of the population on the occurrence and prevention possibilities of floods 3.1.4. Sustainable thinking formed on the importance of landscape adaptation to climate change in communities 3.1.5 The involvement of local media and environmental NGOs in the process of mitigating the negative effects of climate change increased 3.1.6. Project results available to all interested parties	100 000
4. Total components cost			**1 235 000**
5. Project/Programme Execution cost*			**117 000**
6. Total Project/Programme Cost			**1 352 000**

7. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)	**114 000**
8. Amount of Financing Requested	**1 466 000**
9. Community contribution(in-kind)	**63.000**
10. Total Project/Programme Cost	**1 529 000**

Project preparation grant (PPG) – 27000 USD

*Copyright and technical supervision, independent midterm and final monitoring of the project, midterm and final audit, midterm and final mission of AF specialists.

**Copyright and technical supervision which was calculated in accordance with copyright and urban planning legal acts of the RA.

a) Component 1: Technical supervision of construction works-1,5 % of the component cost (11,175 US$) and copyright supervision-0,4% of the component cost (2, 980 US$);

b) Component 2: Technical supervision of the works- 1,5 % of the component cost (5,250 US$), and 0,4 % of copyright supervision (1,400 US$):

For the case of a programme, individual components are likely to refer to specific sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well defined interventions / projects.

PROJECT AREA

Artik area represents mainly erosion slopes, cut with many permanent and temporary gorges. Artik town is located in south-eastern part of Shirak marz, in north-western foothills of Mountain Aragats at an altitude of 1800m above sea level. One of the major factors that influence the climate are south and south-west air flows that cause cold weather. The Artik town climate is temperate mountain, with long cold winter and steady snow cover, the absolute minimal air temperature reaches -30 ºC. There are sometimes strong winds, often fogs and snow storms. Summer is warm, relatively wet, the maximal temperature is +30 ºC. The average temperature in July is 16 ºC C. The annual rainfall amount is 500-550mm, snow cover height is 61cm, soil frost depth is 110cm. The average wind velocity is 3.0-6.0m/sec, the westward winds prevail. There is developed non-metal mineral products industry and multi-branch farming. The area is rich in commercial construction sand, tuff, scoria, pumice stone resources. The area acceleration is 0.3-0,4g and is situated in 8-9 point earthquake probable performance zone. The natural landscapes are black soil mountain steppes.

The area vegetation mostly relates to steppe type. Among the soil types the black soils prevail where forbs grass are common. The mountain steppes are presented by three vegetative formations of Gramineae Poaceae family species (Stipa, Festuca and Bromus). Currently, the forest vegetation in the Shirak floristic zone is completely absent. But in past the lands were covered by forests the evidence of which is existing thorny shrubs.

The common representatives of the area fauna are steppe, alpine species. It is represented by the domestic animals, birds' reproduction. From amphibians and creepers there occur species of toads, frogs, lizards and snakes. Of widely spread animals there are hares (Lepus europaeus), foxes (Vulpes vulpes), wolves (Canis lupus) and number of rodents.

There are no vulnerable or special nature protected areas on the project area.
There is developed non-metal mineral products industry and multi-branch farming. The area is rich in commercial construction sand, tuff, scoria, pumice stone resources.
Mechanical extraction of tuff in Artik mines started since 1928. During the mentioned period more than 50 million cubic meter tuff mass was extracted of which only 35-40% was used as a standard building material while the rest was thrown into the environment as waste. Moreover, these wastes and abandoned stone pits here occupy more than thousand hectares of fertile black soils.
Within the last 30 years an increased average annual temperatures is observed in Artik region of Shirak marz, as well as in all the regions of the country. According to Gyumri meteorological station data which which is located only 27 km from the town of Artik, the average temperature for Janury reached -7.4^{0}C, which is higher by 2.3^{0}C from the multi-annual average temperature. Meanwhile the average temperature in the warmest month of the year in August is higher by 1.5^{0}C from the multi-annual average temperature. The maximum temperature in Gyumri reached +37 ^{0}C , +36 ^{0}C in Artik(multi-annual average temperature was+35,5 ^{0}C). High temperatures were recorded in July 2014, +33. In 1998 in the first decade of August lasting high temperature in Shirak marz caused intense fusing of glaciers of the northern top of Aragats mountain as a result of which unprecedented floods were recorded in Gegharot river system.
Unprecedented warming has been observed in 2001 and 2004. In 2004 the temperature reached +13^{0}C which was not observed in the last 100 years for this month. The temperature for the first decades on March was +2 ^{0}C which was higher by 6 ^{0}C from the norm (-4 ^{0}C). During the second decade was also higher from the norm with little difference. In the 3rd decade the average air temperature was +6.1^{0}C (norm 0.9 ^{0}C). March precipitation corresponded to the multi-annual average temperature 30.5 mm.
This unprecedented warming resulted in mudflows and rapid snowmelt of Shirak marz mountainous zone. Eleations up to 1800m released from snow cover. Multiannual observation analyses showed that in Shirak plateau particularly in Artik region in early spring snow cover removal was not observed.39 communities of the marz suffered from mudflows the damage caused by these which amounted 250000 USD.
Such temperature changes were recorded duringthe 2010-2016.
Floods: The frequancy of most dangerous floods intensified since 1996 and they regularly repeated in 2004, 2006, 2007 and following years.
Hail: The damage caused by this atmospheric phenomenon is greater since 2000. Hails is mainly observed in the months of June-July. Each year about 30-60% of sown areas of Artik region are damaged.

