



## Project Document

### GEF Medium-Size Project (MSP)

Government of Armenia

United Nations Development Programme

PIMS 3814

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### **PIMS 3814: Adaptation to Climate Change Impacts in Mountain Forest Ecosystems of Armenia**

#### Brief description:

Armenia's forest ecosystems have been identified as a global conservation priority inasmuch as they fall under the Caucasus-Anatolian-Hyrcanian Temperate Forests Ecoregion that has been listed by WWF as a Global 200 Ecoregion, and by Conservation International as a biodiversity hotspot. The high level of biodiversity is one of the most important features of the Syunik region in south-eastern Armenia. The region's ecosystems form part of the eco-corridor of the Eastern Lesser Caucasus that has been identified as a conservation priority by the Ecoregional Conservation Plan for the Caucasus. Recognizing the need to protect the unique biodiversity of this region, the government has established five specially protected areas, and is in the process of establishing three others. This region, however, has also been identified as a critically vulnerable region of the country, especially in terms of the risk posed by climate change to its unique mountain forest ecosystems. This conclusion comes from the first comprehensive vulnerability and adaptation assessment undertaken for Armenia under the aegis of its First and Second National Communications to the UNFCCC.

Under the business-as-usual scenario, climate risks will not be taken into account in the forest and biodiversity sector, primarily due to the prevalence of certain key barriers including: planning process that governs management of forest ecosystems does not include the climate change threat as a criterion in decision making; institutions and individuals do not have the technical capacity to observe and forecast adaptive capacity of forests, understand changes in forest species spurred by climate change including impacts on communities reliant on forest resources, identify options for autonomous and planned adaptation, and then to use this information to raise awareness and mobilize programmatic choices regarding protection of forest ecosystems in the face of climate change; there are no concrete experiences with implementing adaptation response measures, which can be leveraged to motivate wide scale acceptance and adoption of such measures.

The Government of the Republic of Armenia (GoRA) is, therefore, requesting technical assistance from UNDP with funding from the GEF/ SPA to address these barriers. In addition to the GEF resource, the Government will bring to bear its own resources to achieve a normative situation whereby the forestry and biodiversity sectors in the Syunik region are managed in a way that forest ecosystems are better able to adjust to climate change. The three main outcomes of the project are: (1) The enabling environment for integrating climate change risks into management of forest ecosystems is in place; (2) Forest and protected area management in the Syunik region integrates pilot adaptation measures to enhance adaptive capacity of mountain forest ecosystems; (3) Capacities for adaptive management, monitoring and evaluation, learning, and replication of project lessons are developed. Lessons from the project are expected to be replicated in other mountain forest ecosystems of central and northern Armenia.

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## Acronyms and Abbreviations

APF	Adaptation Policy Framework
APR	Annual Project Report
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of Germany
BSAP	Biodiversity Strategy and Action Plan
CC	Climate Change
CCU	Climate Change Unit
CENN	Caucasus Environmental NGO Network
CEPF	Critical Ecosystem Partnership Fund
CO	Country Office
DJB	December, January, and February
EIA	Environmental Impact Assessment
EU	European Union
FE	Forest Enterprise
FNC	First National Communication
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIS	Geographic Information System
GTZ	German Technical Assistance
GORA	Government of the Republic of Armenia
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
JJA	June, July, and August
LA-21	Local Agenda-21
MAM	March, April, and May
MDG	Millennium Development Goals
MOA	Ministry of Agriculture
MOES	Ministry of Emergency Situations
MONP	Ministry of Nature Protection of Armenia
MOTA	Ministry of Territorial Administration
MTEF	Medium-Term Public Expenditure Framework
NCSA	National Capacity Self Assessment for Global Environmental Management
NEAP	National Environmental Action Programme
NEX	National Execution
NGO	Non-Governmental Organization
NSS	National Statistical Service
NTFP	Non-Timber forest products
OSCE	Organization for Security and Co-operation in Europe
PB	Project Board
PCA	Partnership and Cooperation Agreement with European Union
PoWPA	Programme of Work on Protected Areas
PRSP	Poverty Reduction Strategy Paper
RA	Republic of Armenia
REC	Regional Environmental Centre for the Caucasus
SBAA	Standard Basic Assistance Agreement
SNC	Second National Communication
SNCO	State Non-Commercial Organization
SON	September, October, and November
SPA	Strategic Priority on Adaptation
SPAN	Specially Protected Areas of Nature
UNCBD	UN Convention on Biological Diversity
UNCCD	UN Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	UN Framework Convention on Climate Change
WWF	World Wildlife Fund

## SECTION I: Elaboration of the Narrative

### PART I – SITUATION ANALYSIS

#### A – SUMMARY

1. Armenia's forest ecosystems have been identified as a global conservation priority inasmuch as they fall under the Caucasus-Anatolian-Hyrcanian Temperate Forests Ecoregion<sup>1</sup> that has been listed by WWF as a Global 200 Ecoregion. The Caucasus has also been listed by Conservation International as a biodiversity hotspot. Within Armenia, the Syunik region that falls in the south-eastern part of the country is also notable for the high level of biodiversity. The region's forest ecosystems form part of the eco-corridor of the Eastern Lesser Caucasus that has been identified as a priority conservation area by the Ecoregional Conservation Plan for the Caucasus. From the banks of Arax, Vokhchi and Vorotan rivers up to the tops of Zangezur, Bargushat and Meghri mountain ranges, various types of ecosystems are represented, namely, semi-deserts, arid open forests, oak forests, steppes, tragacanth formations as well as aquatic and marsh growth, alpine and sub-alpine vegetation, and petrophilous vegetation. Recognizing the need to protect the unique biodiversity of this region, the government has established five specially protected areas<sup>2</sup>, and is in the process of establishing three others<sup>3</sup> (further details on the globally significant biodiversity of the Syunik region are in [Annex 1](#)).
2. Based on assessments of impacts of climate change, including variability, the Syunik region has been identified as a critically vulnerable region of the country, especially in terms of the risk posed by climate change to its unique mountain forest ecosystems. This conclusion comes from the first comprehensive vulnerability and adaptation assessment undertaken for Armenia in the face of potential climate change under the aegis of its First National Communication (FNC) to the UNFCCC, an initiative supported by UNDP-GEF. According to the FNC, climate change impacts are observed from the more frequent occurrence of extreme weather and climate events and disasters, climate aridization, with resultant changes in biota, as well as a decrease of land productivity. Climate change, including variability, has also led to water stress and health issues. The SNC further confirms the need to focus on forest areas where there is a likelihood of significant impacts.
3. In spite of the vulnerability of the forests of Syunik region, under the business-as-usual scenario, climate change risks will not be taken into account in the forest and biodiversity sectors, primarily due to the prevalence of certain key barriers including: planning process that governs management of forest ecosystems does not include the climate change threat as a criterion in decision making; institutions and individuals do not have the technical capacity to observe and forecast adaptive capacity of forests, understand changes in forest species spurred by climate change including impacts on communities reliant on forest resources, identify options for autonomous and planned adaptation, and then to use this information to raise awareness and mobilize programmatic choices regarding protection of forest ecosystems in the face of climate change; there are no concrete experiences with implementing adaptation response measures, which can be leveraged to motivate wide scale acceptance and adoption of such measures.
4. The Government of the Republic of Armenia (GoRA) is, therefore, requesting technical assistance from UNDP and GEF to address these barriers. It will bring to bear its own resources and those of the GEF to achieve the preferred normative solution whereby the forestry and biodiversity sectors in the Syunik region are managed in a way that forest ecosystems are better able to adjust to climate change. This requires (a) reducing or removing anthropogenic pressures<sup>4</sup>, and (b) by adopting policies and practices which directly assist species in forest ecosystems to adjust to climate change. Under the business-as-usual scenario, the government, along with donor support, is addressing anthropogenic pressures through various measures aimed at strengthening Armenia's SPANs, as well as

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<sup>1</sup> In addition to Armenia, this ecoregion falls under the administrative territories of Azerbaijan, Bulgaria, Georgia, Iran, Russia, Turkey, and Turkmenistan.

<sup>2</sup> One Strict Nature Reserve (Shikahogh state reserve spanning 10,000 ha) and 4 State Reservations (Sev Lich – 240 ha, Boghakar – 2,728 ha, Goris – 1,850 ha, and Plane Grove – 64.2 ha)

<sup>3</sup> One National Park (Arevik) and two Reservations (Vorotan and Zangezur)

<sup>4</sup> See section on [anthropogenic pressures](#).

strengthening forest management (see section on [baseline programming](#)). These measures form the foundation for this GEF/SPA project on which specific measures to adapt to climate change are to be undertaken. The GEF/SPA project is fully in line with UNDP's approach to adaptation that sets the ground to arriving at more integrated national adaptation outcomes. The project will operate at multiple levels (i) to integrate climate change risks into the critical decision-making points of forest conservation and management at national and sectorial level; (ii) to develop institutional capacities for planned adaptation by improving climate risk monitoring, data management, knowledge and skill-set for scenario-based decisions; and (iii) to demonstrate effectiveness of adaptation measures that are designed and implemented by the local stakeholders at sub-national level. The GEF/ SPA project will thus focus on strengthening the enabling environment for mainstreaming climate change risks in forest and protected area management planning, developing associated technical capacities, as well as piloting on-the-ground adaptation measures in target sites. The relevant forest enterprises and administrative units of existing and planned protected areas located in the identified vulnerable target sites will be involved in the project. Lessons are expected to be replicated in other mountain forest ecosystems in central and northern Armenia. The three main outcomes of the project are:

- Outcome 1: The enabling environment for integrating climate change risks into management of forest ecosystems is in place.
- Outcome 2: Forest and protected area management in the Syunik region integrates pilot adaptation measures to enhance adaptive capacity of mountain forest ecosystems.
- Outcome 3: Capacities for adaptive management, monitoring and evaluation, learning, and replication of project lessons are developed.

## B - COUNTRY OWNERSHIP

### B1. Country Eligibility

5. The Republic of Armenia has ratified the UNFCCC (ratified on May 14, 1993, entered into force on March 21, 1994) and the Kyoto Protocol (ratified on April 25, 2003, entered into force on February 16, 2005), thus making it eligible for receiving GEF support under the climate change focal area. The country has also joined the Ramsar Convention (entered into force on November 6, 1993) and the UNCBD (entered into force on May 14, 1993). It has also ratified the UNCCD (ratified on July 2, 1997, entered into force on September 30, 1997). It is eligible to receive development assistance from UNDP.

### B2. Country Drivenness

6. Since the ratification and entry into force of the UNFCCC and Kyoto Protocol, the Government of the Republic of Armenia (GORA) has effectively fulfilled various assessment and reporting requirements for developing a national strategy for addressing climate change mitigation and adaptation through a broad-based consultative process. The country has prepared its First National Communication (FNC, 1998), and a National Capacity Self Assessment for Global Environmental Management (NCSA, 2004). It is currently preparing (with GEF support) its Second National Communication (SNC) to UNFCCC, according to 17/CP.8 and other guidance provided.

7. The FNC identified the forest sector, and particularly the south-east mountain forest ecosystems, as some of the most vulnerable in Armenia. The SNC further confirms the need to focus on forest areas where there is a likelihood of significant impact of climate change, including variability. A comprehensive multi-criteria analysis has resulted in prioritization of the south-east mountain forest ecosystems as an area where adaptation actions need to be pursued. This is based on an analysis of vulnerable sectors conducted in three selected marzes<sup>5</sup> of the Republic. In conducting this prioritization exercise, the following sectors (sub-sectors) were taken into account: forestry, biodiversity, and water. Options were rated on the scale of vulnerability to climate change, relevance to national development priorities and data availability. The final evaluation matrix developed under the stocktaking exercise is attached as [Annex 2](#).

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<sup>5</sup> An administrative region in Armenia is called a "marz".

8. During the preparation of the Second National Environmental Action Programme (NEAP-2), biodiversity conservation and the forest sector have been prioritized taking into account, among other things, the lack of introduction of integrated management approaches of biological resources, irrational management of forests, and climate change, which are resulting in degradation of natural resources, elimination of considerable forest areas affecting the ecological balance, and increasing poverty. The draft NEAP-2 stresses the importance for Armenia to undertake forest adaptation measures in the light of the vulnerability of forests.

9. Taking into account the findings of the above national, broad-based, consultative dialogue, the Ministry of Nature Protection of Armenia (MONP) has recommended the implementation of pilot measures aimed at strengthening the resilience to climate change of the most vulnerable regions of the country. With GEF support, it hopes to set in motion a long-term process of adaptation to ensure that management of forest ecosystems also includes well-thought out responses to mounting climate change risks, with the ultimate goal of conserving the globally significant biodiversity of the region, sustaining local natural resource-dependent livelihoods, and contributing to the mitigation of land degradation in mountainous areas.

## C – PROGRAM AND POLICY CONFORMITY

### C1. Program Designation and Conformity

10. This proposal conforms to the Operational Guidelines for the Strategic Priority “Piloting an Operational Approach to Adaptation” (SPA)<sup>6</sup>. As outlined in these operational guidelines, the project will contribute to the GEF’s stated objective of reducing vulnerability and increasing adaptive capacity to the adverse effects of climate change in the biodiversity focal area by focusing on the valuable mountain forest ecosystems of the Syunik region of Armenia. In terms of the “incrementality” concept outlined in the SPA guidelines, “the incremental cost of activities that generate GEB but do not necessarily increase resilience to climate change”, such as proper management of protected areas and forestries in the Syunik region, will be covered through various donor and government funded initiatives described in the [baseline programming](#) section of this document. The “adaptation increment”, or the incremental cost of activities that increase resilience to climate change, will be covered through resources being requested from GEF/ SPA. Through these resources, this pilot, demonstration project will address adaptation needs and reduce risks of loss of biodiversity, which is of global significance. It will reduce the vulnerability of the south-east mountain forest ecosystems to the adverse impacts of expected climate change.

### C2. Project Design

#### Geographical and political context

11. The Republic of Armenia is located in the North-East of the Armenian Highland, at the turn of Caucasus and Vorder (South-Western Asia). It borders Georgia in the North, Azerbaijan in the East, Turkey in the West and South-West and Iran in the South. The territory is 29,743 km<sup>2</sup>. The greatest extension of the territory from South to North is 360 km, and 200 km from West to East. Armenia is a mountainous country, with 76.5% of its territory located at 1,000 to 2,500 meters above sea level. The highest point is at 4,090 m (Mount Aragat), and the lowest point is at 370 m. 46.8% of the territory of Armenia falls under agricultural lands, 11.2% under forests, 5.6% under water surface, 7.4% under specially protected nature areas, 5.4% under settlements, industry and communications territory, and 23.6% under other areas.

12. After the collapse of the USSR and founding of the Republic of Armenia in 1991, a number of political, economic and social reforms were implemented in the country, including land and industry privatization, as well as transition to market economy. The governance structure in Armenia consists of two levels: the republican government and local self-administration (localities, communities)<sup>7</sup>. The

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<sup>6</sup> GEF/C.27/Inf.10, October 14, 2005

<sup>7</sup> Both levels collect taxes, charges, etc., and have their own budgets.

country is administratively divided into 11 regions, each governed by territorial administrations (marzpetarans<sup>8</sup>), which coordinate activities of the local self-administrations.

13. The administrative region of Syunik, with a territory of 4,506 km<sup>2</sup> (15.1 per cent of the country's territory) is located in the South-East of Armenia. The Syunik region is gifted with wonderful landscapes created by the chain of the Zanghezur Mountains. It is notable for its large altitudinal variation. The highest point is Mount Kaputdzhukh (3,906 m), and the lowest is the depression in the Megrin gorge (375 m). The lack of plains, frequent alternation of mountain tops, impassable canyons and gorges together give the Syunik region its extraordinary picturesque-ness. It is abundant in Alpine meadows, forests, caves and rivers. The main waterways of the marz are the Vorotan, the Vokhdzhi, and the Megri. In the Soviet period, the region's territory was divided into four administrative districts: Sisian, Goris, Kapan and Meghri. At present, there are 7 urban and 103 rural communities in the region.

#### Socio-economic context

14. As of the end of 2006, the population of the Republic of Armenia was approximately 3.2 million people, with an average density of 108 per km<sup>2</sup>. The population distribution is extremely disproportionate, due to the country's mountainous relief and the varying level of economic development. The maximum density of 686 per km<sup>2</sup> is distinctive to altitude zones of up to 1,000 m height. The minimum density of 22 per km<sup>2</sup> is observed in high-altitude zones of up to 2,000-2,500 m.

15. Following the sharp economic recession of 1991-1994, Armenia successfully passed through transition and reached certain economic stability and notable economic growth. Average annual economic growth was 5.4 per cent in 1995-2000, and 12.4 per cent in 2001-2004. Political and economic stability, consistency in pursuing market transition and structural reforms, and the establishment and improvement of a legislative base became the most important pre-requisites for positive development of the economy. GDP per capita was USD 2,844 in 2007. The poverty rate is 26.5%; unemployment rate is 7.1%. In terms of human development, Armenia is ranked 83<sup>rd</sup> in the 2005 Human Development Report, with an HDI value of 0.775.

16. Sustainable economic development and poverty reduction remain top priorities. The Government and civil society adopted a Poverty Reduction Strategy Paper (PRSP) in August 2003. The second PRSP paper is being developed for the period 2008-2015. The main objective is to ensure high rates of economic growth and to redistribute this growth through social programmes aimed at poor and socially disadvantaged groups. To support the implementation of the strategy, the Government has adopted a Medium-Term Public Expenditure Framework (MTEF). Relevant ministries and state agencies are developing comprehensive action plans based on the PRSP strategy and goals. It is important to state that PRSP II recognizes the significance of forests for realizing biodiversity conservation. By implementing the key elements of the PRSP, the Government hopes to set the foundation for eradicating mass poverty and improving living standards by 2015 in accordance with the Millennium Development Goals (MDGs). In this context, Armenia has also developed an MDG Report, which, among other things, sets targets under Goal 7 for sustainable use and access to water resources, rehabilitation of forests and arresting current desertification trends.

17. The number of permanent residents in the Syunik region is 152.9 thousand people (4.74 per cent of the country's population), including 103.7 thousand people in urban, and 49.2 thousand people in rural communities. Population density is 33.93 people 108 per km<sup>2</sup>. Mining and agriculture are the most important sectors for the region's economic development. 76.3% of the employed population is engaged in private sector and 23.5% in public sector. Poverty rate is 25.3%. Unemployment rate in the Syunik region is around 15.4%, which is twice as high as the national average.

18. Forest management in the region is implemented by four forestry enterprises (Sisian, Syunik (Goris), Kapan and Meghri forestry enterprises), that are comprised of 13 forestry units. Based on a survey conducted during the project preparation<sup>9</sup>, local communities depend on forests primarily for

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<sup>8</sup> Marzpetarans do not collect taxes/charges and their budget comes from the republican one.

<sup>9</sup> 30 people were interviewed (19 employees of the forest enterprises and 11 local residents) in Goris, Kapan and Meghri sub-regions in May 2008.



firewood for heating<sup>10</sup> as well as for non-wood forest products. The same survey found that witnessed climate change unambiguously concurs with forecasted climate change. All the interviewed observed: (i) increase of temperature and decrease of precipitations, (ii) increase of droughts and forest fires, (iii) increase of forest pestholes and diseases. Although the interviewed people mentioned that the use of non-wood forest products remains the same, witnessed climate change and its impact on forest and forest resources is a point of concern for communities.

### Biodiversity context

19. Notwithstanding the very small size of the country's territory, Armenia is notable for its extremely rich biodiversity. Armenia's forest ecosystems have been identified as a global conservation priority inasmuch as they fall under the Caucasus-Anatolian-Hyrcanian Temperate Forests Ecoregion<sup>11</sup> that has been listed by WWF as a Global 200 Ecoregion. The Caucasus has also been listed by Conservation International as a biodiversity hotspot. Except for wet subtropics, all the main ecosystems of Caucasus are represented here. Armenian flora includes more than 3,600 species of vascular plants, which is more than ½ of Caucasian eco-region plant species. There are more than 120 endemic plant species. The fauna is very diverse and rich as well. All the classes of terrestrial vertebrates are represented in Armenia by more than half of Caucasian fauna species. 86 species of mammals (of the total 153 known from Caucasus), about 350 species of birds (of 400), 53 species of reptiles (of 77) and 8 species of amphibians (of 14) are represented here. Most invertebrate species are studied less completely in Armenia as well as in Caucasus, however, as for higher taxons known in the whole Caucasus and in Armenia, the latter's fauna is notably represented by more than a half of the Caucasus fauna. For instance, in Armenia 155 species of terrestrial mollusks (Mollusca) are found from about 280 known from the Caucasus, about 230 butterfly species (Lepidoptera-Rhopalocera) of approximately 400, 220 species of longhorn-beetles of 353, 160 species of jewel-beetles of about 250, etc.

20. Within Armenia, the Syunik region that falls in the south-eastern part of the country is also notable for the high level of biodiversity. The region's forest ecosystems form part of the eco-corridor of the Eastern Lesser Caucasus that has been identified as a conservation priority in the Caucasus by Conservation International and WWF. From the banks of Arax, Vokhchi and Vorotan rivers up to the tops of Zangezur, Bargushat and Meghri mountain ranges, various types of ecosystems are represented, namely, semi-deserts, arid open forests, oak forests, steppes, tragacanth formations as well as aquatic and marsh growth, alpine and sub-alpine vegetation, and petrophilous vegetation. Armenia's BSAP (1999) notes the serious degradation of pastures and meadows which has occurred over the last 100 years, with the most significant impacts recorded inter alia in the grasslands of Zangezur (geographical name of Syunik region). The BSAP highlights the importance of ecosystems in Zangezur and underlines a number of specific sites which support ecosystems of global or regional significance.

21. At present, there are five Specially Protected Areas of Nature (SPAN) in the Syunik region: 1 strict nature reserve (Shikahogh state reserve spanning 10,000 ha) and 4 state reservations (Sev Lich – 240 ha, Boghakar – 2,728 ha, Goris – 1,850 ha, and Plane Grove – 64.2 ha). Three other SPANs – National park “Arevik” and two reservations (Vorotan and Zangezur) – are in the process of being established (*in statu nascendi*). For more detailed information on the globally significant biodiversity and protected areas of the Syunik region, see [Annex 1](#).

### *Forest ecosystems*

22. In Armenia, forests are unevenly distributed across the country (see map of forest cover in [Annex 1](#), Map 3). 62% of forests, comprising about 207,000 ha of forest land, are found in the north-eastern region (marzes of Lori and Tavush). Only 18% of forests are found in the vast central and southern regions (marzes of Aragatsotn, Kotayk, Gegharkunik, Ararat and Vayots Dzor), and the remaining

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<sup>10</sup> According to the survey, one family in Goris and Kapan sub-regions uses about 5-10 m<sup>3</sup> of wood for heating annually, and up to 5 m<sup>3</sup> in Meghri sub-region.

<sup>11</sup> In addition to Armenia, this ecoregion falls under the administrative territories of Azerbaijan, Bulgaria, Georgia, Iran, Russia, Turkey, and Turkmenistan.



20% are found in the south-east (Syunik Marz) covering about 65,000 ha of forest land. According to official data, average forest productivity coefficient is 3.6 growth class, and forest density is 0.55. Forests in the country mainly occupy lofty slopes and heavily incised landscapes at elevations of 550-2400 m above sea level. The geographical location and mountain relief has favored formation of rich biodiversity and high level of endemism. Forest areas are represented by 274 tree and shrub species. The main forest species (89.1% of forest cover) are *Fagus orientalis*, *Quercus iberica*, *Quercus macranthera*, *Carpinus caucasica* and *Pinus kochiana*.

23. The area of forest lands in the Syunik region reaches 94,243 ha, including forest-covered area of approximately 65,000 ha (20% of the country's forest-covered area). Area under crops totals 27,345 ha. At the elevation of 600-1500 m, oak forests (*Quercus iberica*, *Quercus macranthera*) are present. However, pure oak forests are not usual here. Forest areas in Syunik mainly consist of oak-hornbeam forests with a predominance of hornbeam (*Carpinus betulus*), ash-tree (*Fraxinus excelsior*), species of maple (*Acer hyrcanum*, *Acer campestre*), elm (*Ulmus glabra*), etc. At lower elevations, cornel (*Cornus mas*), nut-tree (*Corylus avellana*), eastern hornbeam (*Carpinus orientalis*), honeysuckle (*Lonicera caucasica*), buckthorn (*Rhamnus cathartica*), viburnum (*Viburnum lantana*), privet (*Ligustrum vulgare*) are found as underbrush with oak and hornbeam. Forests of the Syunik region have a diversity of endemic and rare plant species listed in the Red Book. *Zelcova carpinifolia*, which is listed in the IUCN International Red Book, is also found in the forests of the Syunik region. The Caucasus natural plane grove located in Syunik is of global significance and is under state conservation (see [Annex 1](#)).

#### *Forest management*

24. Forests in Armenia are state owned. The forest governance structure consists of the republican body "ArmForest", which is a State Non-Commercial Organization (SNCO). It has regional sub-units or forest enterprises. Each forest enterprise has several forest areas (forestry) under it. In the Syunik region there are four forest enterprises: Sisian forest enterprise, Syunik forest enterprise (also referred to as Goris forest enterprise because it is near the town of Goris), Kapan forest enterprise, and Meghri forest enterprise.

#### Water resources context

25. Water resources are an integral part of ecosystems and they play a crucial role in the survival and health of forest ecosystems. They fulfill vital functions in terms of creation and maintenance of microclimate, sustaining habitats for forest flora and fauna species, and their natural regeneration. The Syunik region includes 3 major river basins: Vorotan, Voghji and Meghri. Water resources are relatively abundant compared to other regions. The tables below describe the region's water resources.

**Table 1. Water balance in Syunik**

River Basin	Area (km <sup>2</sup> )	River Flow (million m <sup>3</sup> /year)	Atmospheric Precipitation (million m <sup>3</sup> /year)	Evaporation (million m <sup>3</sup> /year)
Vorotan	2476	725	1828	811
Voghji	1341	502	1097	448
Meghri	664	166	470	241

**Table 2. Main characteristics of river networks in Syunik**

Length	Number of Rivers and Length in km	River Basin		
		Vorotan	Voghji and Tsav	Meghri and Small Tributaries to Araks
< 10 km (smallest ones)	Quantity	1100	1152	655
	Length	1690	1737	761
10-25 km	Quantity	34	20	16
	Length	477	304	201
25-50 km	Quantity	3	2	1
	Length	88	59	36
50-100 km	Quantity	-	1	-
	Length	-	56	-
More than 100 km	Quantity	1	-	-
	Length	119	-	-
Entire River Network	Quantity	1138	1175	672
	Length	2374	2156	998
Area of the River Basins, km <sup>2</sup>		2476	1341	664
Coefficient of River Network Density, km/km <sup>2</sup>		0,96	1,61	1,50

**Table 3. Underground water resources in Syunik**

River basin	Total	Including (cubic m per sec)		
		Spring Flow	Drainage Flow	Outflow
Vorotan	17.24	5.44	8.01	3.79
Voghji	5.00	2.52	2.18	0.30
Meghri	1.63	0.61	0.80	0.22
Total	23.87	8.57	10.99	4.31

26. Assessment of the vulnerability of water resources to climate change is based on changes in river flows, which, in turn, are contingent upon atmospheric precipitation, evaporation, air temperature and changes in relative humidity. The decline of water resources in Armenia during the last decades is partially due to decrease of precipitation and increase of ground level temperature. The situation is not different in the Syunik region. Interviews with local stakeholders and representatives of the Southern Basin Management Authority that is in charge of management of water resources in Syunik region show a significant decrease of water resources. This decline of water resources in the Syunik region is likely to be another factor contributing to degradation of forest ecosystems due to reduction of essential functions that water resources provide. In order to assess the quantity of water decline, an analysis of atmospheric precipitation, air temperature and hydrological data was conducted (a map of hydrometeorological observation points in Syunik region is in Map 5, [Annex 4](#)). However, since monitoring of underground water resources has not been conducted in the southern basin for the last decades, this makes it difficult to assess changes in underground water resources.

27. As for surface water resource in the vicinity of pilot areas, data limitations do not allow for an in-depth analysis and conclusions. However, existing data from hydrological observation points show that water resources have declined in Meghri and Vorotan River Basins. In Vorotan River Basin, where hydrological observations have been carried out since 1962, water resources have declined by 3.44%, which might be due to reduction of precipitation by 0.60%. For Voghji River Basin, it is difficult to draw conclusions since anthropogenic impacts are observed here and the natural flow has undergone significant changes. For the Meghri River Basin, annual average multi-year flow for 1949-2006 has been 91.2 million m<sup>3</sup>, whereas the average annual flow for the period 1991-2006 is 80.9 million m<sup>3</sup>. Thus, the average annual river flow has declined by 11.3% in the period 1991-2006. This calculation does not include extraction rates for human use for drinking, irrigation and industrial

purposes, since the extraction of water resources from the river (composing about 2.8% of the total flow) did not change significantly during the last decades.

### Climate change context

28. Armenia's climate is dry owing to the high elevation of the terrain above sea level and its relief. The atmospheric circulation and its most important constituents, including baric fields, atmospheric fronts and air masses significantly influence the formation of weather and climate conditions. The country's weather is conditioned by anticyclone (46%) and cyclone fields (33%), the local air circulation (14%) and by the impact of southern hot dry tropical air (7%). The complicated topography with significant altitude changes (lowest point 379 m; highest point 4,090 m.) significantly affects atmospheric circulation. Only in the upper layers of atmospheric mass does transfer from west to east occur, which is characteristic of sub-tropical zones. Atmospheric occurrences are mainly contingent upon penetration of prevailing western and eastern air masses, with frequent infringement of arctic cold air masses from the north and hot air masses towards the Meridian from the south. In some parts of Armenia, particularly in Ararat Valley, clearly expressed mountain-valley circulation is observed, which intensifies in summer months. Wind velocity in summer might reach 20m/sec and more.

29. The absolute maximum temperature in the country recorded in Artashat (Ararat region) and Meghri (Syunik region) is 43<sup>0</sup>C. In June-August average air temperature varies from 10<sup>0</sup>C in high mountainous regions to +24 to +26<sup>0</sup>C in lowlands. Winters are quite cold with the coldest period in the second half of January. In January the average air temperature depending on the altitude and peculiarity of the relief fluctuates from -13<sup>0</sup>C to +1<sup>0</sup>C. Very low January temperatures are recorded in the north-west regions of the country, where the absolute minimum temperature recorded in Paghakn is -42<sup>0</sup>C, whereas in the north and south-eastern regions the winter is rather mild and the January temperature varies between 0.6<sup>0</sup>C (Ijevan) and 1.6<sup>0</sup>C (Meghri).

30. The annual total precipitation in Armenia is 592 mm. The maximum is observed during the period April-May. The driest regions are Ararat valley (Ararat region) and Meghri region (Syunik region), where the annual precipitation is 200-250mm. In Ararat valley, during the entire summer, total precipitation does not exceed 32-36mm. The maximum precipitation is observed in high mountainous areas – more than 1000 mm annually. In high mountainous regions, the snow cover is formed in the months of September-October and melts in July. In separate years the height of snow cover exceeds 2m. In warmer regions the snow cover is formed in December and melts in March. Sustainable snow cover is formed only in 15-20% of winters. In mountain passes, 31 days per year with stormy winds are observed. Hail is recorded more frequently in May-June. The regions of Lori-Pambak (Vanadzor, Tashir) are subject to most of the hail storms (6-8 days).

31. Consultations with national climate and biodiversity experts during the PPG has provided a more detailed picture of current climate variability in the Syunik region and its impact on biodiversity, as well as the projected impact of future climate change. The following paragraphs focus on climate variability in the target Syunik region of Armenia (further details on climate variability in Armenia more generally are provided in [Annex 3](#)).

### *Current climate variability in the Syunik region*

32. The climate of the Syunik region is remarkably diverse due to its complex topography. The high altitude above sea level, orientation of the mountain ranges, and occluded borders of the river valleys and basins has a notably large impact on the local climate. The majority of the mountain slopes has an eastern orientation, due to which air masses that blow from the east move up the mountain slopes and cool rapidly, causing a gradual increase in the relative humidity. As a result, precipitation is scarce on the western side of the mountains and in the Sisian basin. The eastern slopes of the Bargushat Mountains are rich with forests as they receive a relatively large portion of humidity, whereas forests are rare on the western and northern slopes. The vertical landscape zones on the eastward and westward slopes are largely divergent. The conditions in the Meghri sub-region are similar. In this region the humid air masses are blocked by the Meghri Mountain Range. Only when the air masses moving from the east are extremely strong and humid, Sisian and Meghri receive precipitation triggered by external factors. A similar phenomenon is observed when humid western air masses

penetrate the region. The Syunik region is blocked by the Zangezur Mountain Range in the west. While passing over the mountain ranges, the air masses undergo a significant transformation and become drier.

33. Air temperature in the region fluctuates within a large range due to differences of altitudes. The average annual temperature is 13.8<sup>0</sup>C, which is the highest throughout the country. The average January temperature in Kapan and Meghri sub-regions is respectively 0<sup>0</sup>C and 0.9<sup>0</sup>C. Meghri sub-region has the warmest winters in Armenia. The absolute minimum temperature recorded in Meghri sub-region is -22<sup>0</sup>C. The town of Meghri has favorable daytime temperature in winter, which sometimes reaches 20<sup>0</sup>C. The average summer temperature here in some years has been 27<sup>0</sup>C, with the highest absolute temperature reaching 43<sup>0</sup>C. Summers are also mild at medium elevations and in the lowlands of the Syunik region. The average July temperature is 25.8<sup>0</sup>C. Summer temperatures in Goris and Kapan sub-regions are 19.1<sup>0</sup>C and 23<sup>0</sup>C respectively. The climate of Kapan is temperate-warm, temperate-humid and is characterized with warm winters and warm summers. The annual average air temperature is 12.1<sup>0</sup>C. The average monthly temperatures throughout the year are positive. Monthly mean temperature in January is 0.9<sup>0</sup>C, and in July is 23.5<sup>0</sup>C. However, due to the penetration of cold air masses, the temperature in winter may fall up to -22<sup>0</sup>C. The highest summer temperature in Kapan reaches 39-40<sup>0</sup>C.

34. The spatial distribution of annual precipitation in the Syunik region is quite irregular. The amount of precipitation increases with the elevation. This increase is particularly noticeable in the basin of the Meghri River. In this area the precipitation increases by 33-44 mm at every 100 meters of upward elevation. But there are areas such as the Voghji basin, where the precipitation decreases with the elevation rise. The same pattern is observed in the valley of the Geghi River (a branch of the Voghji River), where annual precipitation is less in areas with lower elevation. The situation is virtually the same in the basin of the Vorotan River. Nevertheless, there is more precipitation in Goris (714 mm) than in Sisian sub-region (384 mm), although Sisian is 200m higher than Goris.