Drought: Mostly seen in June-August. Since 2000 frequency of drought and increase of caused damaged is observed.
Early spring frosts: Decrease of early spring frosts is observed in the region since 1996.
The analyses over the last 30 years show that a steady increase in the average annual temperature and precipitation decrease of Shirak marz is observed which creates both environmental and social problems.

Projected Calendar:

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

Milestones	Expected Dates
Start of Project/Programme Implementation	2017
Mid-term Review (if planned)	2018
Project/Programme Closing	2019
Terminal Evaluation	2020

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.

Component1. **Restoration, management and increase of adaptation potential of natural landscapes of the area affected by climate change and anthropogenic factors**

The objective of this component is to develop a series of complex events which will eliminate human-induced adverse effects and to demonstrate the level of increase of adaptation ability of fully disturbed natural landscapes, as well as to create waste management mechanisms, reduce waste impact on the environment, improve territories. Implement recultivation, tree planting and sowing of soil layer strengthening herbs, irrigation system construction; create a recreational area in the territory and to allocate it to Artik municipality for further protection. A single system of actions will be merged into methods for enhancing natural and agro landscape climate change adaptation which will demonstrate more efficient opportunities for the recovery of degraded areas. It is planned to create stakeholders associations in communities that are responsible for the use, maintenance and continuity of the project results. Site management plan will be developed on participatory management basis which will reflect the envisaged actions and implementation schedule.

During Soviet and post-Soviet years more than 60% of construction stone of the Republic's total volume was produced in Artik of which only 35-40% was used as a standard building material while most of the rest were thrown into the environment as waste. As there were not any special waste dumping places they were irregularly poured into the surrounding areas of mines. In Soviet times mainly natural landscape of Artik town and surrounding communities were used, while in post-Soviet years lands of agricultural importance which were privatized and later abandoned by the owners. Mountain steppe black soils, gorges and steep slopes were mainly contaminated where forbs grass and bushes are common. As a direct effect, flora and fauna of the given area and adjacent territories has significantly become poorer and most importantly soil physical and chemical composition and expansion feature deteriorated. Under these conditions snowmelt and rainwater surface flow is accelerated, deteriorating the quality of the soil to retain water and absorb moisture, resulting species and quantitative composition loss of flora and fauna. Such changes are accelerating the degradation processes of natural landscapes.

As a secondary effect of the stone pits the spread of stone dust, soluble substances and relatively small fractions into adjacent natural and agricultural landscapes through wind, snowmelt and rain waters exists. Over the years their gradual accumulation has had negative impact on the sustainability of natural and productivity of agricultural landscapes.

The said effects greatly weakens self-restoration feature of landscapes and adaptation to projected climate changes.

Thus we can generalize that adverse effects of uncultivated mines and wastes can be likened to a chain whose links are natural, agricultural and artificial landscapes, aquatic ecosystems, adjacent communities and infrastructures.

The envisaged measures will contribute to the improvement and self-recovery of more than 300 hectares of arable land 190 hectares of pastures, 15 hectares of hay meadows, 640 ha of artificial forests, 80ha of water reservoir and other natural landscapes in the project impact area, as well as to sustainability and adaptation level increase to climate change.

Till today full reclamation of closed stone pits has not been carried out in the Republic of Armenia and there aren't any comparisons to other available technologies and techniques for climate change adaptation. The list of works and costs was calculated by the specialists of Artik city municipality. Taking into account the area's climate and soil conditions we have come to a conclusion that soil layer

recovery and establishment of forest is most effective way to counter climate change and promote adaptation of the surrounding landscapes.
As it was mentioned in the description of climate change trends in the Artik region and in Armenia over the past 30 years a steady increase in the average annual temperature of the region is observed, decrease in summer precipitation and intensification of extreme climatic events creating both environmental and social problems.

The situation is further aggravated when current climate change and projections are not taken into account when anthropogenic impact on ecosystems and landscapes. In case of Artik town dozens of stone pits have been exploited in the last 100 years which were not reclaimed. Stone pit areas are mainly mountain steppe landscapes with 20-25cm soil layers and grass vegetation. If until 1990 there was some natural recovery of grass vegetation in the area of disturbed landscapes, then since 1990 that natural process has slowed down. Due to intensive repeated spring snowmelt and heavy rains naturally generated 2-3cm soil layer is degraded. Bare and brittle rocks under high summer and low winter temperatures fastly erode, pour into of runoff canals clogging them and causing the occurrence of floods in the area of the city. It can be stated that although the Armenian law provides for the reclamation of exhausted mining areas, this was not implemented for stone pits. Partial smoothing has been made in some stone pits without soil layer restoration.