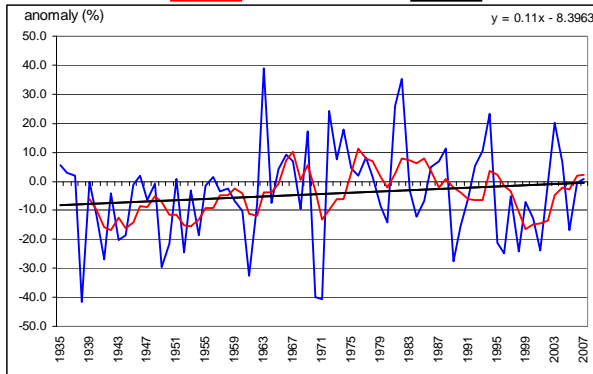
**Table 4. Precipitation and Temperature in the Syunik region**

Station	Altitude (meters)	Annual precipitation (mm)	Average annual air temperature ( <sup>0</sup> C)
Sisian	1615	384	7.2
Goris	1367	714	9.1
Kapan	704	552	12.1
Meghri	661	271	14.3
Average		481	10.7

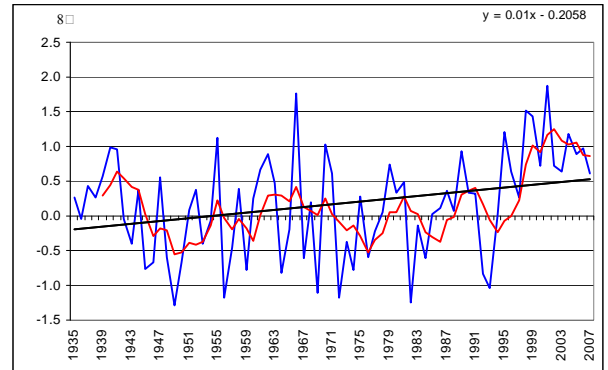
35. Analysis of observed data for the period 1935-2007 shows that in general the **annual precipitation** has increased with respect to the 1961-1990 average by 8% in Syunik (Figure 5). However, significant reduction of precipitation during 1978-2007 is revealed. Analysis of observed data for the period 1978-2007 compared with the 1961-1990 mean shows that total precipitation over the Syunik region and for the target areas (Goris, Kapan, Meghri) has decreased by 9% (Figure 6). Empirical-statistical analysis shows that a reduction of precipitation is very likely during the next 2-3 decades.

**Figure 5. The anomalies of annual precipitation and average air temperature (1935-2007) in the Syunik region (the 1961-1990 baseline period)**

Syunik Marz: Annual Precipitation anomalies , 5 year running averages and linear trends



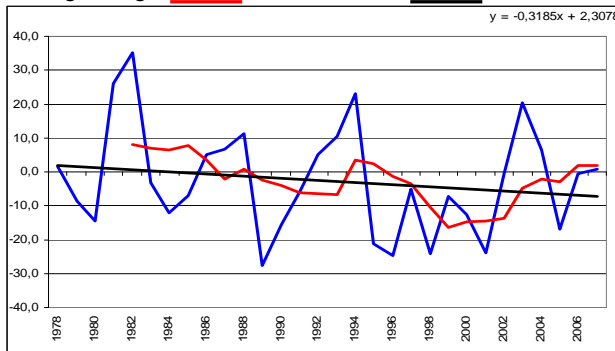
Syunik Marz: Average Air Temperature anomalies , 5 year running averages and linear trends



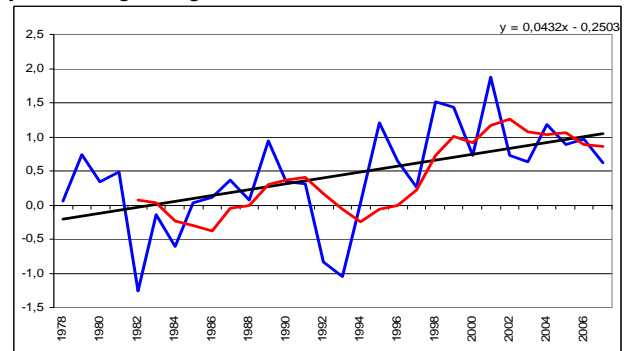
Source: Armenian State Hydrometeorology and Monitoring Service

**Figure 6. The anomalies of annual precipitation and average air temperature (1978-2007) in the Syunik region and in individual observatories (Goris, Kapan, Meghri) (1961-1990 baseline period)**

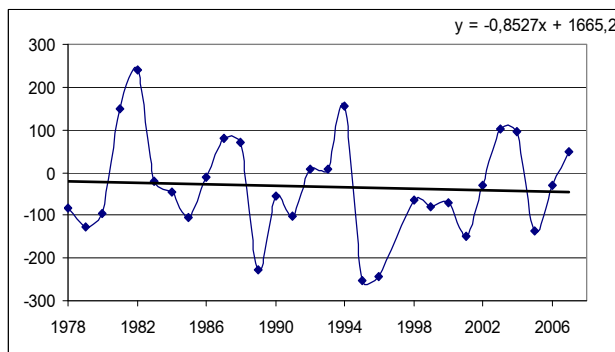
Syunik Marz: Annual Precipitation anomalies , 5 year running averages and linear trends



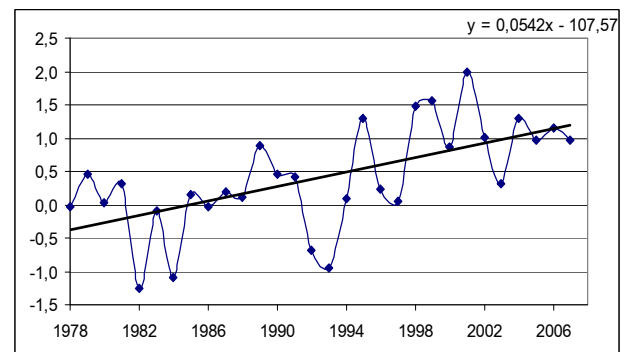
Syunik Marz: Average Air Temperature anomalies , 5 year running averages and linear trends



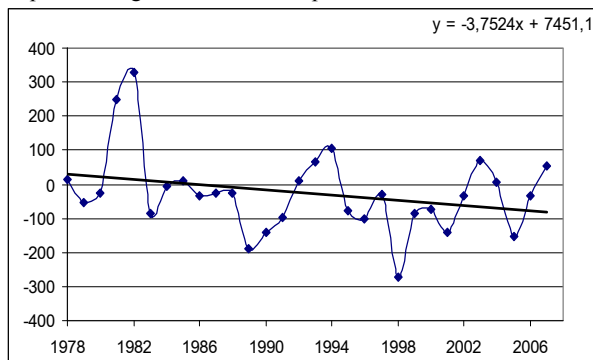
Goris sub-region: Annual Precipitation Anomalies



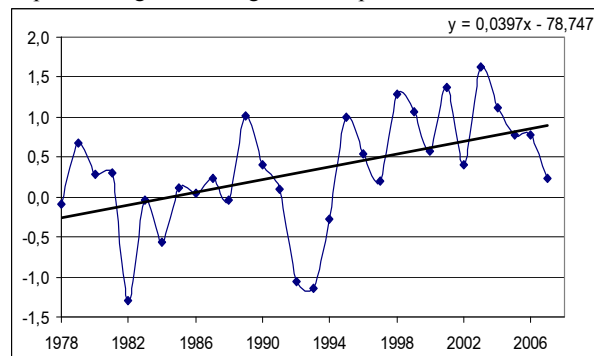
Goris sub-region: Average Air Temperature Anomalies



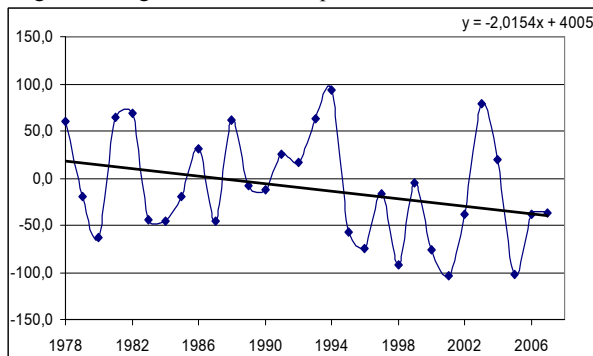
Kapan sub-region: Annual Precipitation Anomalies



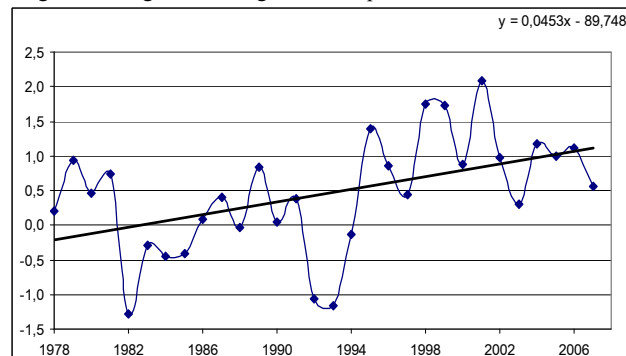
Kapan sub-region: Average Air Temperature Anomalies



Meghri sub-region: Annual Precipitation Anomalies



Meghri sub-region: Average Air Temperature Anomalies



Source: Armenian State Hydrometeorology and Monitoring Service

36. The average **air temperature** during the period of 1935-2007 has increased by 0.7°C (Figure 5). However, the air temperature anomalies are not the same in different seasons and regions. Thus, the maximum increase in the air temperature has been reported during the summer season, whereas changes in winter months are rather insignificant.

37. The table below demonstrates the deviations in the average monthly air temperature and total precipitation for 1998-2007 from the 1961-1990 mean for the meteorological stations located at the closest distance from the selected target areas. As can be seen from the table, during the last decade the monthly precipitation has reduced in comparison with the 1961-1990 mean in contrast to general increasing trend over the 1935-2007. A significant reduction of precipitation has been reported during summer months, particularly in Meghri where rainfall has reduced in June by 60%. The average monthly air temperature for the Syunik region during the mentioned period has increased. Further study has been carried out analyzing climate change detection indices. The results showed that during the whole period of observations (1936-2007) the number of consecutive dry days (CDD - days with daily precipitation <1mm) has increased in Kapan by 5.4 days, Meghri - 18, Goris - 5.3. Number of summer days (SU25 - days with daily maximum >25°C) has significantly increased during the same period (in Meghri by 10, Kapan and Goris by 21 days). These results indicate that drought conditions have intensified in the target region of the project.

**Table 7. Deviations of monthly mean air temperature and total precipitation from 1961-1990 average, Syunik region**

Sub-region	1	2	3	4	5	6	7	8	9	10	11	12	annual
Kapan: Precipitation													
98-07	18,6	19,8	64,3	78,9	110,5	49,6	29,6	26,9	27,1	42,4	40,9	26,0	534,6
61-90	27,1	31,6	59,3	79,0	94,9	67,4	30,1	29,3	41,2	55,4	39,8	26,9	582,0
ΔR%	-31,2	-37,3	8,6	-0,1	16,4	-26,4	-1,6	-8,4	-34,2	-23,4	2,7	-3,5	-8,1
Kapan: Temperature													
98-07	1,7	3,8	6,9	14,0	16,0	21,2	23,8	24,1	19,4	14,0	7,5	2,8	13,0
61-90	0,6	1,9	5,8	11,8	16,3	20,3	23,6	22,7	18,7	12,6	7,6	2,9	12,1
ΔT	1,2	1,9	1,1	2,2	-0,3	0,9	0,2	1,4	0,7	1,4	-0,1	-0,1	0,9
Goris: Precipitation													
	1	2	3	4	5	6	7	8	9	10	11	12	annual
98-07	24,9	37,0	71,3	109,0	130,6	66,2	42,2	40,6	53,9	66,4	54,5	26,5	723,2
61-90	35	42	75	95	112	99	51	53	61	74	47	34	778
ΔR%	-28,7	-11,8	-4,9	14,8	16,6	-33,1	-17,3	-23,5	-11,6	-10,3	16,0	-22,1	-7,0
Goris: Temperature													
98-07	0,4	1,7	4,6	8,8	12,6	17,1	19,5	20,3	15,7	11,4	6,0	2,0	10,0
61-90	-0,9	-0,4	2,7	8,3	12,5	16,0	18,8	17,8	14,3	9,2	5,6	1,8	8,8
ΔT	1,3	2,1	1,9	0,5	0,1	1,1	0,7	2,5	1,4	2,2	0,4	0,2	1,2
Meghri: Precipitation													
	1	2	3	4	5	6	7	8	9	10	11	12	annual
98-07	8,4	14,8	31,4	49,0	55,6	12,4	8,3	5,0	7,6	19,5	23,3	12,8	248,0
61-90	16	16	35	42	49	31	10	10	13	30	23	15	290
ΔR%	-47,3	-7,8	-10,4	16,7	13,4	-60,1	-16,8	-50,3	-41,7	-35,0	1,2	-14,9	-14,5
Meghri: Temperature													
98-07	2,2	5,7	9,9	14,0	18,9	24,5	27,2	27,6	22,6	16,7	10,0	4,2	15,3
61-90	1,6	3,3	8,2	14,1	18,8	23,1	26,3	25,4	21,2	14,7	9,5	4,7	14,2
ΔT	0,6	2,4	1,7	-0,1	0,1	1,4	0,9	2,2	1,4	2,0	0,5	-0,5	1,1

*Impact of climate variability on forests and biodiversity in the Syunik region*

38. The forest vulnerability assessment in Armenia, conducted as part of the FNC and SNC, in the light of forecasted global climate change scenarios, examines the composition of tree species, their natural regeneration, change in the carbon absorption rate, forest fire risk, pest prevalence and development, change in the pest harmfulness, as well as threats to the forest biodiversity. The lower bound of the south-eastern forest area of the country stretches through altitudes of 600 m; and the upper bound reaches as high as 2,600 m. The forests located in the lower-bound area are particularly vulnerable to anticipated climate change. Over the last 30-40 years the lower-boundary of oak and oak-hornbeam forests has moved upwards by 200 m at a minimum. Those forest areas were mainly replaced with arid open forest with predominance of *Quercus araxina* and *Paliurus spina-christi*. Initially, the replacement was caused by intensive economic activity (mainly grazing). However, rehabilitation of forest ecosystems has not taken place even after discontinuation of economic activities, which indicates change of the forest growth conditions towards arid conditions.

39. As a rule, the rise in temperature and change in precipitation significantly affect the ability of forests to regenerate through tree seeds. Although the negative humidity balance creates unfavorable conditions for seed restoration in lower-bound forest areas, in upper-bound areas it contributes to the improvement of the temperature regime, ensuring acceptable forest fertility, and regeneration through the seed base. Consequently, it brings about a gradual elevation of the upper-bound forest area<sup>12</sup>. The vulnerability of endemic species and those included in the Red Book found in the Syunik region is

<sup>12</sup> This positive impact in the upper-bound forests needs to be juxtaposed with the fact that these forests are more prone to anthropogenic pressures from pasture activities.



more detectible in the lower-bound forest areas, where they are prevalent. Apart from the expected gradual forest recession, the area will be penetrated by semi-desert and arid open forest plant species (*Bothrichloa ischaemum*, *Artemisia fragrans*, *Stipa capillata*, *Rhamnus pallasii*, *Kochia prostrata*, *Quercus araxina*, *Pistacia mutica*, *Paliurus spina-christi*, etc.). In the forests located at altitudes of 1,700 and higher, there will not be tangible changes in the forest ecosystems (except for the degraded forest ecosystems found at these altitudes) owing to the high adaptability potential of these forests. Under the 250-300 m upward movement, forest conditions would remain at the middle mountain zone where endemic and rare species will easily find habitats. In areas higher than the current upper-bound, conditions for forest would be favorable but establishment of forest ecosystem would take significantly longer. At the lower-bound, the change of climatic conditions leads to total degradation of forest ecosystems.

40. Pest infestation already affects an area of 20,000 hectares in the Syunik region and it is expected that in the south-eastern forests **pestholes of leaf-eating insects** will significantly grow due to change of climate conditions if no actions are undertaken. Among the 15,000 species of insects prevalent in Armenia, about 1,300 are described by scientists as tree-shrub pests. Particularly harmful are the leaf-eating insects. The class of leaf-eating insects is extremely diverse and includes thousands of species harmful to trees and shrubs to some extent or the other. These species include thousands of butterfly, beetle and phylloxera varieties. However, there are a few species among them, which can spread substantially and cause dying of extensive forests areas of thousands of hectares. The number of such harmful species is relatively small and limited to a few dozens. The particularly prevalent leaf-eating insects in the south-eastern forests of Armenia include *Ocneria dispar* L., *Euproctis chrysoorrhoea* L., *Malacosoma neustria* L.

41. During the years when they are substantially prevalent, the leaf-eating pests significantly harm the forests by destroying its leaf mass. The natural regeneration of the trees with destroyed leaf areas is slow, which also affects the buildup of the wood mass. Failing pest control measures, trees that have been continually stripped of their leaf area, die out. Other trees become significantly weaker, are subjected to attacks of secondary (wood) pests, and become prone to the spreading of disease pathogens. In the last decade, the spread of pestholes of leaf-eating insects has grown and the outbreaks coincided with the hot years of 1999, 2000, 2001. Quantitative increase per unit area has also been detected. During the last decade, leaf-eating pests have rapidly spread through the forests of Syunik. Approximately 2,000 ha of forest area have partially dried out. It has been observed that the annual natural growth rate of trees deprived of their leaves has fallen by 80%. In the Meghri sub-region forest areas that had been affected by pest infestation were ultimately also prone to higher fire risk.

42. Over the last few years, the **occurrence of forest fires** in the region has also increased significantly. Pests and fires continue to contribute to the process of dying out of forests. Based on an analysis of the occurrence of forest fires over 2001-2006 (table below), this effect is particularly distinct in the south-eastern forest areas. According to the data, from 2001 to 2006, 6 out of 24 forest fire reports for Armenia came from the Syunik region. 91% of forest land destroyed in the fire is found in the Syunik region. The remaining 9% was in the forest rich central and north-eastern regions (80% of total forest area).

**Table 8. Forest fire incidence in Armenia (2001-06)**

Year	Names of regions (marzes) and sub-regions *	Number of forest fires	Total area burned (ha)	Area burned (ha) including	
				Forest-covered	Not forest-covered
2001	Syunik marz				
	Meghri	1	20	20	-
	Other marzes	-	-	-	-
2004	Syunik marz	-	-	-	-
	Other marzes				
	Yeghegis	1	1.5	-	1.5
	Ijevan	1	12	1.5	10.5
2005	Syunik marz				
	Goris	1	10	5	5
	Other marzes				
	Gugark	6	14.3	-	14.3
	Stepanavan	2	20.1	20.1	-
	Yeghegis	1	1.0	-	1.0
	Aragatsotn	1	10.0	-	10.0
2006	Syunik marz				
	Kapan	1	120,0	90,0	30,0
	Goris	1	10,3	7,3	3,0
	Meghri	2	193,0	192,0	1,0
	Other marzes				
	Jermuk	1	0,06	-	0,06
	Tumanyan	1	3,0	3,0	-
	Yerevan	3	5,6	5,3	0,3
	Gugark	1	1,6	1,6	-
	2001-2006	Total in Syunik marz	6	353,3	314,3
	Total in other marzes	18	69,16	31,5	37,66
	Total in Armenia	24	422.46	345.8	76.66

43. An assessment of the impact of climate variability on biodiversity is currently under implementation, with an emphasis on the main ecosystems and some rare and endemic plant and animal species<sup>13</sup>. According to findings thus far, the following main impacts have been identified:

- Uncommonly hot weather and frequent droughts in the last decade (1998-2008) have led to the drastic deterioration of living conditions for the majority of mesophilous plant species that are reflected in a decrease of their areas in the Syunik region, provoked mass pest reproduction/ outbreaks (especially phyllophagous pests) that resulted in shrinking/ shriveling up of forest massifs over considerable areas, led to decrease of the territories with permanent water and marsh ecosystems, and provoked an increase in the number of forest fires and enlargement of areas affected by fires. Forest bedding exhaustion has led to a deterioration of soil invertebrates' living conditions and, as a result, reduction in the quantitative and qualitative indicators of meso-fauna, changes in the composition of the soil animals associations, and decrease of the most hygrophilous species' share in the total number of species, particularly, beetles.
- The Syunik region in general is characterized by high frequency of extreme climatic events, mainly heavy rainfalls. As a result, this region is ranked the first in Armenia for landslide areas and high risk of mudflows. Further, as mentioned earlier, the incidence of extreme events has increased over the last 20 years. These climatic events impact natural ecosystems significantly by leading to undesired changes in growth and to destruction of many plant and animal species' habitats.
- In parallel to human activity that transforms natural ecosystems into agricultural lands and erects many other barriers on migration roads of many animal species, climate variability leads to pronounced fragmentation of many animal and plant species' habitats that threatens their existence as such.

<sup>13</sup> This assessment is being performed under the UNDP/GEF "Enabling Activities for Preparation of Armenia's Second National Communication to the UN Framework Convention on Climate Change (UNFCCC)" project.

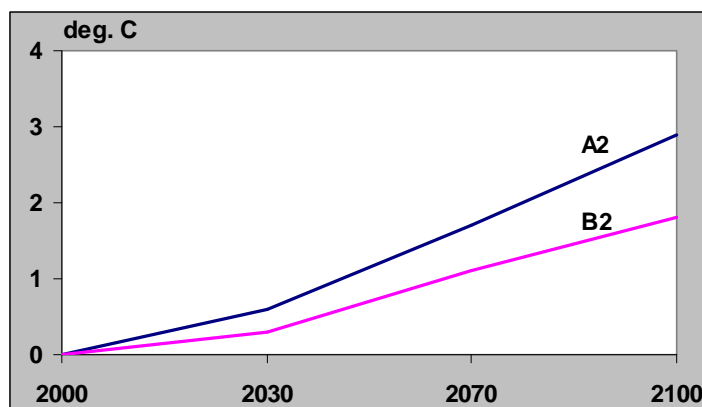
44. It can thus be concluded that climate variability has had an unfavorable impact on the biodiversity of the Syunik region ranging from decrease in natural areas and quantity of populations of many rare species, to penetration of alien xerophilous animal and plant species into the natural ecosystems that may demonstrate invasive features.

*Projected climate change in the Syunik region*

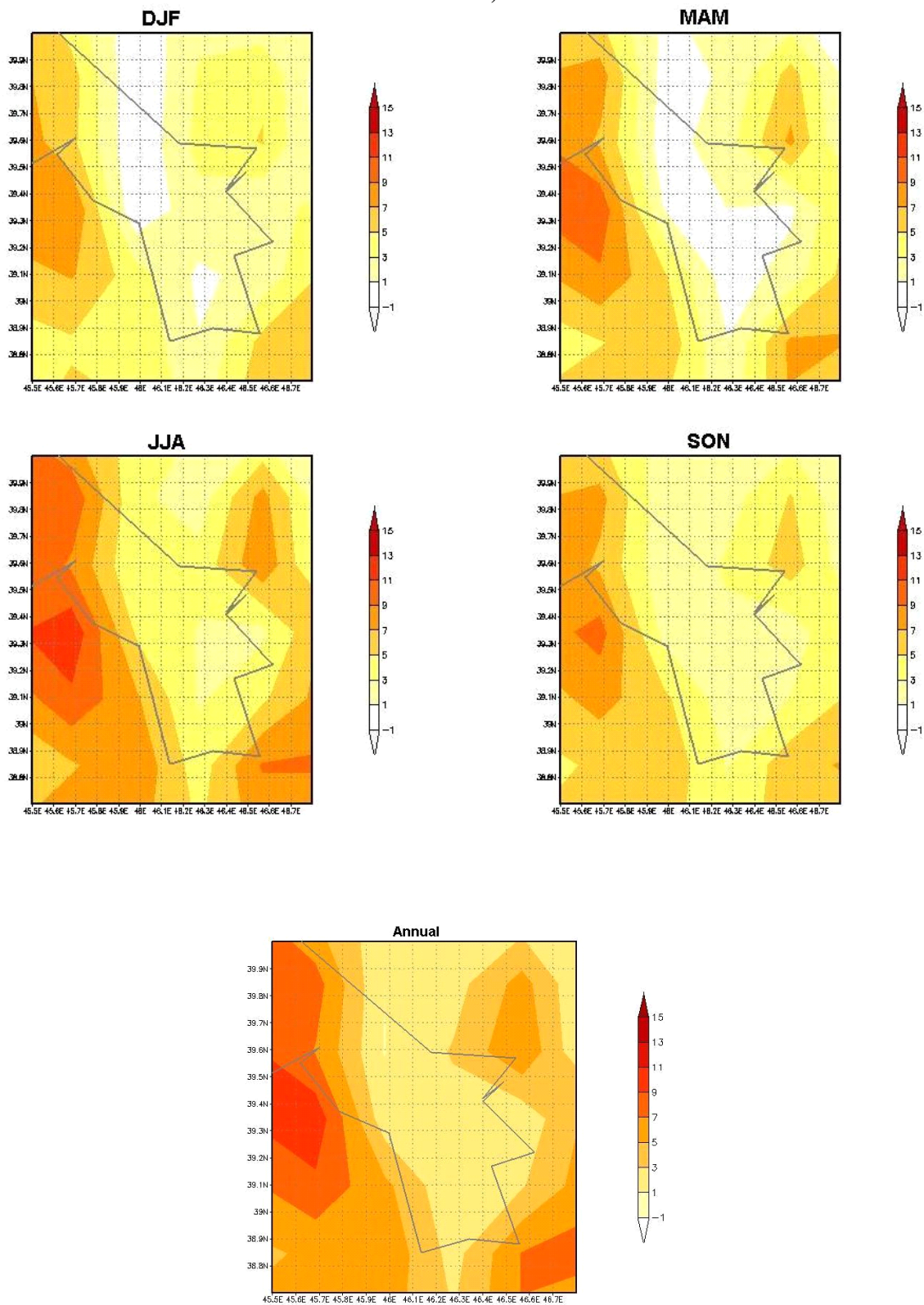
45. The assessment of projected climate change in Armenia is based on the analysis of outputs of a regional PRECIS Model, developed at the Hadley Center, UK with the baseline period of 1961-1990. According to the research findings, until the end of the present century the temperature will significantly rise throughout the entire territory of Armenia. The largest increase is expected during the summer season. Patterns of temperature change in different parts of Armenia will be different. In particular, warming will be much stronger in the western and central parts of the country and, especially, in the Ararat Valley during all the seasons.

46. In the southern part of Armenia – in the Syunik region – the temperature increase will be moderate, fluctuating in the range of 1°C to 3°C under B2 and A2 emission scenarios (Figure 9). The seasonal distribution of the temperature increase will differ from region to region. The largest increase of around 5°C will be expected during the summer season in the regions of our interest. The temperature increase during the winter and autumn seasons will be 1°C to 2°C, whereas little change is predicted during the spring season (figures below).

**Figure 9. Predicted temperature changes in the Syunik region under A2 and B2 emission scenarios**



**Figure 10. Seasonal and annual temperature changes in the Syunik region until 2100 compared with 1961-1990 mean (simulated by the PRECIS Model under A2 emission scenario)**



47. Precipitation projections for Syunik region did not correspond to an overall national trend. Moreover, the model validation revealed that the precipitation field is not reproduced well and has a large bias and odd patterns. Particularly in the region of our interest, precipitation pattern, according to the model, is overestimated during most of the year. This could be explained by the weakness of the model in reproducing precipitation. Empirical-statistical analysis has been carried out to correct precipitation projections. Results show a decrease of precipitation during the next two decades, which does not agree with model results. Having this in mind, it can be concluded that the reduction of precipitation started at the end of last century will still continue during the first quarter of the current century<sup>14</sup>.

*Impact of expected climate change on mountain forest ecosystems in the Syunik region*

48. The FNC showed that natural ecosystems of the country would be very vulnerable to changes in climate expected at that time. According to the scenarios of climate change, the following impacts were projected: a shift of the conditions peculiar to zonal ecosystems for 150-200 m up by mountain profile, changes in the structure and composition of the ecosystems, decrease or increase of their territories and their redistribution in the country. Under the SNC (under implementation), the vulnerability of ecosystems and of certain plant and animal species is now being re-estimated in light of new scenarios of climate change. According to these scenarios, living conditions for Armenian natural ecosystems will be changed to a greater extent than what was expected under the FNC. It has been shown that if the new scenarios become reality, unfavorable habitat conditions will develop for the majority of rare plant and animal species of Armenia. This is the reason why restoration of previously destroyed ecosystems and conservation of existing natural ecosystems is one of the most important measures for ensuring adaptation of biodiversity to expected climate change.

49. The rise in temperature in the range of 1°C to 3°C by 2100 under B2 and A2 emission scenarios will most likely lead to considerable worsening of living conditions along the lower border of Armenia's forest belt due to the climate change, especially in the southern part of Armenia where the Syunik region is located. It is expected that forests in the lower-bound area will gradually recede and the forest belts will move 250-300 m upward. Most likely, as a result of this impact combined with intensive economic activity, replacement of vegetation will take place as follows. Along the lower border of the forests of the Syunik region within a 200-300 m wide belt (by relative altitude) forests will be at best replaced by arid open forests and otherwise by semi-desert vegetation. Changes in dominants will take place in many areas, for example in the Meghri sub-region forests with Georgian oak (*Quercus iberica*) will most probably be replaced by open forests with Araxian oak (*Quercus araxina*) or even by semi-desert vegetation with fragrant sage-brush (*Artemisia fragrans*). Decrease in precipitation will cause drying up of forest bedding leading to deterioration of living condition for numerous invertebrates including many rare and endemic species. Presumed changes in flora composition will lead to correlated changes in the populations of the phytophagous animals (mainly invertebrates) connected with the respective plant species. By 2100, forest loss will total about 5,600 ha in the Syunik region, or around 8% of the south-eastern forest area.

50. Increase in average temperatures in the region and decrease in precipitation (in some sub-regions) will develop favorable conditions for invasion of species adapted to arid conditions from surrounding territories of Iran and Nakhichevan to the territory of the Syunik region. These species, many of which may demonstrate invasive features, will penetrate to the natural ecosystems and stimulate cardinal changes in them, threatening existence of species with narrow ecological amplitude.

51. An increase in the number of extreme climatic events (storm, rainfalls) will lead to strengthening of erosive processes, increase in areas prone to landslides, mudflows and floods. This, in turn, will also raise threats to the biodiversity of the Syunik region.

52. The prevalence of pest holes is also expected to increase. Taking into account the biological characteristics of leaf-eating pests and, particularly, the interrelation between the prevalence area and harmfulness with temperature conditions, volume of precipitation and humidity, it is expected that the

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<sup>14</sup> As IPCC reports indicate precipitation projections are in general characterized by high uncertainties. These uncertainties and biases will be further addressed by the SNC and final results will be considered by the project.

areas of prevalence of these pests will grow to reach 50,000 ha and more by 2100 according to assessments<sup>15</sup>. If no measures of aerial pest control are taken, the loss in the annual wood growth will significantly increase and total around 54,100 cubic meters. This implies that the potential carbon accumulation will fall by about 18,935 tons and the absorption of the CO<sub>2</sub> gas will drop by around 70,000 tons (IPCC estimates). In order to prevent the negative influence of the harmful insects, it is necessary to take aerial pest control measures which are relatively safe to the environment.

53. Based on the [data on forest fires over 2001-2006](#), it is expected that projected climate change will significantly increase the incidence and negative impact of forest fires. It is reasonable to expect that the frequency and force of fires will likewise increase. In particular, forests found in the south-eastern region will be particularly prone to fire hazards.

#### Legislation and policy context

54. The Constitution of the Republic of Armenia states that "...the state shall ensure the protection and reproduction of the environment and the reasonable utilization of natural resources..." (Article 10) and that one of the basic tasks of the state is "to pursue the environmental security policy for present and future generations" (Article 48). The Constitution also requires that "everyone shall have the right to live in an environment favorable to his/ her health and well-being and shall be obliged to protect and improve it in person or jointly with others" (Article 33.2). Moreover, the Constitution mentions that "the public officials shall be held responsible for hiding information on environmental issues and denying access to it" (Article 33.2).

55. Legislation regulating the environmental sector in Armenia originated in 1991. Over the past years, 27 codes, laws and numerous normative acts ensuring the execution of the latter have been adopted. Environmental policies and legislation have been amended in parallel with the development of national economy and taking into consideration commitments under international treaties that have been ratified by Armenia. In particular, since 2000, several codes and laws (water, forest, land, mining, protected areas, environmental economics) have been adopted in lieu of the ones adopted in the 1990s.

56. The first National Environmental Action Program, produced in 1997-98 with the assistance of the World Bank, identified and evaluated Armenia's main environmental problems and proposed complementary projects and activities. The second National Environmental Action Program has been recently developed with the assistance of UNDP and is currently in the process of adoption. It highlights sustainable use and protection of forest ecosystems in the interest of biodiversity conservation, and also underlines the importance of corresponding measures that would support forest adaptation to climate change impacts.

57. As a response to the dramatic impact of the energy crisis of the 1990s on Armenia's forest ecosystems (massive tree cutting combined with illegal logging), the government undertook the following important policy and legislative initiatives to reinvigorate forest management and improve ecosystem integrity of Armenia's unique forests.

58. Armenia's forest sector policy documents have been developed and adopted in recent years including the National Forest Policy and Strategy, National Forest Program, and Action Plan for Mitigating Actions to Help Address Problems Associated with Illegal Logging:

- *The National Forest Policy and Strategy Paper of the Republic of Armenia* was developed in 2003-2004 and was approved by the Government of the Republic of Armenia in 2004 along with the *Action Plan for Mitigating Actions to Help Address Problems Associated with Illegal Logging* (RA Government Protocol Decision #38, dated September 30, 2004). The key concept underlying the *National Forest Policy and Strategy Paper* is that "forests are a national wealth and must serve the present and the future generations." The main objective of the abovementioned paper is "to ensure the restoration of the degraded forest ecosystems, their sustainable use and further development of the useful properties of the

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<sup>15</sup> Expert studies under preparation as part of the SNC.

forests.” This objective is comparable with the requirement for the promotion of the carbon dioxide sinks and removals set out in the Climate Change Framework Convention.

- In 2005 the Government of the Republic of Armenia also developed and approved the *National Forest Program of Republic of Armenia* (RA Government Decision #1232-N, dated July 21, 2005). It should be noted that the *National Forest Program* to some extent addresses issues pertinent to climate change. The Section on *Issues Related to the Forest Sector* of the mentioned Program discusses the importance of the forests and the main challenges they face from the climate change perspective, including: (i) the possible vulnerability of the forest ecosystems and change in their adaptation, as well as lack of measures aimed at preventing the mentioned processes; (ii) loss of the general forest biodiversity and resources; and (iii) insufficient involvement of the forest sector in global undertakings aimed at the mitigation of the climate change effects

59. In 2005, the National Assembly also passed the new *Forest Code of the Republic of Armenia* (replacing the previous one from 1994). According to the new Code, forests, irrespective of their ownership, are designated for use for the following purposes: protective purpose, special use, industrial purpose. According to the new Forest Code, the 200 m wide zone of the lower and upper forest areas, as well as forests growing in the semi-desert, prairie and forest-steppe zones are also included in the schedule of forests designated for protection (varieties allowed for logging from these forests are limited). This fact is very important when viewed from the perspective of the mitigation of forest vulnerability to climate change.

60. GoRA has developed and adopted a number of legislative acts stemming from the RA Forest Code, including Procedure on Establishing the Procedure for Restorative Wood Harvesting in the Forests Designated for Industrial Use and on Amending the Decision #49 of the RA Government, dated January 23, 2001 (Decision #1412-N of the RA Government dated 7 September, 2006), Procedure for Carrying out Treatment and Sanitary Loggings (Decision #897-N of the RA Government, dated 22 June, 2006), Procedure for Assigning a Management License for the State Forests to the Community Organizations without Running a Tender (Decision #583-N of the RA Government, dated 4 May, 2006), Procedure of Exploitation and Preservation of the Forests Designated for Industrial Use (RA Government Decision #1545-N, dated 29 November, 2007), Procedure of Exploitation and Preservation of the Forests Designated for Protection (RA Government decision #1316-N, dated 8 November, 2007); Procedure of Leasing State Forests and Forestlands (RA Government decision #806-N, dated 24 May, 2007), Procedure for Carrying out Operations in the State Forests which are Unrelated to the Forest Management and Forest Use (RA Government decision #1045-N, dated 30 August, 2007), Procedure for Maintaining the State Forest Cadastre and for the State Registration of the Forests (RA Government Decision #133-N, dated 7 February, 2008). Notwithstanding the abovementioned positive shifts, there are still many challenges on the way of developing and implementing adaptability improvement measures, which will reduce vulnerability of the forest ecosystems to climate change.