In the last 30 years due to repeated strong snowmelt and spring heavy rains these areas have lost their ability to restore naturally. Another issue is the piles of wastes accumulated during mine exploitation which have changes the physical structure of natural landscapes and made the restoration of landscapes inefficient. New eco-engineering approaches are planned to be applied in the current situation:

1. Selection of more sustainable trees, shrubs and herbs to climate change,
2. Recovery of the area in a way to increse newly formed landscape adaptation level to maximum
3. Creation of a vegetation cover which will contribute to the conservation of fauna specific to the area

The component will focus on disseminating the best practices in the adjacent communities where there are abandoned and disused mines.

Component2. Flood prevention and management
The main goal of the component is to reduce hazards caused by floods and to contribute to adaptation of natural and agricultural landscapes and aquatic ecosystems in the impact zone of floods.
The task of the component is to create flexible system of flood management which will contribute to reducing the vulnerability to flooding in adjacent communities of Artik.
Climate change in the whole territory of Armenia as well as in Artik region increased the frequency of extreme phenomena which creastes both environmental and social problems. Due to regularly recurring high spring temperatures, heavy rains and intensive snowmelt the frequency of dangerous floods increased. Floods of various intensity have been observed in the area beginnig from 1996 and susequently in 2004, 2006, 2007, 2010, 2013 and 2016 causing significant damage to natural and agrucultural landscapes reducing reducing the level of adaptation to climate change. The poverty level is higher from average republican and the damage caused by floods reduces the household incomes overwhelming backyards and apartments. The communities do not have sufficient resources to prevent floods and to eliminate the damage cased by them.
Frequently observed abnormally high summer temperatures create favorable conditions for the development of dangerous microflora and rodents in untreated or partially treated storm canals.
As it was mentioned in Component 1 the adverse effects of uncultivated mines and wastes can be likened to a chain one of the links of which is flood management. Environmental damages have not

been calculated in Artik city till today which is a relatively large and besides direct impact it also has long-term further impact.
Taking into account Artik city geographical location previously storm canals were built which met the estimated volume requirements of snowmelt and rainwater removal. However climate changes of the recent years/ sharp rise in spring temperatures and spring haivy rains/ caused new problems. Large amounts of snowmelt and rain waters flood unused stone pits and other surrounding territories bringing large amounts of soil, gravel and large pieces of stones. In the result the storm canals of the city are blocked and water flow floods streets, huoses, roads and backyards. The damage caused to the population by the flood of June 2016 was estimated USD 210000 which does include infrastructure(roads, drinking water supply network and so on). Environmental damage is not calculated as well which is significant and except direct damage it has long-term influence. Before reaching the city and thereafter the portion of the wastes carried by the floodwaters pollute agricultural and natural landscapes covering the soil with gravel, dust and stones. City runoff floodwaters carry a large amount of wastes the portion of which pollutes surrounding landscapes before reaching reservoir. The relatively small portion of wastewater/mainly gravel and dust/ is discharged into the reservoir significantly deteriorating water quality features and reducing capacity of the reservoir.

Environmental damage caused by floods can be classified as direct and indirect environmental damage.

Direct environmental damages:

1. Agro and natural landscapes are covered with gravel and stone wastes
2. Soil quality is gradually deteriorates
3. Plant growth and reproduction conditions deteriorate in natural landscapes
4. Survival and reproduction conditions of animals adapted to their environments is deteriorating in natural landscapes
5. Crop yield decreases in agrolandscapes
6. Water contamination level increases in aquatic ecosystems deteriorating life cycles of plant animal species
7. Sanitary and Hygiene conditions of the settlements worsen resulting in a number of diseases spread.

Indirect environmental damages:

1. After floods the dust is spread over large distances through winds and rain contaminating the surrounding agricultural and natural landscapes
2. Along with the spreading of dust and wastes productivity and sustainability agricultural and natural landscapes is decreasing
3. The amount of dust coming from surrounding areas increases in aquatic ecosystems due to late spring rains and strong summer winds
4. Water turbidity gradually increases, temperature rises and the amount of oxygen decreases.
5. Aquatic ecosystems are gradually losing self-cleaning feature.
6. The spreading of dust through wind in summer causes allergic and other diseases.

It should be noted that the damages are also conditioned by the feature of tuff stone extracted in the area. It is quite fragile, during the extraction large volumes of waste in various sizes appear, is unstable over temperature variations / quickly decomposes and turning into gravel or sand /. Small fractions of wastes are relatively light and are easily spread over great distances by wind or water.
Flood prevention and further sustainable management will significantly reduce direct and indirect contamination of aquatic ecosystems, in the result of which their sustainability protection ability and adaptation level will be restored to climate change conditions.
It is worth mentioning that social economic and direct and indirect environmental damages are conditioned by exported tuff stone features. It is rather fragile and during extraction waste heaps in different sizes are generated, it is stable over temperature variation /quickly decomposes and turns

into gravel or sand/, small fractions of wastes are rather light and are easily spread by wind or water over great distances.
Flood prevention and further sustainable management will significantly reduce direct and indirect contamination of landscapes and aquatic ecosystems thanks to which their conservation stability and climate change adaptation capability will be restored.

In collaboration with local communities direct measures will be developed for long-term flood prevention and mitigation of risks. Runoff canals will be cleaned of waste and household waste, garbage bins will be replaced for the collection of solid household waste, tree planting and soil layer strengthening sowing will be carried out along runoff canals. Lessons learned and best practices will be shared with the communities of the Republic that are exposed to flood risks associated with climate change.