61. Pursuant to the provisions of the new Forest Code, management plans have been developed for 7 forestries and 3 specially protected forest areas (with a total area of 188,827 hectares), an interagency task force and Forest Monitoring Centre were established to monitor illicit logging, Forest Recovery and Development Fund was established back in 2004. The development of community forest management plans is underway, pilot projects are designed to inform future community forest management scope and models. This process should be carried out with application of innovative cooperation mechanisms involving local administrations, the private sector and NGOs. The government is committed to encouraging community and private forest management, and pest management projects. The government is also exploring the development of an afforestation project in Lori marz aimed at using Clean Development Mechanism under the Kyoto Protocol.

62. Further, the National Security Strategy of the Republic of Armenia (2007) recognizes the importance of increasing the efficient use and protection of forest resources as well as to introduce sound environmental practices to restore and preserve forests.



63. The Partnership and Cooperation Agreement (PCA) between the European Union (EU) and Armenia is effective since 2000. Since 2006 Armenia is involved in the process of the EU New Neighborhood Policy and the Government adopted the National Program for the implementation of the PCA. The adoption of the National Program obliges the Government, among other things, to carry out the harmonization of environmental legislation with EU directives, which must be resolved by the joint efforts of certain institutions and agencies.

64. Decision #1840-N of 2004 of the Government of the Republic of Armenia, which adopted measures to fulfill obligations of the Republic of Armenia under a number of environmental conventions, including ones under the UNFCCC, states the need to assess vulnerability and develop measures on adaptation to climate change impacts. Decision #880-N of 2005, which adopted a plan of measures for implementation of cross-cutting issues under the three UN conventions (FCCC, CBD, CCD), envisaged development of a system of sustainable management of forest ecosystems, including in particular (1) determining optimal forest coverage of Armenia, (2) developing an inventory of forest biodiversity and wood resources, (3) identifying carbon sequestration funding mechanisms for reforestation and afforestation activities, and (4) developing forest plantations.

65. Other relevant environmental policy documents include the Biodiversity Strategy and Action Plan, National Action Plan to Combat Desertification, State Strategy and National Action Plan on Development of the Specially Protected Areas of Nature, Integrated Water Resources Management Programme, and the State Water Policy and Programme.

66. Unlike the availability of national development and environmental policy documents, the Government has just begun preparation of development policies for regions, and, consequently, the Syunik marz does not have one so far. Marzes are territorial administration authorities and are in between the Republican government and localities in the country's governance structure. Their role is important in terms of coordination of activities. Since communities are the immediate users of forest resources, the role of local self-government authorities is significant in forest protection. In that context the local self-government bodies need capacity development for fully understanding the ecosystem services provided by the forests as prerequisites for sustainable livelihood in mountainous regions. That can ensure efficient cooperation with forest authorities and environmental protection agencies aimed at protection of forest ecosystems and successful implementation of adaptation measures.

### Project Baseline

67. In the business-as-usual scenario, without a GEF-supported intervention, degradation of forest ecosystems<sup>16</sup> in the south-eastern region, which has already claimed 2,400 hectares of forest land, is likely to be magnified. The main anthropogenic and climate-related threats are discussed below.

#### *Anthropogenic threats to biodiversity*

68. Anthropogenic factors that negatively affect forest ecosystems in the Syunik region include grazing, illegal logging, human-generated fires, illegal harvest of fruit (berries) and seeds, atmospheric contamination with different compounds, exploitation of mining deposits, and construction works. These anthropogenic factors have a serious negative impact on forest integrity and, in certain cases, even lead to the destruction of significant forest areas. Relatively smaller anthropogenic threats arise from activities such as illegal, small scale logging of individual trees, and grazing in traditionally used pastures. In general, however, access of communities to piped gas and rising living standards has had a positive impact on forest ecosystems as evident from the decreasing number of reports of illegal logging during recent years.

69. In the Meghri sub-region of the Syunik region, the main anthropogenic threat to forest ecosystems comes from overgrazing of pastures in close proximity to the villages, mining and enlargement of the network of roads. In Kapan sub-region, the primary threat to all natural ecosystems, including juniper

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<sup>16</sup> The criteria for identifying degraded forest ecosystems are as follows: forest completely or partially destroyed in fire; forest is dried or is drying due to pests and diseases and forests have lost biological resistance abilities; entirely logged forest areas with no natural regeneration; open forest on large eroded areas.

open forests, is development of the mineral resource industry (enlargement of old and building new mines, open pits, preprocessors and respective infrastructure). Pastures and illegal/ irregular use of forest resources impose a lesser threat. In the Goris sub-region, the most threatening anthropogenic factor is grazing in forest areas that drastically reduce the possibility for natural forest renewal. In addition, the illegal use of forest resources also has negative impacts on forest health.

70. The change in forest integrity coupled with microclimatic conditions contribute to a worsening of growth conditions, weakening of the resistance of the forest stand to pest and disease invasions, and slowing of the natural regeneration abilities. In general terms, the forest becomes even more prone to adverse impacts of unfavorable climate change. Anthropogenic threats exacerbate the impact of climatic variability and change. Further, anthropogenic factors (included, but not limited to, grazing in summer time, hay-mowing and illegal logging) may affect the expected positive shifts in the upper boundary forests and stop the upward shift of the forests to sub-alpine and alpine zones. Thus, it may be inferred that both anthropogenic and climatic conditions will significantly contribute to the worsening of the forest health.

#### *Climate related threats to biodiversity*

71. A discussion of current climate variability in the target area and its impact on biodiversity, as well as the projected impact of future climate change is presented above under the [Climate Change Context section](#).

#### *Baseline programming*

72. In the baseline scenario, the Government of RA has and will continue to undertake several initiatives to promote sustainable development, poverty alleviation, protection of the region's forest ecosystems through protected areas and sustainable forest management. These measures will help reduce human induced threats to forest biodiversity. The following discussion summarizes this baseline, in the scope relevant to the context of this UNDP-GEF Adaptation MSP that proposes to mainstream adaptation to climate change into the baseline of mountain forest ecosystem protection.

#### SUSTAINABLE DEVELOPMENT RELATED INTERVENTIONS

**73. Sustainable Development of Mountain Regions of the Caucasus: Local Agenda 21.** Within the framework of a mountain partnership, the Alpine states are supporting mountainous communities in the Caucasus. In collaboration with the Principality of Liechtenstein and the German Federal Environment Ministry, REC Caucasus and REC Russia are developing a long-term action plan for the sustainable development of the Caucasus region on a transboundary basis for the states of Armenia, Azerbaijan, Georgia and Russia. In Armenia, the communities of Yelpin (Vayots Dzor Marz) and Shvanidzor (Meghri sub-region, Syunik Marz) have been selected. The main objectives of the small projects in Shvanidzor community are: promotion of cultivation of wheat and other cereals which are not dependent on irrigation; assistance in cultivation of currently inaccessible fertile agricultural lands; ensuring preservation of community fruits, vegetables and other agricultural products in a specially constructed refrigerator; increasing flexibility of community marketing strategies and competitiveness on local markets; increase mechanization of community agriculture; ensuring equal access to potable water for the village districts; ensuring flow of potable water to the community, contributing to the solution of complex social, health, environmental problems; improvement of youth education standards, cultural life and flow of information in the community; building capacities for networking, provision of means of communication to the local-self governance and other stakeholders; diversification of community income by tourism development; establishment of self-sustaining business in order to diversify community income sources. This programme has been underway since 2003 and will continue through 2008. The second phase of the programme, which is under development, envisages selection of two more villages in order to replicate the positive experience and increase regional cooperation with the long term objective of developing a Local Agenda 21 for the whole Syunik region. The first phase budget for small projects in Shvanidzor

(Meghri sub-region, Syunik region) is approximately USD 193,857<sup>17</sup>; financing for the second phase is still to be decided.

74. This programme that focuses on sustainable development of communities lays a good foundation for reducing human induced threats to forest ecosystems by diversifying incomes and reducing direct dependence on forest resources. It has also increased awareness and participation of communities in management of natural resources. However, in the context of climate change and increased risks of forest fires and pests, communities should be more involved in preventive actions. Lessons from the UNDP-GEF Adaptation MSP will therefore be very useful in integrating climate change concerns into this ongoing process of developing a Local Agenda 21 for the Syunik region.

#### PROTECTED AREAS AND SUSTAINABLE MANAGEMENT OF FOREST ECOSYSTEMS

**75. Biodiversity Protection and Community Development: Implementing Ecoregional Conservation Plan Targets in Southern Armenia.** The Norwegian Government and WWF Armenia are assisting in: (i) administration of Khosrov State Reserve (Ararat region) in development of a visitors program according to international criteria, in order to attract local and international tourists, generate additional income, and create more space for involvement of local communities; (ii) strengthening Shikahogh State Reserve (Syunik region) in order to effectively protect biodiversity, manage protected area in a sustainable manner, and integrate concerns of the local population and public; and (iii) awareness raising on biodiversity issues and community development by target SPANs. This initiative began in 2007 and will continue through 2009. Of the total budget of approximately USD 1.1 million, resources allocated for Shikahogh State Reserve (Syunik region) are approximately USD 270,000.

76. This baseline initiative does not take into account climate change threats into the management plan of the protected areas. Climate change impacts need to be monitored so that this threat to biodiversity can be effectively addressed in the management of SPANs through preventive measures for reducing risks from fires and pest outbreaks. The pilot adaptation measures tested under the UNDP-GEF MSP will provide useful lessons on adaptation measures that can be integrated into management of SPANs.

**77. 2012 Protected Areas – Caucasus Ecoregion.** MAVFA Foundation and WWF Armenia are implementing this project covering the Caucasus region (Armenia, Azerbaijan, Georgia) that aims to enhance: stakeholders' participation, capacity building, sustainable financing of SPANs, and conservation of critically important natural ecosystems. The three main objectives are: (i) an effective mechanism is in place that ensures the implementation of the Programme of Work on Protected Areas (PoWPA) in the countries; (ii) relevant organizations in at least three countries of the Ecoregion (Armenia, Azerbaijan, Georgia), most importantly the governments, are capable of implementing all priority targets and actions of the PoWPA, and (iii) adequate funding is available for implementation of priority targets and actions. The initiative began in 2007 and will continue through 2011. The resources allocated for Armenia are approximately USD 172,250<sup>18</sup>; while there is no separate allocation for Syunik region, the region will benefit from the activities.

**78. Projects under the CEPF and WWF to strengthen biodiversity conservation through protected areas.** This programme has various components, described below, that are aimed at promoting conservation and sustainable management of the critical forest ecosystems in the Caucasus region (including Armenia). The budget for the Syunik region in southern Armenia totals approximately USD 860,000.

**79. Assistance to establishment of new Protected Area “Arevik” in Southern Armenia (USD 150,000).** The Ministry of Nature Protection and Ministry of Agriculture of Armenia in cooperation with CEPF and WWF Armenia are implementing the project in order to establish the “Arevik” protected area in Syunik region with following steps: implementation of research and inventory on flora and fauna species diversity (including the endemic, rare and endangered species ) of the

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<sup>17</sup> All budgets that were in Euros have been converted to USD using the UN Operational Rates of Exchange for June 2008, which was USD 1 = 0.643 Euro.

<sup>18</sup> All budgets that were in Swiss Francs have been converted to USD using the UN Operational Rates of Exchange for June 2008, which was USD 1 = 1.045 Swiss francs.

proposed area and surroundings, as well as mapping (in GIS) their habitats; clarification and drafting of the boundaries as well as creation of the digital map for the area with consideration of all land users; development of the management plan of “Arevik” SPAN and consultation of it with all stakeholders; preparation of the draft government decisions on establishment of the “Arevik” SPAN and its administration; establishment of the infrastructure for the “Arevik” SPAN; professional development and training for protected area staff.

**80. Assistance to establishment of new protected area “Zangezur” in Southern Armenia** (USD 174,000). The Ministry of Nature Protection of Armenia and Syunik Regional administration in cooperation with CEPF and WWF Armenia are implementing the project in order to establish the “Zangezur” protected area in Syunik region with following steps: implementation of research and inventory on flora and fauna species diversity (including the endemic, rare and endangered species ) of the proposed area and surroundings, as well as mapping (in GIS) their habitats; clarification and drafting of the boundaries as well as creation of the digital map for the area with consideration for all land users; development of the management plan of “Zangezur” SPAN and consultation of it with all stakeholders; preparation of the draft government decisions on establishment of the “Zangezur” SPAN and its administration; establishment of the infrastructure for the “Zangezur” SPAN; professional development and trainings for protected area staff.

81. These 2 protected areas fall within the forested areas that have been identified as vulnerable to climate change, yet the impacts of climate change and variability are not being fully assessed and considered in the management of these areas. The outcomes of the UNDP-GEF Adaptation MSP will help to investigate and develop concrete measures aimed at mitigation of the impact of climate change on the forest biodiversity of the newly established protected areas and increase awareness of the neighboring communities on the importance of reducing pressures on the most vulnerable areas.

82. Increasing the awareness and commitment of decision makers to biodiversity and ecosystem conservation in Armenia’s part of East Lesser Caucasus Corridor (USD 100,000; there is no separate allocation for Syunik region, however activities for Syunik region are included). Regional administrations of Ararat, Vayots Dzor, and Syunik regions, in cooperation with CEPF and WWF Armenia, are implementing the project in order to improve conservation of Armenian Mouflon and Bezoar Goat. The components include: training for community leaders, conservation agencies' administrations, residents, hunters, foresters and border-guards; publication of journalistic research articles and broadcast TV programmes; organization of photo exhibition; preparation and broadcasting of documentaries; publication of booklets, guidebook, billboards and posters.

83. Study of the present state of populations of amphibians and reptiles as a base for updating the Red Data List of Armenia and IUCN (USD 18,000; there is no separate allocation for Syunik region, however activities for Syunik region are included.). CEPF and WWF Armenia are implementing the project aimed at assessment in quantitative terms information on population distribution, size and structure across the ranges of reptile and amphibian species in Armenia; preparation of a set of scientifically justified recommendations and guidelines for the species conservation for submission to the MONP; preparation of recommendations for updating National and IUCN Red Data Lists.

**84. Public monitoring of infrastructure programme of Millennium Challenge Account of Armenia (MCA) in the Eastern Lesser Caucasus Corridor** (USD 20,000; there is no separate allocation for Syunik region, however activities for Syunik region are included). CEPF and WWF Armenia are handling the project designed to analyze the approved proposal of MCA in order to identify the vulnerable areas (critical ecosystems) under the project; to create a network with environmental NGO for strengthening influence during EIA process (in collaboration with other relevant networks coalitions, e.g. PRSP, CENN, etc.), increase involvement of local rural communities in the EIA process and monitoring; to organize small local monitoring groups for early reaction; to organize multi-stakeholder discussions and round tables; to support participation in public hearings during EIA of the MCA project components; to lobby organization of public hearings on EIA; to organize mass-media events to improve dissemination of information and to stimulate wider participation in the project implementation.

**85. Development of an IBA Caretaker Network in the priority corridors** (USD 200,000; There is no separate allocation for Syunik region, however activities for Syunik region are included). The

long-term goal of the project being implemented by CEPF and Birdlife International is to improve conditions at 31 sites for globally threatened species and proposing an effective network consisting of local residents in order to promote conservation of identified sites (priority corridors for globally threatened bird species).

86. Promoting alternative livelihoods through small grants for local communities located around the protected areas in southern Armenia (USD 198,000). This project (CEPF and WWF Armenia) covers the existing Shikahogh State Reserve and planned Arevik and Zangezur SPANs, and aims to develop management guidelines to encourage sustainable resource use and marketing and distribution of sustainably-harvested products and services in selected local communities of the Syunik region; organization of training on sustainable use of biological resources in selected local communities of the Syunik region; promotion of alternative livelihoods for local communities through developing ecotourism (in Shvanidzor and Shikahogh villages), provision of capacity for sustainable resource use, marketing and distribution of sustainably-harvested products (in Gekhi, Tsav, Srashen and Nyuvadi villages), establishment of a nursery for growing of firs and planes trees (in Nerqin Hand village), organization of beekeeping (in Shishkert and Kajaran villages), organizing dry fruit production (in Aldara village). This initiative will play a critical role in reducing anthropogenic threats to forest ecosystems. The partnerships and community involvement nurtured by this initiative can provide a good foundation for building knowledge at the local level on adaptation practices connected with protection of forest biodiversity.

87. **Syunik Forest Enterprises' expenditures on forest management.** Under the baseline scenario, Forest Enterprises of the Syunik region are expected to receive approximately USD 3 million over the period 2008-2011 on forest management activities: preservation and protection of the forest fund, reforestation activities, ensuring sustainable use of forest resources, forest monitoring, stocktaking and accounting. However, these baseline activities lack an assessment component measuring the impacts of climate change and of the massive invasion of leaf-eating pest species on forest growth. They do not envisage restoration works to respond to climate-induced degradation. International practice is suggesting a large number of autonomous adaptation strategies for planted forests such as changes in management intensity and hardwood/ softwood species mix. However proven adaptation practices are as yet very limited for the mountainous mixed species natural forests. Forest Enterprises do not have the capacity to select and implement appropriate adaptation measures.

88. **Natural Resource Management & Poverty Reduction Project** (USD 16 billion; there are no resources targeted for the Syunik region). The Government of Armenia with support of the World Bank is implementing the project to adopt sustainable natural resource management practices and to alleviate rural poverty in mountainous areas where degradation is reaching a critical point. The project helps averting further deterioration of natural resources (soil, water, forest, fishery, and biodiversity) and stabilizes incomes in the local communities. The first of the project component focuses on selected micro-catchments. The second component supports rehabilitation, protection, and sustainable management of state forests in the project area; improves the forest sector's institutional, legal, and policy framework; and enhances institutional capacity to monitor and control forest operations. The third component supports measures to improve the role of two key protected areas in the conservation and sustainable use of the region's biodiversity and sustain these improvements. Although the focus areas are Tavush and Gegharkunik regions, improvement of the forest sector's institutional, legal, and policy framework and enhancement of institutional capacity to monitor and control forest operations are ultimately linked to other forest regions too, including Syunik. This project, which started in 2002 and continues through 2008, is being implemented in the Gegharkunik and Tavush regions and has not addressed climate change adaptation measures as such. However its outcomes could be assessed and evaluated for their practicality as adaptation measures to climate change impacts, and correspondingly applied in the Syunik region<sup>19</sup>.