This component task is to carry out measures that would reduce and manage the risk of flooding in Artik city and its adjacent communities
The activities will include:

- Cleaning of 7,5 km long storm canals from waste and household waste picked up from stone pits through floods
- Replacement of bins along storm canals
- Tree planting along storm canals
- Signing of the contract on the collection of waste and care of planted trees with Artik city community municipality

Component 3. Raising awareness and knowledge level of population for the management of stone pit wastes and floods under current climate change conditions

The goal of the component is to raise awareness and knowledge level among decision makers and local population on the landscape and ecosystem adaptation to climate change and on efficient management of floods.
Activities are aimed at forming a base knowledge on the opportunities of the recovery of degraded areas and benefits. In order to increase the effectiveness of the activities specialists both from higher educational institutions and both the Agricultural Support Marz (Regional) Centers will be involved. This approach will enable to combine environmental protection, agriculture and the urban economy efforts to develop a joint training program on the restoration of natural and agrolandscapes under climate change conditions and on raising the level of adaptation.
The training program will be based on the idea of the importance of interconnectedness of agricultural, natural landscapes, urban economy and human health and landscape adaptation under climate change. The provision of knowledge on measures aimed at the preservation and continuity of the outcomes of the current program will be highlighted.
Training program will provide a differentiated approach to the needs of different age groups and will develop knowledge enhancement programs for them.
Particular attention will be paid to the creation of groups possessing the necessary reserve of knowledge to be able to ensure the continuity of dissemination of knowledge during and after the project closure.
To increase work efficiency thematic guidelines and public information leaflets will be developed, published and provided to all interested parties.
Lecturer-listener based model will be used during awareness raising trainings which will make provided material perceptible through using different actions.
The component will contribute to strengthening the capacity of local media and environmental NGOs, through their involvement in project dissemination, propagation and implementation activities.

Given the Component's objectives and problem requiring solutions the activities will be mainly addressed to awareness and knowledge raising of those vulnerable groups that are directly related to project objectives, ways of achieving them, ensuring stability and continuity.
Based on lessons learnt from the projects implemented by EPIU and other organizations targeted groups will be selected in communities through needs assessment.
Community administration employees, members of farm households, teachers and high school students, the mass media, employees of stone pits operating in the area are determined as initial target groups. :
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. Within the project raising the knowledge of the municipal councils and staff members 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 make such decisions in the future that would cause little damage to the environment and in the result to people's health.
Members of farm households: The zone of influence of the project is mainly agricultural which is carried out relatively on small plots 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 disaster prevention, rehabilitation of degraded areas and harmful effects of waste on human health. These target group members can most successfully spread their knowledge within communities.
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.
Mass media: Great is the role of this target group on the dissemination of information on the project, coverage of event, outcome analyses, propagation of positive experience, transparency and mobilization of stakeholders. Special training program will provide mass media with the necessary knowledge that will help them to represent the project's goals, objectives, outcomes and the importance of ensuring continuity to the broad strata of the society.
Stone pit employees: This target group is the direct holder of the consequences arising from the indiscriminate use of stone pits and waste pollution of the environment. The representation of environmental, social, economic and health problems and their solutions opportunities will raise their knowledge level and will contribute to be more actively involved in the suggestion of more environmentally safe events of the mines, development of activities and implementation process.
The common idea for all target groups is that the humanity can fight not only to mitigate climate changes, as well as to develop effective measures to increase the level of natural and agricultural landscapes adaptation.

The whole process of project implementation will be available for all strata of society. 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 EPIU. Whistleblower hotlines of Ministry of Nature Protection, regional administrations and EPIU will make it possible to rapidly respond to all complaints with the participatory problem solving approach.

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.

At present the experience of risk management of the climate change is rather low at community and regional levels. There are insufficient skills for decision-making, long-term implementation and continuity of the experience related to climate change. The activities envisaged by the project are consistent with the objectives of protecting the population in emergency situations and do not contradict the laws of Republic of Armenia. It should be noted that the program offers solutions that do not require special permits from the EIA. The potential areas and stakeholder of the project are determined through consultations at regional and local levels and site visits conducted by the EPIU specialists.

During the preparation of project documents participatory meetings will be held with the population of beneficiary communities. Innovative adaptation measures that are more stable over the long-term effects of climate change will be developed and introduced within the project. These measures are very important in terms of socio-economic and environmental benefits and contribute to raising the level of adaptation of natural and agricultural landscapes under projected climate changes. These include bioengineering works to improve the stability of settlement infrastructures and economic assets.

The expected environmental benefits and impacts within the program are of great importance and will contribute to solving a number of environmental issues. Promoting the greater coordination, cooperation and expanding capacities, the project gives an opportunity to create exemplary political atmosphere which will give a chance to increase the adaptability of landscapes and settlements to the negative effects of anthropogenic and natural climate change. It will be implemented through the natural and agrolandscape recovery, sustainable management capacity building development and by increasing the efficiency of institutional structures.

The program will create a new bioengineering model for the preservation and restoration of biodiversity conservation which will unite agricultural and natural landscapes into one conservation planning process. In this regard, this will enable to identify and test “the best practice” which reinforces the use, stability and flexibility of natural resources. Promoting the creation of temporary and permanent workplaces in the region of Armenia with comparatively poor population the project will contribute to reducing poverty and welfare improvement, thus reducing the anthropogenic further pressure on vulnerable landscapes.