ENVIRONMENTAL POLICY AND LAW

89. **Support to the Sustainable Management of Natural Resources in the South Caucasus** (working title). The Ministry of Nature Protection of Armenia and GTZ, given the importance of

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<sup>19</sup> Because this project does not directly impact the Syunik region, it is not included in the Baseline estimate of the IC matrix. It is nevertheless described here as it could have lessons for the Syunik region.

sustainable management of natural resources, are planning a new regional project with the framework of the European Neighborhood Policy and Caucasian Initiative in the field of environmental policy and law. The overall objective is: sustainable management and a higher appreciation of the value of natural resources are better integrated into the public and private sectors and society on a regional, national and local level. The components of the first phase projects are: institutional development, reform of legal framework, human capacity development, and enhanced public awareness.

90. The entire time frame for the programme is 2007-2015, with the first phase from 2007-2009. The budget for the first phase is approximately USD 4.6 million. The pilot adaptation measures tested under the UNDP-GEF MSP will provide useful lessons on adaptation measures that can be integrated into the management of mountainous forests. Project experiences can guide the development of policy under this long term initiative.

91. As described above, the Government of the Republic of Armenia, in cooperation with international organizations and donor countries, is undertaking several initiatives to strengthen forest management and conservation of forest ecosystems in the Syunik region, and will continue to do so in the future. Notable among these are the development of forest planning documents for the first time since the early 90s, rehabilitation of forest monitoring and inventory system, control of illegal logging, aerial pest control, establishment of the Forest Recovery and Development Fund, and development of the SPAN system. Together, these measures create favorable conditions to mitigate anthropogenic threats to forest ecosystems. However, the capacity to consider additional threats due to climate change will be lacking.

#### *Baseline gaps and barrier analysis*

92. In the absence of a GEF-supported adaptation intervention, planned activities for management of the south eastern mountain forest ecosystem of Armenia are unlikely to take into account the expected impacts of climate change, including variability. This is in spite of the scientific consensus on vulnerability of this area and the potential adverse impacts on the forest ecosystem such as recession of lower-bound forests, change in species composition, increase in pest infestation, and increased risk of forest fires (see section on [Impact of Expected Climate Change in Syunik](#)).

93. Given the expected adverse impacts, the preferred normative situation for Armenia is one where the forestry and biodiversity sectors in the Syunik region should be managed in a way that forest ecosystems are able to respond to climate change to the limits of their capabilities. This can be achieved (a) by reducing or removing existing pressures, and (b) by adopting policies and practices which directly assist species in forest ecosystems in adjusting to climate change, for example strengthening existing management regimes within and outside forest and protected areas to enhance resilience of the forest ecosystem by focusing on species that are more vulnerable and sensitive to climate change, and monitoring of forest biodiversity, particularly since populations of species serve as barometers of forest ecosystem integrity. It is in this sense that existing baseline programming can be enhanced to ensure that pressures are minimized more than they would be in the baseline scenario through additional adaptation response measures.

94. In the absence of this UNDP-GEF Adaptation MSP, such options will not be explored, integrated or implemented in the Syunik region because of the prevalence of several barriers to mainstreaming climate change adaptation:

- The planning process that governs management of forest ecosystems does not include the climate change threat as a criterion in decision making.
- Institutions and individuals in a position to influence management of forest ecosystems do not have the capacity to observe and forecast adaptive capacity of forests, understand forest species change instigated by climate change and options for combined efforts for autonomous and planned adaptation, and then to use this information to raise awareness and mobilize programmatic choices regarding protection of forest ecosystems in the face of climate change.
- A systematic assessment and understanding of climate change impact on forests that can help identify how communities of forest species will be affected by climate change i.e., what physical and biological changes could take place as a result of changes in temperature,

precipitation and aggravation of situation with extreme climate events, is yet to be conducted for the Syunik region. This, in turn, would make it possible to identify appropriate response measures and integrate them into ongoing conservation efforts as well as the development agenda so that the forest ecosystems in the Syunik region do not face additional pressures.

- There are no concrete experiences with implementing adaptation response measures, which can be leveraged to motivate wide scale acceptance and adoption of such measures.

95. The FNC and TNA (both completed) and SNC (currently under implementation) are the first exercises in Armenia that have considered this issue in a serious and rigorous manner based on UNFCCC guidelines. Thus far the analysis has been at a national scale (FNC, TNA), and regional scale covering the Syunik region too (SNC). These exercises have been instrumental in prioritizing, through broad-based stakeholder consultation, the Syunik region as an area where adaptation to climate change should be taken into account following a rigorous methodology and process.

96. Based on current and future vulnerability assessments provided above and considering that evidences of climate change have already been observed during the last decades, adaptation actions in the Syunik region are not only something to be applied in the future but urgently needed now. Discussions during the PPG stage with forest authorities, central and regional government representatives, donors, environmental NGOs and research institutes reinforced this point and have shown that the interest and commitment to the concept of addressing adaptation issues in the Syunik region is present. However, in order to move from concept to practice, a detailed and quantified impact assessment needs to take place in the focused geographic boundaries of the Syunik region, feasible response measures need to be identified and implementation of these activities need to be piloted, coupled with developing institutional and individual capacities.

## **PART II – STRATEGY**

### **A. ALTERNATIVE GEF SCENARIO**

97. Based on the above situation analysis, the proposed project strategy is to take an “adaptive capacity enhancement approach”, as outlined in UNDP’s Adaptation Policy Framework (APF). Under this approach, the project will assess the mountain forest ecosystems in the Syunik region with respect to their current adaptive capacity, and propose ways in which adaptive capacity can be increased so that it is better able to cope with climate change, including climate variability. The focus will be on increasing the capacity of the south-east mountain forest ecosystems to be resilient to climate change. This will be achieved by introducing flexible policies, spatial planning and management practices to enhance the inherent adaptability of the species and habitats and reduce trends in human-induced pressures that increase vulnerability to climate variability. This will particularly include (i) developing technical capacities for systematic observation, data collection and scenario planning; (ii) implementing ecological restoration to bring back environmental resilient conditions to forest species populations, stands and landscapes, testing and streamlining other adaptation measures to improve pest and fire management; and (iii) supporting knowledge transfer and experience sharing aimed at full integration of internationally proven adaptation practices in mountain forest management at the national and local levels.

98. While the project will be of broader relevance to all mountainous forest areas in Armenia, the immediate focus of pilot adaptation measures will be in the Syunik region of south-east Armenia. The project will undertake activities in 3 of the 4 forestries in Syunik<sup>20</sup>, each managed by an independent forest enterprise: Syunik (Goris sub-region)<sup>21</sup>, Kapan and Meghri forestries. Selected target areas for the pilot projects are: Shrunukh forest area of the Syunik (Goris) forest enterprise, Davit Bek forest area of the Kapan forest enterprise, and Shvanidzor forest area of the Meghri forest enterprise. See

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<sup>20</sup> The project will not undertake activities in Sisian because forests there are in better condition and humidity is a bit higher.

<sup>21</sup> The Syunik Forest Enterprise is referred to as Syunik (Goris) because it is near the town of Goris.



[Annex 4](#) for a description of the most vulnerable forest areas in the Syunik region, and details on the areas selected for pilot projects.

99. The long-term development **goal** of this medium size project is to assist Armenia in beginning a process by which strategies to moderate, cope with, and take advantage of the consequences of climate change are enhanced, developed, and implemented. The specific **objective** of the project is to enhance adaptive capacities of the vulnerable mountain forest ecosystems to climate change in the Syunik region.

100. This will be done by identifying, evaluating, and integrating climate change response measures into forest conservation and development programmes in the Syunik region and piloting some critical adaptation activities with high demonstration and replication value. The following **outcomes**, each of which will draw on APF guidance, will contribute towards the achievement of the project objective. Indicators and assumptions for each outcome are presented in the [log frame](#).

Outcome 1: The enabling environment for integrating climate change risks into management of forest ecosystems is in place.

Outcome 2: Forest and protected area management in the Syunik region integrates pilot adaptation measures to enhance adaptive capacity of mountain forest ecosystems.

Outcome 3: Capacities for adaptive management, monitoring and evaluation, learning, and replication of project lessons are developed.

**Outcome 1: The enabling environment for integrating climate change risks into management of forest ecosystems is in place.**

**(SPA Increment: \$ 834,100; Of which GEF: \$ 219,100; Cofinance: \$ 615,000)**

101. Through this outcome the project will ensure that the current process governing planning and management of forests in the Syunik region integrates climate change and its impacts as a criterion in decision making, and that institutional roles and responsibilities for an early warning and response system to climate change are clarified and formalized.

*Output 1.1: Planning documents that govern forest management modified to take account of climate change risks*

102. The current planning process consists of Forest Management Plans (led by the local Forest Enterprises and Hayantar SNCO of the MOA) covering forest lands under the jurisdiction of Forest Enterprises, and Protected Area Management Plans (led by the MONP) covering existing protected areas and those that are in the process of being established. Based on the pilot adaptation measures under the project, climate change concerns will be included under the corresponding sections of forest and protected area planning documents. Specific management measures for inclusion would cover areas such as control and prevention measures for maintaining forest health, specific approaches to be taken into consideration during reforestation and forest rehabilitation activities. Resources will be allocated to undertaking this through a process of broad-based stakeholder consultation.

103. Additionally, staff involved in the development and implementation of forest and protected area management plans will be trained in how to reflect climate risks in management plans. Training will be based on international best-practice in the area.

*Output 1.2: An early warning and response system to climate change risks based on clearly defined institutional roles and responsibilities*

104. There are a number of institutions that need to be involved in an early warning and response system such as the local forestry, scientific research institutions, emergency management agency, fire department, protected area management units. The early warning system needs to cover monitoring, prevention, early warning, and responses for pest outbreaks and forest fires. Currently, there isn't a coordinated response plan among these actors and they operate on very ad-hoc manner with no consideration of longer term climate change impacts on effectiveness and efficiency of their current practices. Under this output, roles and responsibilities will be clearly defined, based on comparative advantages of the different actors, and integrated into regular monitoring regime of forest

management authorities. The development of the response plan will be undertaken in consultation with stakeholders.

**Outcome 2: Forest and protected area management in the Syunik region integrates pilot adaptation measures to enhance adaptive capacity of mountain forest ecosystems**

**(SPA Increment: \$ 1,288,000; Of which GEF: \$ 431,000; Cofinance: \$ 857,000)**

105. Through this outcome, the project will undertake on-the-ground adaptation response measures in the target areas that were identified during the PPG (see [Annex 4](#) for information on target sites). Response measures will relate to mitigating the effects of the three main climate-induced threats to forest ecosystems – pest outbreaks, forest fires and increased fragmentation. By piloting these measures, the health and resilience of the forest ecosystems to climate change and variability will be enhanced.

*Output 2.1: Comprehensive system for data collection and interpretation to feed into scenario development and identification of adaptation measures*

106. A key bottleneck has been the lack of knowledge and proper understanding of climate change impact on the forests. Currently, forest management decisions do not employ scenario planning as part of the decision-making and planning exercise. The systematic collection of climate-related data will help to identify how communities of forest species will be affected by climate change i.e., what physical and biological changes could take place as a result of changes in temperature, precipitation and aggravation of situation with extreme climate events. This observation and forecasting system will provide the foundation for planning appropriate response measures and integrating them into ongoing forest management efforts. The project will introduce scenario planning as part of routine forest and protected area management planning.

*Output 2.2: Measures to mitigate elevated pest outbreak risks due to climate change, including variability*

107. In response to pest outbreaks in 1999-2001, GoRA began to allocate funds for aerial pest control using pesticides, which helped to reduce pest infestation. However, the negative ecological impacts of pesticide use pose a threat to the forest biodiversity, and this is particularly undesirable taking into consideration the rich biodiversity of the region. Besides, the current efforts are not adequate to effectively address the increase in pest infestations that are being observed during the last decade with temperature shifts. The current budget allocations are limited and can not mitigate the impact accordingly. The project strategy is designed inter alia to facilitate environmentally sound long-term pest control and is planned in the following directions: (i) improve complex monitoring of the pest invasion, prevent pest outbreaks and mitigate impacts, (ii) promote environmentally sound aerial pest control using biological treatment in the Meghri sub-region of Syunik region (the most prone area to pest outbreaks), and (iii) capacity building for adequate monitoring and response. The response measures will be undertaken based on the best available local and international practices: early diagnostics, cooperation with scientific community, transfer of knowledge, guidelines for preventive measure (e.g. removal of dead and affected trees). The environmentally safe biological treatment measures (for example microbiological substances: *Bitoxi Bacillin*, *Bedro Bacillin*) will be tested in the target area in order to prevent pest outbreaks and to avoid adverse ecological effects of chemical pesticides that are currently in use. The mentioned microbiological substances have target effect on leaf-eating insects with no damage to the forest biodiversity. The results of the pest biological treatment will be monitored, evaluated and recommendations will be drafted and presented to the forest authorities for further application in other forest areas. The foresters (Armforest and SPANs) will be trained in early identification and localization of pest invasion and effective pest control tools.

*Output 2.3: Measures to mitigate elevated forest fire risk due to climate change, including variability*

108. As temperature increases, forest fires may become the primary agent of vegetation change in the vulnerable Syunik region. At the same time, due to the human-induced pressures leading to changing vegetation and habitats it is quite difficult to understand and/or characterize natural forest fire regimes. Climate change will further impact wild fire dynamics. Therefore, the current fire control

and management that is mainly in the nature of reactive measures will not suffice in the face of anticipated climate change. The impacts that will lead to further aridification of climate in the Syunik region will lead to more conducive conditions for fires of greater magnitude. The project will introduce measures to minimize fire risks and help local counterparts to consider **climate scenarios** for fire management planning. Emphasis will be on fire prevention, as well as control and management as part of the forest adaptation strategy through the following measures: (i) awareness raising and partnership building with local communities, NGOs, tourist organizations to mitigate human-induced fire events, (ii) minimization of activities that tend to lead to fire occurrence (agricultural waste burning practices, spontaneous ignition of dry grass on glades and along highways in proximity to forests, open fire in forest recreational areas during dry seasons), (iii) assistance in establishment of early warning system as part of forest fire administration including training for representatives of different agencies: foresters, republican, regional and local administrations, emergency and fire departments, protected area management units and communities, (iv) assistance in improving forest management in conjunction to climate change, (v) enhancement of forest fire early response capacities of forest enterprises through provision of special tools and techniques (equipment for fire early response), (vi) improvement of coordination and setting clear-cut responsibilities of various agencies for pro-active fire prevention and fire management.

*Output 2.4: Measures to reduce forest fragmentation and improve ecological restoration*

109. In areas that have been degraded due to anthropogenic factors and where fragmentation has further increased due to climate-related factors, the project will undertake ecological restoration by reforestation. This will cover areas where the condition of the soil is such that forest health can be improved through planting and assisted natural regeneration. Areas that were degraded due to forest fires during the heat wave years will be reforested with endemic species of juniper (natural regeneration of this species is highly complicated). It will also cover areas affected by pest outbreaks, and those areas that were initially affected by pest outbreaks and are now more vulnerable to forest fires. However, the reforestation efforts undertaken by the project will be implemented in a way that leads to improved resilience of the ecosystem. This will be done by achieving greater spatial heterogeneity of large ensemble of local endemic tree species, preferably with varied bio-climatic optimum conditions. Found in close spatial distribution, this concentrated heterogeneity will help reduce considerably dispersal distances requirements and stabilize the target ecosystem. This effort of in-situ conservation of priority species and habitats will enhance inherent adaptive capacity of the targeted forests. Experts consider that mixed forest stands are more “natural” and resilient to changing climate conditions or to likely consequences of climate change.

110. Foresters and local community members will participate in restoration activities, which will also be organized as a learning process. Therefore, foresters will benefit from on-the-site / on-the-job training in forest management practices that leads to reduction of forest fragmentation and improves resilience of the ecosystem to climate-driven disturbances.

**Outcome 3: Capacities for adaptive management, learning and replication of project lessons are developed.**

**(SPA Increment: \$ 440,900; Of which GEF: \$ 154,900; Cofinance: \$ 286,000)**

111. This is the first time that Armenia will be attempting to include climate impacts as an integral part of management of forest ecosystems in a vulnerable area. This outcome will, therefore, focus on enabling adaptive management and learning, and facilitating replication.

*Output 3.1: Training and sharing of experiences with foresters and community members from other regions/ sub-regions in Armenia to develop their capacities to integrate adaptive measures in forest management*

112. The experience with integrating adaptation response measures into planning documents and implementing pilot adaptation measures will not be limited to the south-eastern mountainous forests of the Syunik region. The project will aim to leverage this experience to mobilize change in other forest enterprises in the central and northern regions of Armenia. Staff from at least 6 other Forest Enterprises will be trained in mainstreaming adaptation to climate change and will be involved in demonstration of pilot adaptation measures. The aim is to capacitate them to lead a similar process in

their respective regions reaching out to various stakeholders. This approach will be detailed during the MSP implementation, as part of the replication plan.

*Output 3.2: A user-friendly manual on how to integrate climate change risks in forest management is developed and widely disseminated*

113. In order to facilitate dissemination and uptake of project experiences, resources will be dedicated to analyzing project benefits for forestries and local communities and for developing a manual for use by foresters, communities, and other stakeholders. The manual will analyze the project results and elaborate a detailed case study to showcase adaptation options for forest ecosystems. This will include ecological restoration strategies that improve landscape connectivity and heterogeneous mix of tree stands and tree diversity, forest fire management and environmentally friendly pest control methods that will remain effective under the changing climatic conditions. In addition to the case study, the manual will synthesize international good practice, draw on existing guidance and customize for a local use suited to the specific conditions of forest management in Armenia.

*Output 3.3: A results-based monitoring, evaluation and learning system is in place*

114. This will involve establishing the project management team which will coordinate the work of the inter-disciplinary adaptation team. Regular monitoring and reporting of impact indicators specified in the logframe will be undertaken. This will include any additional physical, hydrometeorological, and biological monitoring, over and above what is currently being undertaken by the local administrations of the target sites. A determination of additional monitoring needs will be made by the project team in consultation with national and international experts in the inception phase of the project.

115. In order to maximize the project's catalytic role, an effective communication strategy will be essential. Therefore, a communication strategy will be developed and implemented, including the hosting of seminars and exchange-visits to share findings with key "change agents" that can push the frontier in terms of integrating climate impacts into policy, programme and project development and implementation in other regions of Armenia. This could also include sharing of experience with other countries in Europe. Lessons learned will be documented to expand the knowledge base in terms of adaptation in the country. The experience will also be beneficial to other countries in the region and beyond, through UNDP/ GEF's Adaptation Learning Mechanism.

## B. GLOBAL ENVIRONMENTAL BENEFITS OF PROJECT

116. The project will develop adaptive capacities for south-eastern mountain forest ecosystems in Armenia in line with UNFCCC objectives of promoting adaptation to climate change. Inasmuch as the project focuses on areas of mountain forest ecosystems (as outlined in Annex 1), the project will generate benefits in the biodiversity focal area by ensuring that the forestry sector mainstreams conservation of biodiversity into its activities by specifically undertaking measures that mitigate climate-related threats to biodiversity. This will help reduce the vulnerability of mountain forest ecosystems that harbor endangered and vulnerable flora and fauna to expected climate change and reduce the risks of global biodiversity loss. By developing adaptive capacities of local communities, local self-governments, conservation managers and foresters of the target forest region, the global environmental benefits being delivered by multiple efforts described above will be made resilient to climate change.

117. National benefits will also be realized because Armenian institutions and nationals will acquire the skills to address adaptation which can be applied in other parts of the country. To the extent that the project will develop critical capacities to begin a longer-term process of integrating climate concerns into the implementation of programs which in turn enhance ecosystem integrity and resilience to climate change, this will benefit locals that rely on the natural resources base as a source of livelihood.

118. To summarize, the main adaptation benefits of the project are that it will be able to provide concrete inputs into conservation and development planning in the Syunik region to ensure that climate change concerns are taken into account. Given that the Syunik region is rich in biodiversity that is considered by national experts to be under threat from climate variability and expected climate

change (along with other anthropogenic factors), the project will be able to build and enhance the inherent adaptive capacity of the ecological system to climate change, once the proposed measures are adopted and implemented. The project will help mitigate environmental (including socio-economic) costs of disturbance processes exacerbated by climate change, and maintain societal values of the current ecological and related economic systems (i.e. in-situ conservation of the priority species and habitats, and improved forest management and forestry practice). This is expected to be the first show case in the country where climate concerns are taken into account and lessons learnt will be replicated to other regions of the country that share similarity to the selected system.

### C. INCREMENTAL COSTS

119. The incremental cost rationale underlying this project is that under a business-as-usual scenario adaptation to climate change will not be taken into account into forest management policies, programmes and activities and this, in turn, will undermine efforts to conserve unique mountain forest ecosystems. This is principally due to the fact that national capacity to understand and predict the impacts of climate change on the globally significant biodiversity of the mountainous forest ecosystems, and to identify and implement appropriate adaptation response measures is weak. To date, none of the government and donor-funded activities in the area takes explicit account of adaptation to climate change. However, the baseline offers several opportunities to integrate adaptation in forest planning, as the forest sector, with international assistance and increased national budget allocations, has recently embarked on elaboration of forest planning documents for all forest enterprises over a 10 year period. The planning documents lay the legislative and budgetary foundation for forest management. This UNDP-GEF Adaptation MSP would be timely in ensuring that climate risks are integrated in this process. By removing existing barriers, the project will play a catalytic role in realizing the normative situation where the forestry and biodiversity sectors in the Syunik region are managed in a way that forest ecosystems are able to respond to climate change to the limits of their capabilities (a) by reducing or removing existing pressures, and (b) by adopting policies and practices which directly assist species in forest ecosystems in adjusting to climate change.

120. The baseline is estimated at US\$ 9,096,107. This includes measures aimed at strengthening conservation of forest ecosystems against anthropogenic threats, but does not address the additional threats posed by climate change, including variability. The GEF Alternative, which includes targeted measures to improve the adaptive capacity of forest ecosystems of the Syunik region to climate change, is estimated at US\$ 11,896,107 (see IC matrix in [Annex 5](#) of the Project Document). The incremental cost is therefore US\$ 2,800,000 (including project management). Of this amount, US\$ 1,900,000 is being mobilized from GoRA (Hayantar SNCO). The GEF is being requested to contribute US\$ 900,000. By covering these incremental costs of removing barriers to adaptation, the GEF would play a catalytic role in advancing adaptation to climate change not only in forest management policies and practices in Armenia, but potentially will be disseminated as good practice example also in other countries of South Eastern Europe and beyond prone to similar impacts of climate change on forest ecosystems.

### D. SUSTAINABILITY

121. The continuation of the adaptation strategy developed by the project, upon project completion, depends on the extent and depth of stakeholder engagement in the project, the capacities that are developed, and the mainstreaming of adaptation in relevant policy-making processes. The project will therefore emphasize active engagement and capacity building among a wide range of stakeholders from the national to local level (as identified in the stakeholder analysis section). The emphasis will be on engendering institutional capacity for adaptation, awareness raising, and providing opportunity for participation. By integrating adaptation into existing regional plans, policies and programmes with high relevance to mountain forest ecosystem stability in the Syunik region, the financial cost of implementing measures will also be mainstreamed in the long-term.

### E. REPLICABILITY

122. The geographical focus of the project is on the mountain forest ecosystems of the Syunik region, which has been prioritized under the FNC and SNC. The experience of mainstreaming adaptation to climate change impacts in mountain forest ecosystems of the Syunik region will necessarily generate useful lessons for other vulnerable mountain forest ecosystems in Armenia. Under Outcome 3 resources will be specifically set-aside for sharing experience with key stakeholders in the other regions to lay the foundation for replication of the project's experience.

#### F. COST EFFECTIVENESS

123. In line with the GEF Council's guidance on assessing cost-effectiveness of projects (Cost Effectiveness Analysis in GEF Projects, GEF/C.25/11, April 29, 2005), the project development team has taken a qualitative approach to identifying the cheapest way, among competing alternatives, of achieving the project objective. A rigorous and quantitative application of cost-effectiveness analysis (where an indicator that best describes the outcome of the intended activities is identified, and the cost of achieving a unit of that indicator for the different competing alternatives is computed) was not feasible.

124. At the level of the project strategy, the chosen strategy is considered the most cost-effective for several reasons. First, the geographical area where limited adaptation resources are to be used to pilot the mainstreaming of adaptation response measures has been prioritized as vulnerable to climate change and as an area where the potential ecological losses to forest ecosystems could be significant. By investing project resources in enhancing adaptive capacity of this area, the potential pay-off in terms of ecological benefits is higher than it would have been in another region. Second, by taking into account climate risks the project would ensure that the threat of other investments in conservation of forest ecosystems being undermined by climate induced hazards is reduced. Third, in line with the precautionary principle, by integrating adaptation response measures at this early stage, the project is expected to minimize degradation of ecosystem values and services, which once lost could be prohibitively costly to restore.

125. At the level of individual adaptation response measures, the project will scrutinize proposed measures with cost-benefit analysis to identify low regret and no regret adaptation actions, thus ensuring cost effectiveness of investments.

## G. STAKEHOLDER ANALYSIS AND INVOLVEMENT PLAN

126. During the project preparation phase, a detailed stakeholder analysis was conducted. The tables below list all main stakeholders of the adaptation process in the Syunik region. During project development, stakeholders have been involved in discussing the project idea and providing background information (see Part II of [Annex 7](#) for a record of consultation during project development). During project implementation, APF guidance (especially that provided in Technical Paper 2) will be relied on to ensure effective stakeholder engagement.

**Table 11. National level stakeholders**

Institution	Department	Responsibility / Field of Activities	Relevance to Forest Sector/ Reasons for Inclusion
Ministry of Nature Protection (MONP)	Ministry in general	<p><i>MONP is a republican body of executive power designated to elaborate and implement state policy of the Republic of Armenia in environmental conservation and sustainable use of natural resources. Responsibilities of the MONP relevant to forest protection and climate change are as follows:</i></p> <ul style="list-style-type: none"> <li>- Elaborates and implements the government’s policies in the areas of environmental protection and sustainable use of natural resources.</li> <li>- Conducts national policy on natural resources.</li> <li>- Implements international commitments of Armenia in the field of environment, including ones under UNFCCC, UNCBD and UNCCD.</li> </ul>	<ul style="list-style-type: none"> <li>- MONP <b>leads</b> the Project Board</li> <li>- The responsibly of the <b>GEF Focal Point</b> (Operational/Political) stands under MONP</li> <li>- The responsibility of <b>UNEP</b> and other <b>UN Conventions</b> stands under MONP</li> <li>- MONP is the <b>Executing Agency</b> for UNDP-GEF portfolio for all GEF projects Armenia</li> </ul>
	Environment Protection Department	<ul style="list-style-type: none"> <li>- Keeps the Red Books of Armenian flora and fauna,</li> <li>- Performs activities to protect natural biodiversity of Armenian flora and fauna from alien plant and animal species,</li> <li>- Elaborates norm-setting principles and develops legal acts of normative nature and terms of references on use of bio-resources,</li> <li>- Elaborates principles and develops terms of references on SPAN choice, border correction and protection regime setting.</li> <li>- Develops recommendations on land use issues, including ownership (from state to private) and land identity,</li> <li>- Collects and summarizes data on the RA soils’ fertile layer use,</li> <li>- Participates in SPAN border correction as well as organizes state accounting and keeps an administrative statistical Registrar on use, current condition and pollution rate for soils of environmental importance,</li> <li>- Elaborates norm-setting principles and develops legal acts of normative nature and terms of references on atmosphere, biodiversity, water and land resources protection.</li> </ul>	<ul style="list-style-type: none"> <li>- Provides <b>policy advise</b> regarding atmospheric air, climate change, biodiversity (including forests), water resources, land resources</li> <li>- Potential <b>data provider</b> for atmospheric air pollution, climate change, biodiversity (including forests), water pollution, land pollution</li> <li>- Potential provider of <b>technical expertise</b> and <b>policy advice</b> in related issues</li> <li>- Focal point for UNFCCC and UNCBD.</li> </ul>



Institution	Department	Responsibility / Field of Activities	Relevance to Forest Sector/ Reasons for Inclusion
	Division of Environmental and Nature Use Economics	<ul style="list-style-type: none"> <li>- Elaboration of economic and financial components for environmental sections in the RA socio-economic programs,</li> <li>- Analyzes and evaluates economic and financial activities of the MONP's subordinate units.</li> </ul>	<ul style="list-style-type: none"> <li>- Provides <b>policy advise</b> regarding environmental and nature use economics</li> <li>- Potential <b>data provider</b> for environmental and nature use charges .</li> </ul>
	Division of Meteorology and Monitoring of Atmosphere Pollution	<ul style="list-style-type: none"> <li>- Elaborates strategies and concepts in its field of activities,</li> <li>- Drafts legislative and normative-methodological acts to regulate activities in the field,</li> <li>- Participates in elaboration and implementation of short-, medium- and long-term state projects in the field,</li> <li>- Prepares application packages for state funding or subsidy to implement specific works in the field,</li> <li>- Contributes to elaboration of national reports on state of the environmental.</li> </ul>	<ul style="list-style-type: none"> <li>- Provides <b>policy advise</b> regarding environmental monitoring</li> <li>- Potential <b>data provider</b> for environmental monitoring</li> <li>- Potential provider of <b>technical expertise</b> in environmental monitoring</li> </ul>
	Bio-Resources Management Agency	<ul style="list-style-type: none"> <li>- Elaborates normative-methodological acts on preservation, reproduction and sustainable use of biodiversity and bio-resources,</li> <li>- Organizes and ensures research of flora and fauna objects, ensures implementation of measures for sustainable use, recovery and reproduction of plant and animal world objects,</li> <li>- Stock-taking, accounting and monitoring of flora and fauna as well as continuous update of data bank and cadastre by the state authorities,</li> <li>- Grants licenses (permits) and formulates agreements for use of plant and animal world objects.</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> for biodiversity protection (including forests) and SPAN system</li> <li>- Potential provider of <b>technical expertise and policy advice</b> in biodiversity protection (including forests) and SPAN system</li> </ul>
	Water Resources Management Agency	<ul style="list-style-type: none"> <li>- Classifies water resources by operation and status,</li> <li>- Participates in water resources standards elaboration and supervises their observance,</li> <li>- According to water resources national program, adopts qualitative and quantitative indicators for permissible marginal flow of waste waters,</li> <li>- Adopts marginal amount of water (surface, subsurface, ground water) intake,</li> <li>- Elaborates and ensures implementation of basin management plans,</li> <li>- Grants permissions for water use, including for third parties, withdraws permissions etc.,</li> <li>- Keeps records of the state water Cadastre and provides information,</li> <li>- Monitors water resources, includes the results into planning and management processes,</li> <li>- Reveals catchment basins' exhaustion danger and elaborates programs on prevention of their impact on ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> for water resources</li> <li>- Potential provider of <b>technical expertise and policy advice</b> water resources management and protection</li> </ul>
	State Environmental Inspectorate	<ul style="list-style-type: none"> <li>- Ensures implementation of environmental supervision over environmental conservation and feasible use of natural resources as well as observance of environmental norms</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> for environmental enforcement</li> </ul>

Institution	Department	Responsibility / Field of Activities	Relevance to Forest Sector/ Reasons for Inclusion
		(atmospheric air, water resources, soils, subsoil, flora and fauna, hazardous waste and substances, EIA, environmental and nature use charges) in the RA territory, <ul style="list-style-type: none"> <li>- Supervises rule observance in the use of forest lands as pastures, hayfield and the like,</li> <li>- Ensures that afforestation and reforestation works meet the requirements set,</li> <li>- Ensures observance of SPAN regime requirements, as well as of use rules for zones of general use and of other green belts.</li> </ul>	and compliance <ul style="list-style-type: none"> <li>- Potential provider of <b>technical expertise and policy advice</b> in environmental enforcement and compliance.</li> </ul>
	“Environmental Impact Monitoring Center” SNCO	<ul style="list-style-type: none"> <li>- Observes, assesses and predicts physical, chemical and biological impacts on and their consequences for environment: atmosphere, waters, subsoil resources, soils, wild world (flora and fauna), forests, ecosystems and SPAN as well as other objects of environment (domestic animals, crops, substances, constructions and other),</li> <li>- Elaborates and disseminates projections on short-term and medium-term consequences of environmental impacts,</li> <li>- Organizes centralized data collection, processing and presentation in a user-friendly manner,</li> <li>- Ensures international co-operation in its field of activities, including joint monitoring and data sharing systems creation.</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> for environmental monitoring</li> <li>- Potential provider of <b>technical expertise</b> in environmental monitoring</li> </ul>
	“Shikahogh State Reserve” SNCO	<ul style="list-style-type: none"> <li>- Ensures preservation of landscape and biological diversity, gene pool and natural heritage; organizes and implements their scientific studies,</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> for biodiversity (including forests) and water resources in the state reserve</li> <li>- Potential provider of <b>technical expertise</b> in biodiversity (including forests) and water resources in the state reserve.</li> </ul>
Ministry of Agriculture (MOA)	Ministry in general	<p><i>MOA is a republican body of executive power designated to elaborate and implement state policy of the Republic of Armenia in agriculture, forestry and food provision. Responsibilities of the MOA relevant to forest protection and climate change are as follows:</i></p> <ul style="list-style-type: none"> <li>- Develops and implements government’s policies in the field of agriculture, forestry and food provision management,</li> <li>- Conducts administrative statistical registry and inventory of agricultural land reclamation conditions,</li> <li>- Conducts state management of forests, pastures, and meadows, including protection, monitoring, conservation and use. Implements forestation activities, conducts state forest inventory and monitoring, takes stock of the state forest fund,</li> <li>- Develops methods and technologies for land protection, efficient use of agricultural land, reclamation, increase of fertility and rehabilitation,</li> </ul>	<ul style="list-style-type: none"> <li>- Provides <b>policy advice</b> regarding forestry and agriculture</li> <li>- Potential <b>data provider</b> for forestry and agriculture</li> </ul>

Institution	Department	Responsibility / Field of Activities	Relevance to Forest Sector/ Reasons for Inclusion
	Crop Production, Forestry and Plant Protection Department	<ul style="list-style-type: none"> <li>- Develops agrarian fundamental and applied sciences.</li> <li>- Regulates activities in the fields of crop production, forestry and plant protection,</li> <li>- Implements state policy in the field of reservation, protection, use and reproduction of the RA forests,</li> <li>- Elaborates concepts and programs of stable management of forestry enterprises,</li> <li>- Elaborates targeted programs for forests' productivity improvement, reforestation, afforestation, forest care etc.</li> <li>- Identifies, analyses and elaborates solutions for strategic and administrative issues of reservation, protection, use and reproduction of forests of state property,</li> <li>- Identifies primary measures of plant diseases prevention and pest combat, elaborates short- and long-term programs for agro-chemical studies of soil species and their fertility improvement as well as for building on achievements in selection,</li> <li>- Collects, analyses, summarizes data on damage assessment due to various natural disasters and elaborates relevant recommendations,</li> <li>- Participates in information analysis and relevant recommendations' development within the MOA and the system as a whole,</li> <li>- Participates in relevant legal acts and regulations elaboration, provides methodological clarifications and guidance, prepares reports for presentation to other state authorities and public.</li> </ul>	<ul style="list-style-type: none"> <li>- Provides <b>policy advice</b> regarding forestry and agriculture</li> <li>- Potential <b>data provider</b> for forestry and agriculture</li> <li>- Potential provider of <b>technical expertise</b> and <b>policy advice</b> in forestry and agriculture</li> </ul>
	"ArmForest" SNCO	<ul style="list-style-type: none"> <li>- Organizes activities to preserve and protect the RA forest fund, performs reforestation, is responsible for forest use, stocktaking and accounting, keeps the Forest Cadastre,</li> <li>- Performs forest monitoring, plans and organizes activities to improve forest use efficiency, forest productivity and forest land fertility, ensures sustainable use of forest resources,</li> <li>- Performs its functions on site through subsidiary forest enterprises (see local stakeholders).</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> for forestry, forest management and protection</li> <li>- Potential provider of <b>technical expertise</b> in forestry, forest management and protection</li> </ul>
	"Forest Monitoring Center" SNCO	<ul style="list-style-type: none"> <li>- Participates in organizing monitoring on state of forest and forest lands as well as in elaboration and implementation of the state policy, strategy, and programmes in its field of activities,</li> <li>- Makes observations, assessments and projections aimed at prevention of negative impacts and their consequences on forests and forest lands,</li> <li>- Ensures improvement and reliability of forests and forest lands impact factors and consequences data collection, storage, processing, analysis and dissemination methods and systems,</li> <li>- Ensures transparency of measures undertaken against illegal cutting, lumber removal and other negative activities,</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> on state of forest and forest lands</li> <li>- Potential provider of <b>technical expertise</b> in assessments and projections on forests and forest lands</li> </ul>