Natural disasters and climate changes have negative impact on the ecosystems of the area. The stream fall into Vardaqar reservoir damaging its ecosystem and decreasing reservoir’s capacity. Reservoir is used for irrigation purposes, it covers 80 hectares with a capacity of 5 million cubic meters. Implementation of the program will also help prevent soil erosion, and conserve the ecosystems.

In addition to the direct benefits of Armenia's agricultural and natural biodiversity protection and guidance, the program will provide global advantages by developing and creating tools, experience and methodology within the program that will be globally available to all stakeholders ensuring the continuity of the program. The program will create age groups with necessary knowledge who will be able to share their knowledge with other interested communities after the end of the program. The program will promote to strengthen the capacities of local mass media and environmental NGOs. The inclusion of the best practice achieved by the five-year community development plans will contribute to the stability of the project outcomes. It is expected that adaptability and sustainability of natural and agricultural landscapes will be ensured through the recognition of the importance of biodiversity role and by displaying capabilities of possible natural disaster prevention under climate change by all stakeholders.

Social-economic situation and benefits

Poverty level is very high in the project area, extremely poor make up 9% of the population and the poor- 44%, which is above the national average. The number of children dying under one year of age is high which makes up 12%, while the maternal mortality rate is 2.7%. Disabled people constitute 12% of the population.

The main source of income is agriculture. Climate change and natural disasters are causing great harm both to the environment, and agricultural food production. Lands adjacent to communities are intensively exploited due to which the qualitative composition of the soil has changed. The recurring floods cause great damage to the region that wash residential and public buildings, lands, gardens, sheds, yards and streets, domestic animals. The dust has a negative impact on agricultural crops, adjacent forests and human health. 2016 flood caused more than US $ 210 000 damage to the communities of the region.

Economic benefits

Stone pit dust has negative impact on the health of the population as well as on the forests, arable land, hay meadows and pastures situated on the impact zone of floods. During the implementation of the project local population can be attracted as labor force that will be paid this increasing their income. Jobless women will be mainly involved in landscaping and reforestation activities.

The project will create the opportunity to prevent and minimize damage caused by natural disasters. Costs caused by floods for the reconstruction of buildings, backyard and this will be used for the needs of the families. More than 300 hectares of different types of lands situated in the impact zone of flooding will not be subjected to flooding and agricultural production and incomes will be increased.

Armenia is one of the most vulnerable countries to climate change in the South Caucasus. Already existing climate changes has contributed to increasing the frequency of hydro-meteorological hazards such as extreme high temperatures, summer droughts, severe hail, heavy spring rains, floods, flash floods and associated catastrophic events of mudflows and landslides.

Despite some activities carried out by the government and international organization the country is failing to cope with the mounting pressures from climate hazards that increase in frequency and intensity as a result of climate change. The damages that result from natural disasters in Armenia are direct and indirect, and also tangible and intangible. This does not include indirect damages such as socio-economic, legal and often political problems arising in temporary-migrant resettlement sites.

In addition since 2000 much money was spent on the rehabilitation of roads damaged by natural disasters mainly in mountainous areas. Damage to utilities is also a serious problem and much money was spent by the Government on the rehabilitation of electricity lines damaged by natural disasters:

Compare these direct damage costs with the annual budgets of the amount/ money allocated each year by the government and local authorities it becomes apparent that the currently reactive framework within which natural disaster are dealt, is highly ineffective and costly to the government and to the communities affected. Intangible damages (direct and indirect) are more difficult (or undesirable) to quantify (such as loss of life, physical injury, loss of heritage or archaeological site), but are potentially more significant than direct tangible damages. Intangible damages (direct and indirect) are more difficult (or undesirable) to quantify (such as loss of life, physical injury, loss of heritage), but are potentially more significant than direct tangible damages. The trend analysis provided in the above sections indicates that the magnitude of damages is on rise. If put into the perspective of long term climate change scenario that points at higher temperatures, greater concentration of precipitation amounts in the shorter periods of time and as a result, more frequent and intensive flood and flash-flood events, immediate actions are required to put more robust systems for flood management. This project is seeking to provide direct adaptation measures to reduce flood levels experienced, and provide flood warning to improve the ability of the affected population to respond and move out of danger during a flood. In addition, it is seeking to develop long-term sustainable approaches to climate change risk management. The project introduces a combined method of structural defense and non-structural prevention that has proven the most effective in many countries of the developed world.

Smart flood management options will deliver considerable socio-economic and environmental benefits to the people residing in the Artik region.
The soft, non-structural flood management measures, otherwise termed as bio-engineering, often tend to be more effective than structural and hard protective measures. This is true especially in the complex mountain terrains as of Armenia and particularly for the prevention of freshets that will more frequently occur as a result of the combined effect of localized, intensive rainfalls and early snow melt due to climate change driven warming. Moreover, watertight materials of hard constructions are thought to make runoff 2 to 4 times greater in comparison to terrains with natural coverage (forests, grass cover). Their rehabilitation improves landscape functions for flood management. These will also abate land erosion processes on over 300,0 ha of natural and agricultural landscapes (both directly and through up-scaling) that delivers significant environmental benefits both in terms of land productivity and stability for all types of land infrastructure.
The focus of the project is on the promotion of the most appropriate mix of structural and nonstructural flood management measures. The restoration of stone pit are and flood natural management measures will include reconnection of the re-establishment of the stone pit area by designating floodways to help store and slow down floodwater, the use of bio-engineering measures such as strenghtening of city adjacent ravine slopes by grasscover, vegetative buffers and tree revetments which can store and slow down water during events.
These measures will also help protect soils from eroding and contributing to landslides and mudflow. Flood management and landscape restoration natural measures such as these, achieve typical benefits such as avoided costs of damage to society, human health and well being, economic activities, infrastructure, and the environment. Environmental benefits for the Artik region will comprise a complex set of environmental attributes from which a range of market and non-market goods and services derive. These will include:
• Habitat creation through the restoration of the stone pit area by zoning development;
• Maintenance/restoration of biodiversity by strengthening the functionality of the landscapes;
• Enhanced landuse management through increasing knowledge;
• Control runoff and soil erosion through agro-forestry, thereby reducing losses of water, soil material, organic matter and nutrients, maintained soil organic matter and biological activity at levels satisfactory for soil fertility.
This depends on an adequate proportion of trees in the system- normally at least 20% crown cover of trees to maintain organic matter over systems as a whole. Agroforestry maintains more favourable soil physical properties than agriculture, through organic matter maintenance and the effects of tree roots.
• Improvement in water quality and restoration;
• Improvement in water resources through improved infiltration, and transmission an all other functions of the full water cycle;
• Contribution to the development of a green economy by providing jobs and business opportunities to local people.
In general the environmental goods and services provided by flood management, relates to local and regional user populations in terms of the final benefits and the primary indirect user populations are households in the Artik city and rural communities that are under the impact zone of the project communities that benefit from flood risk:

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

The project has considered the option of addressing the climate change problem through alternative solutions. For example, consideration was given to scaling up in place traditional structural measures (including embankments, building fences and dikes etc) by considering forward looking hazard profiles in relation to climate change scenarios and adjusting engineering parameters of define structures, including locations and scale. The cost of this would be approximately US$ 3-3,5 million. This is calculated based on the cost of existing flood protection infrastructure for Artik town and 3 rural

communities surrounding it target locations only that would need to be at least doubled given the necessity of expansion with the view of anticipated increase in intensity and frequency of floods. However, based on the latest data of past 30 years that indicate increased occurrence of devastating flash floods this solution, was deemed to be not cost-effective. Given the inherent uncertainties with how climate change will alter hydrological regime and how the inevitable changes will be expressed locally, the measures that yield immediate and long term adaptation benefits are required as opposed to localized, short-term and typical, defense infrastructure oriented, disaster risk reduction methods. AF project will therefore deliver adaptation benefits in the most cost-effective way. With slightly over US$ 1,4 million critical functions of water saturation, storage and transmission will be improved and even restored at Artik region. From the hydrological point of view, factors that have a decisive influence on the occurrence of flash floods – apart from the intensity and duration of the rainfall - are the topography, soil conditions, and coverage of the terrain. Disadvantageous topographical conditions such as high-exposure (steeply sloping) highland terrains or ravines hasten the runoff and increase the likelihood of flash flood occurrence.

It is well known, that urbanization processes and affiliated construction, including hard structural defense infrastructure with watertight materials make run off 2 to 4 times greater in comparison to terrains with natural coverage (grass cover, forests). Hence, the latter option allows for more saturation, transmission and storage and as a result, minimizes the flood water volume, velocity and subsequent impacts. This therefore allows delivering adaptation benefits towards achieving greater resilience at a broader landscape level than location specific structural defense options. This ratio can directly correlate to the ratio of minimum adaptation benefits that the project will deliver by minimizing the exposure to and impacts of floods (2-3 times greater than without the project in business-as-usual scenario) The project is cost-effective in as much as it implements flood / flash flood management measures that are more resilient to long term impacts of climate change on hydrological dynamic and increased frequency and intensity of climate hazards. Each year since 1990 the region suffers a loss of an average USD 150000-250000 from floods and other climate disasters. In this regard it is necessary to defense structures requires a more long term vision to effectively prevent and adapt to climate hazard risks that are to be exacerbated based on regional and national climate change scenarios. The project has closely examined the current, business-as-usual scenario of flood / flash flood risk management that progresses in cost and regresses in effectiveness due to aggravated forces of climatic hazards. As such, abundant snowfalls /thick snow cover in mountains, intensive early snowmelt together with increasing amounts of rainfall; more frequent heavy rainstorms during spring and beginning of summer; are key conditions that get intensified as a result of climate change. Therefore, effectiveness of business-as-usual measures is already questionable now, under the current climate variability, let alone the future climate change scenarios described above. Doing “more of the same” has been considered among the options. However, the cost of structural measures will be extremely high and barely affordable for the country like Armenia and particularly Artik region facing intensified catastrophic events. Given the complexity of the topography such measures may not always be effective. With more forceful floods and flash floods in the upper reaches of Artik region, the flow velocity can be so high that can often destroy the defense structures and pick up the solid matter that has even stronger destructive powers. The 3rd national report stressed the increase of climate-related hazards (e.g. floods, landslides, hail, high temperatures).

Therefore, the project takes more context specific approach in designing flood plain development policy and offers a suite of structural and non-structural measures the best suited to the local circumstances and the long term hydrological alterations due to climate change. Based on initial calculations of payback rate per unit of investment in types of measures offered by the project (vegetative revetments, reclamation of exploited stone pit with climate change resistant trees and shrubs, cleaning of storm canals, water flow softening in ravines by bioengeneering methods etc.) can amount to at least 1:3 ratio compared to current modes of flood management by artificial embankments and structural protection measures.

The return period of the events resulting in damages in each year is not known (in fact it is not known whether the damages are incurred in one event, or several over the year), however, the figures can be used as a means of assessing the benefit-cost ratio at a very high level. The project will undertake more detailed assessment of economic benefits of each component which will provide a better assessment of benefit-cost ratio.
The current approach to flood risk management in Armenia is largely reactive. This includes the implementation of works to reconstruction/repair flood walls to existing levels thus providing the same standard of protection despite the increasing risk (frequency and magnitude) of failure of defenses under climate change. Indeed present disaster risk reduction activities in Armenia, including Artik region are mainly focusing on developing local capacities to cope with recurrent disasters: floods, flash floods, mudflows, etc. These actions are not taking into account long-term efforts to adapt to changing climate. Thus this proposed project is the first ever attempt to address long-term flood management measures and to strengthen capacity of relevant institutions.
The aim of this project is to put in place, long-term flood management measures which will enable the Government of Armenia to manage flood risk in a more sustainable manner. Under this project, direct measures including the construction of structural defenses which take account of climate change will provide a higher standard of protection that takes account of changing flood levels with climate change. This will reduce the risk of defense structure failure (operational and structural failure). Under this project a number of direct intervention structural measures will be implemented, which will complement and improve on the Government's annual river wall defense work. This project therefore offers the critical long-term adaptation and climate resilient flood management measures required for the basin. It will also develop and provide the tools (e.g. modeling, monitoring, forecasting and early warning) that will enable the government to manage flood risk in a more sustainable and cost-effective manner.

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.

The aims and objectives of the program are fully consistent with the Intended Nationally Determined Contributions of the Republic of Armenia under the UN Framework Convention on Climate Change Protocol Decision No 41, 10 September, 2015 Government of the Republic of Armenia, National Strategy and Action Plan of RA's Biodiversity Conservation, Protection, Reproduction and Use, National Strategy and Action Plan to Combat Desertification in Armenia.
10 main strategic and other documents have been developed in Armenia which are directly connected with biodiversity and agrobiodiversity conservation and which relate to the proposed project intervention. These are:
1. 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.);
2. 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;
3. Strategy and state program of conservation and use of specially protected nature areas of the Republic of Armenia (2014) S
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;

4. 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;

5. Community Agricultural Resource Management and Competitiveness Project (2010-2020), the action plan includes 4 components: community pasture and livestock management system; agricultural advisory and community animal health services; competitive grants program; and, project management and monitoring and evaluation. The project is envisaged to be implemented in 6 Marzes of the Republic (Aragatsotn, Shirak, Lori, Tavush, Gegharquniq, Syuniq); and finally,

6. "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.

7. The social-economic development program for Shirak region (2014-2017) –The project should contribute to solving urgent problems in the urban and rural communities of Shirak marz(creation of jobs, restoration of damaged buildings, solution of environmental problems, reconstruction of roads of city's streets and urban settlements, expansion of drinking and irrigation water pipelines, equal development of territories, improvement of infrastructures).

8. The social-economic development program for Artik city (2013-2016) - The four-year social economic development program for Artik city thoroughly describes the common understanding of the city's population and authorities on the main directions of city's development, sets out the priority objectives of city's development, introduces the existing problems and challenges, as well as the planned measures needed to overcome them in the medium-term perspective. When defining the priorities for community development available resources liabilities, local features, internal and external challenges, as well as projections of future developments were taken into account.

9. Water Supply and Sanitation Sector Project - Improvement of water supply systems of Shirak marz settlements, subproject (2015)

Implementation of this project will provide a safe, stable and reliable water supply of Artik town and surrounding villages. This project consists of 2 components: (i) rehabilitation and improvement of urban infrastructures, (ii) improvement of management and development, including gender-specific features. The project will contribute to poverty reduction (i) decreasing the number of waterborne diseases and medical care expenses, (ii) revealing women from time requiring homework-bringing water from remote places and water collection, allowing them to be more involved in social and economic activities; (iii) ensure safe, reliable and sustainable water supply, and (iv) improve the quality of life of households in all cities and villages of the project.

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).

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.

All the activities of the project were developed in compliance with national technical standards, which do not contradict to the Environmental and Social Policy of the Fund. Activities envisaged by the

project are consistent with population protection objectives in emergency situations and do not contradict RA laws. It is worth mentioning that the project suggests solutions that do not require EIA.

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

At present reclamation works of stone pits by state and other donor organizations are not carried out. Some flood prevention works are being carried out by the state and municipal budgets in the northeastern part of the Republic in Haghartsin community of Aghstev river, in Tavush marz. 3100 US dollars was spent in 2015, and 13400 US dollars in 2016 from Artik town budget to clean storm canals. Project proposal is not a duplication of project / programme with other funding sources.

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

The 3rd component of the project proposal is related to the increase of knowledge and awareness of various target groups. For this purpose training programs will be developed for target groups having the possibility to share the gained knowledge among other concerned groups. After each training program effectiveness evaluation will be carried out by participants, while experts-outcome analyses. 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.
Summary report will be posted in the websites of EPIU, Shirak municipality and Artik city to increase best practice accessibility on knowledge and awareness level.

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.

During the whole development process of project concept, project budget and EPIU closely collaborated with Artik municipality and with the leaders of mines adjacent to communities and corresponding specialists. They provided us with the necessary information on the current situation of stone pits and storm canals, environmental, social and health damages, rehabilitation activities and implementation prices.
Initial data on demographics, socioeconomic status, the features of the work carried out by women, project-related knowledge level, needs and capacities was collected through relevant community executives.
The analysis conducted by us assures us that the project is in compliance with the Environmental and Social Policy and Gender Policy of the Fund.
The required amount is calculated on the comprehensive consultations with all stakeholders and on the basis of the current prices for the services and goods in the Armenia.

The proportionate increase will be available through the formation of a network of trained and authorized communities for sustainable management of natural and agricultural landscapes. The interagency cooperation, as well as the relation with other programs and projects will be improved at the country level.
During project development stage meetings and consultations with stakeholders and representatives of the local authorities stated that all parties are aware of the importance of the stability and further development of the project results. Community leaders are willing to provide manpower and machinery during project implementation, while after its end to protect and to develop the outcomes.

This program will provide data and methodology, which will enable Armenia's partners to use the best practices in the planned and ongoing work programs. Cooperation with non-governmental organizations, mass media, educational institutions and other interested parties will contribute to innovations, stability, as well as the proportional increase in these areas.

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

Funding is being requested for the implementation of interventions to increase adaptation level of natural and agro landscapes to climate change, as well as eliminate anthropogenic adverse effects. The total funding required for this project is US$ 1 466 000including project management and project execution fees.

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

The aim of this project is to put in place, long-term flood management measures which will enable the Government of Armenia to manage flood risk in a more sustainable manner. Under this project, direct measures including the construction of structural defenses which take account of climate change will provide a higher standard of protection that takes account of changing flood levels with climate change. Under this project a number of direct intervention structural measures will be implemented, which will complement and improve on the Government’s annual river wall defense work. This project therefore offers the critical long-term adaptation and climate resilient flood management measures required for the basin. It will also develop and provide the tools (e.g. modeling, monitoring, forecasting and early warning) that will enable the government to manage flood risk in a more sustainable and cost-effective manner.
The capacity building process of the programme allows training local leaders and population who will be able to build capacity within the communities themselves.
Artik community administration will participate in project development by investing US $ 60000 and a certain amount of money will be allocated to Artik city municipality budget for the implementation of the project results.
During project development stage meetings and consultations with stakeholders and representatives of the local authorities stated that all parties are aware of the importance of the stability and further development of the project results. Community leaders are willing to provide manpower and machinery during project implementation, while after its end to protect and to develop the outcomes.

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	
Access and Equity	The project will provide fair and equitable access to the project beneficiaries and will facilitate access to robust institutions, sustainable livelihoods, efficient energy and knowledge, as well as in decision making processes.	
Marginalized and Vulnerable Groups	Project activities do not have negative impact on marginalized and vulnerable 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	Women's rights are protected and they are included in all stages of project development and implementation. Efforts will be made to ensure equal participation of women in interventions and decision making too. Capacity building and skill development training for sustainable livelihood generation will be provided to the women of communities. This will ensure participation by women fully and equitably, and that they do not suffer adverse effects.	
Core Labour Rights	Labor rights are protected by the Constitution of the RA and Civil Code of the RA	

Following the initial screening process the proposed project concept is expected to be Category C in accordance with Fund's ESP as it has no adverse environmental or social impacts

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

The Programme is guided by the Intended Nationally Determined Contributions of the Republic of Armenia under UN Framework Convention on Climate Change approved by the RA Government Protocol Decision No 41, 10 September, 2015 and will be implemented over a free-year period, beginning in November 2017. The implementing entity (IE) for the programme 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 Programmes at national and international level, the Government of the Republic of Armenia has explicitly endorsed this AF project to be executed by EPIU. Artik municipality will have its contribution to the project as one of the direct beneficiaries of the project. EPIU role in the framework of the project is fully in line with its leading institutional role in the implementation of environmental sector projects.

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 organising 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)[1]	**Project Objective Indicator(s)**	**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.

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

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

A. **Record of endorsement on behalf of the government**[2] *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", "Community Agroresources Management and Competitive Project (2010-2020)")and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Name & Signature Mr. Gevorg Nersisyan Implementing Entity Coordinator	
Date: August- 04- 2017	Tel. and email: : +37410 651631; info@cep.am
Project Contact Person: Rubik Shahazizyan, Edik Voskanyan	
Tel. And Email: rshahzizyan@yahoo.com; edshw@yahoo.com	

[2] 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.