Institution	Department	Responsibility / Field of Activities	Relevance to Forest Sector/ Reasons for Inclusion
		<ul style="list-style-type: none"> <li>- Elaborates and disseminates reports on short- and long-term projections on state of forests.</li> </ul>	
Ministry of Emergency Situations (MOES)		<p><i>MOES is a republican body of executive power designated to elaborate and implement state policy of the Republic of Armenia in population protection in emergency situations and civil safety. Responsibilities of the MOES relevant to forest protection and climate change are as follows:</i></p> <ul style="list-style-type: none"> <li>- Elaborates and implements the policies in the area of population protection and civil defense in emergency situations,</li> <li>- Coordinates state projects on preventing emergency situations, developed by the administrative bodies and organizations,</li> <li>- Organizes awareness activities on the issues of civil protection in case of emergency situations,</li> <li>- Organizes and coordinates state consolidated accounting of fires,</li> <li>- Performs stock-taking of fire prevention and anti-fire machinery and facilities of state and regional authorities and participates in fire extinguishing and rescue as well as recovery activities, establishes anti-fire units in organizations by their request,</li> <li>- Coordinates rescue forces' and anti-fire units' activities,</li> <li>- Qualification certification of relevant units, including anti-fires ones, as well as relevant specialists,</li> <li>- Implements regular and special studies, observations and projections of hydro-meteorological phenomena. Draws up warning system for dangerous weather phenomena.</li> </ul>	<ul style="list-style-type: none"> <li>- Provides <b>policy advice</b> regarding emergency situations and forest fire management</li> <li>- Potential <b>data provider</b> for emergency situations, forest fires and climate studies</li> </ul>
	“Armenian State Hydrometeorology and Monitoring Service” SNCO	<ul style="list-style-type: none"> <li>- Performs hydro-meteorological observations and elaborates relevant predictions to ensure functioning and sustainable development of the economy's sectors that depend critically on hydro-meteorological conditions (agriculture, energy, aviation, construction, transport and the likes),</li> <li>- Implements hydro-meteorological and environmental monitoring programs of state importance within the RA territory,</li> <li>- Compiles database of state informational resources, collects and maintains a consolidated fund of hydro-meteorological events and environment monitoring data,</li> <li>- Performs applied scientific studies in the field of hydro-meteorological and environmental monitoring; elaborates and improves observation and prediction methodology.</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> for meteorology, hydrology, climate variability, extremes and hazards</li> <li>- Potential provider of <b>technical expertise</b> in meteorology, hydrology, climate variability, extremes and hazards</li> </ul>
Ministry of Territorial Administration (MOTA)		<p><i>MOTA is a republican body of executive power designated to elaborate and implement state policy of the Republic of Armenia in territorial administration. Responsibilities of the MOTA relevant to forest protection and climate change are as follows:</i></p> <ul style="list-style-type: none"> <li>- Coordinates implementation of government's regional policy,</li> <li>- Ensures implementation of social and economic development plans by territorial</li> </ul>	<ul style="list-style-type: none"> <li>- Provides <b>policy advice</b> regarding territorial administration</li> <li>- Potential <b>data provider</b> for communities and local self-</li> </ul>

Institution	Department	Responsibility / Field of Activities	Relevance to Forest Sector/ Reasons for Inclusion
		administration bodies.	governments
National Statistical Service (NSS)		<ul style="list-style-type: none"> <li>- Collects, processes, summarizes, analyzes and publishes statistical data,</li> <li>- Co-ordinates the information and data collection according to the unified classification and coding system based on international standards.</li> </ul>	<ul style="list-style-type: none"> <li>- Potential <b>data provider</b> for environmental statistics</li> <li>- Potential provider of <b>technical expertise</b> in environmental data</li> </ul>
Academy of Agriculture		<ul style="list-style-type: none"> <li>- Provides education at Bachelor and Master levels in Agronomy, Foodstuffs Technologies, Economics, Veterinary Medicine and Animal Husbandry, Farm Mechanization and Transportation, Hydro-melioration, Land Tenure and Land Cadastre, Forestry</li> <li>- Conducts scientific research and implements Biodiversity and Environmental projects.</li> </ul>	<ul style="list-style-type: none"> <li>- Potential provider of <b>scientific and technical expertise</b> in forestry</li> </ul>

**Table 12. Regional (marz) level stakeholders**

Institution	Department	Responsibility / Field of Activities	Relevance to Forest Sector / Reasons for Inclusion
Syunik regional (marz) administration		<ul style="list-style-type: none"> <li>- Responsible for the state governance in the region,</li> <li>- Implements regional policy of the RA Government in the region,</li> <li>- Coordinates regional services of the Republican executive authorities in the region.</li> </ul>	<ul style="list-style-type: none"> <li>- Main regional authority</li> <li>- Planning of the activities in cooperation with regional bodies</li> </ul>
Forest enterprises (FE)	Sisian FE Syunik (Goris) FE Kapan FE Meghri FE	<ul style="list-style-type: none"> <li>- Performs forest resources stock-taking and keeps the Cadastre,</li> <li>- Submits recommendations to directing agency on distribution, projection, building and exploitation conditions of objects important for forest condition improvement and reforestation,</li> <li>- Signs contracts on temporary use of forest resources including cutting,</li> <li>- Performs forest planning and management activities,</li> <li>- Collects data on forest planning and submits those to the directing agency,</li> <li>- Chooses locations where cutting may be permitted and provides and approximate estimates of its volumes,</li> <li>- Performs reforestation works and sanitary cuttings, other forest care activities,</li> <li>- Performs follow-up activities on the locations where cutting was permitted,</li> <li>- Erects buildings and constructions for production and other own needs,</li> <li>- Performs reforestation and afforestation activities, enlarges breeding nurseries, organizes forest irrigation,</li> <li>- Initiates activities that aim at more efficient use of forest resources,</li> <li>- Performs operative anti-fire measures on the forest fund territories,</li> <li>- Opens roads for own needs, organizes storages for own products and other relevant facilities including parking lots,</li> </ul>	<ul style="list-style-type: none"> <li>- Local partner for implementation of the activities planned under the project</li> <li>- <b>Data and technical expertise provider</b></li> </ul>

Institution	Department	Responsibility / Field of Activities	Relevance to Forest Sector / Reasons for Inclusion
		<ul style="list-style-type: none"> <li>- Performs activities for preservation and protection of forest fund, including prevention of pest mass reproduction and used forest lands recovery,</li> <li>- Participates in scientific and extension efforts in the field to apply advanced methods on site,</li> <li>- Organizes trainings for professional development of own staff,</li> <li>- Submits selected forest species to the directing agency,</li> <li>- Performs relevant activities within investment programs,</li> <li>- Performs forest monitoring.</li> </ul>	

**Table 13. Local (community) level stakeholders**

Institution	Responsibility / Field of Activities	Relevance to Forest Sector / Reasons for Inclusion
Local self-governments (community)	<ul style="list-style-type: none"> <li>- Performs duties delegated by the State, including those in the field of environment,</li> <li>- Initiates measures to prevent technological disasters as well as to cope with consequences of natural and technological disasters,</li> <li>- Keeps planning, agricultural, environmental and other cadastres,</li> <li>- Performs civic defense and anti-epidemic measures, supports sanitary situation improvement.</li> <li>- Elaborates land use zonal schemes, allows land use, rent or acquisition, supervises land users and ensures target use of soils, prevents and discontinues illegal use of land, Elaborates land balance of the community,</li> <li>- Ensures geodetic points' satisfactory functioning.</li> <li>- Exploits, constructs and maintains melioration nets,</li> <li>- Performs plant disease measures, pest combat and weed removal,</li> <li>- Organizes veterinary service, performs other animal protection measures,</li> <li>- Supports plant and animal selection works.</li> <li>- Organizes preservation and protection measures of land, forest, waters, plant and animal world, subsoil resources use etc.,</li> <li>- Ensures soils protection of anthropogenic impacts (such as chemical and radioactive substances, production waste) as well as performs measures to prevent landslides, lands swamping and similar negative developments.</li> </ul>	<ul style="list-style-type: none"> <li>- Main partner in planning activities aimed at mitigation of antropogenic pressure on forest ecosystems</li> <li>- Main partners in organizing the community awareness activities</li> </ul>

**Table 14. Donor agencies active in Syunik region/marz**

Institution	Scope of responsibilities / activity	Relevance to Forest Sector / Reasons for Inclusion
UNDP	<p>In accordance with the national priorities and reflecting extensive consultations with civil society, the UNDP has signed with the GoRA Country Programme Action Plan setting following priority environmental outputs:</p> <ul style="list-style-type: none"> <li>- Promote environmentally sound technologies and effective management of natural resources in accordance with the MDGs and PRSP,</li> </ul>	<ul style="list-style-type: none"> <li>- GEF implementing agency</li> <li>- Key partner for mainstreaming adaptation to climate change in sustainable development planning and programming in Syunik and for replication in other</li> </ul>

Institution	Scope of responsibilities / activity	Relevance to Forest Sector / Reasons for Inclusion
	<ul style="list-style-type: none"> <li>- Promote sustainable development by helping duty-bearers to integrate the principles of sound resource management and environmental protection into national development policies and programmes,</li> <li>- Strengthen the protection of natural resources by helping to create an enabling environment that promotes sound resource management,</li> <li>- Strengthen the capacity of civil society to contribute to sustainable development by raising awareness, enhancing skills and increasing public participation in the development and implementation of policies and programmes on natural resource management.</li> </ul>	areas
REC	<ul style="list-style-type: none"> <li>- Assists in solving South Caucasian regional environmental problems and supports in building the civil society through promotion of public participation in the decision-making process, development of free exchange of information and encouragement of cooperation at national and regional level among NGOs, governments, businesses, local communities and all other stakeholders,</li> <li>- Provides free access to environmental information,</li> <li>- Assists in increasing the environmental awareness,</li> <li>- Supports public participation in environmental decision-making.</li> </ul>	<ul style="list-style-type: none"> <li>- Partner in sustainable development planning and environmental programming in Syunik and for replication in other areas</li> </ul>
KfW	<ul style="list-style-type: none"> <li>- Implements projects in the areas of sustainable economic development, energy, municipal infrastructure, health, and environment,</li> <li>- Supports measures that encourage regional cooperation among the three countries of Azerbaijan, Armenia and Georgia under the German Government's Caucasus Initiative.</li> </ul>	<ul style="list-style-type: none"> <li>- Partner and responsible agency for parallel project financing aimed at mainstreaming adaptation to climate change in environmental conservation management plans in Syunik and for replication in other areas</li> </ul>
WWF Armenia	<p>Implements projects in the following 6 focus areas:</p> <ul style="list-style-type: none"> <li>- Institutional strengthening and capacity building through providing technical assistance to existing protected areas;</li> <li>- Creating a network of protected areas (Econet) through establishing new protected areas planned by the Government;</li> <li>- Conserving threatened species (Caucasian leopard, Armenian mouflon, Bezoar goat, etc.);</li> <li>- Conserving priority biomes: forests, high mountains, wetlands;</li> <li>- Promoting sustainable use of resources and alternative livelihood in rural communities;</li> <li>- Promoting public awareness on environmental issues through mass media and communications.</li> </ul>	<ul style="list-style-type: none"> <li>- Key partner for mainstreaming adaptation to climate change in environmental conservation management plans in Syunik and for replication in other areas</li> </ul>
WB	<ul style="list-style-type: none"> <li>- Helps accelerate economic growth, create employment and improve social services through analysis, advice and financial assistance,</li> <li>- Supports the country's growth through the provision of technical assistance, as well as analytical and policy advice.</li> <li>- In Frames of Country Assistance Strategy for Armenia the focus of World Bank lending has shifted to poverty alleviation through improvements in education, health, social infrastructure and private sector development as well as to municipal water and wastewater, irrigation, agriculture, municipal heating, transport and natural resources management.</li> </ul>	<ul style="list-style-type: none"> <li>- Partner for mainstreaming adaptation to climate change in sustainable development planning and poverty reduction</li> </ul>
OSCE	<ul style="list-style-type: none"> <li>- Promotes the implementation of the OSCE principles and commitments as well as the co-operation of the RA within the OSCE framework, in all OSCE dimensions, including the human, political, economic and environmental aspects of security and stability.</li> </ul>	<ul style="list-style-type: none"> <li>- Partner in sustainable development planning and environmental security programming in Syunik and for replication in other areas</li> </ul>



## PART III – MANAGEMENT ARRANGMENTS

### A. PROJECT IMPLEMENTATION/ EXECUTION ARRANGEMENTS

127. The Ministry of Nature Protection (MONP) will execute the Project under the UNDP National Execution modality (NEX). The Ministry will extend all necessary support to the project team as well as provide the Team with the required facilities (office space, means of communication, and other utilities as part of their in-kind contribution). A National Project Coordinator (NPC) shall be delegated by the Executing Agency. The NPC bears the overall responsibility of the implementation of the project. (See [Annex 6](#) for an organization chart that depicts how project management fits in with the Climate Change Program Unit, as well as for detailed Terms of Reference.)

128. The day-to-day implementation of the project will be carried out through the well-established UNDP Climate Change Program Unit under MONP. A full time technical expert (Project Manager – PM) will be brought in under the project to provide necessary management and technical backstopping to the Climate Change Program Manager. The services of an international consultant will be engaged during the project inception phase. Additional short-term national and international experts will be brought in for different technical aspects as needed. The Project Management Unit will be responsible inter alia for:

- Recruitment of International and National Consultants, including candidate search/selection, preparation of TORs, supervision;
- Project coordination, including organization of regular meetings with project implementing agency, financial management and accountability, issuance of payments, training staff on financial disbursements and reporting, ensuring completeness and timeliness of financial reporting;
- Technical reporting including preparation of progress reports;
- Monitoring and evaluation; organization of training/workshop activities.

129. At the national level, the project's other main implementing counterparts will be the Ministry of Agriculture, as well as ArmStateHydromet under Ministry of Emergency. At the local level, main counterparts will be the Syunik Marz Department of Agriculture and Environment Protection, Forest Enterprises and Administrations of the Specially Protected Areas. (The full list of stakeholders and their roles and responsibilities is provided in the stakeholder section above.)

130. A Project Board<sup>22</sup> (PB) consisting of representatives from the different Ministries, regional Government, key donors, and CSOs will be set up to provide overall guidance to the project and ensure inter-ministerial coordination and active involvement in the project. From the point of project supervision and management the PB will be responsible for:

- Commenting on project work plans and progress reports;
- Mobilizing co-financing;
- Approving major project outputs;
- Assuring coordination between this project and other ongoing activities and programmes;
- Assuring all stakeholders are appropriately involved in the project planning and management;
- Facilitating linkages with high-level decision-making.

131. The United Nations Development Program will be the GEF Implementing Agency and its Country Office will provide project support. UNDP Armenia will monitor progress towards intended results through regular contacts with the Project Implementation Unit and monitoring visits, on implementation matters and problem solving. UNDP will also provide administrative support upon request and ensure financial oversight. The project will be implemented following the standard UNDP National Execution Guidelines.

132. In order to accord proper acknowledgement to GEF for providing funding, a GEF should appear on all relevant GEDF project publications, including among others, project hardware and vehicles purchased with GEF funds. Any citation on publications regarding projects funded by GEF

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<sup>22</sup> Project Board is the term used under UNDP's new RBMF terminology for what used to be called a Project Steering Committee.

should also accord proper acknowledgment to GEF. The UNDP logo should be more prominent – and separated from the GEF logo if possible, as UN visibility is important for security purposes.

## B. GEF AGENCY CORE COMMITMENTS AND LINKAGES

133. The recent UN Common Country Assessment (2003) highlighted that the main immediate causes of environmental degradation in Armenia have been a combination of accelerated economic activities that have not taken into consideration the environmental impacts along with the inherited and cumulative effects caused by the lack of integrated planning in environmental management. It also pointed out that the loss of biodiversity, mismanagement of natural resources, particularly deforestation and land erosion has adversely affected the natural resources base which is the main source of income for rural populations.

134. The proposed UNDP Armenia Country Programme Document (2005-2009), which is being formulated in parallel to UNDAF, foresees that UNDP will support the national government in implementation of main conventions (UNCBD, UNCCD, and UNFCCC) to ensure environmental sustainability. In an effort to reinforce effective environmental governance, as a key area of UN cooperation for the next five years, in consultations with national counterparts, UN has identified priority assistance areas such as mitigating the impact of climate change, in particular, programmes aimed at technology transfer, energy efficiency and renewable energy. By addressing the vulnerability assessment and development of adaptation measures the project is addressing environmental sustainability issues and importance of integrating climate change issues into poverty reduction efforts, and preservation of GHG sinks and removals and strengthening the national capacity for efficient cooperation with global community in their efforts to mitigate climate change, which are highlighted in the UNDAF and CPD as well. The project will therefore be in line with the new CPD inasmuch as it focuses on the implementation of measures that promote adaptation to climate change under the UNFCCC. While the UNDP-GEF portfolio in the country consists of a number of projects in the GEF's focal areas, this will be the first project related to adaptation to climate change.

## C. CONSULTATION, COORDINATION AND COLLABORATION BETWEEN AND AMONG IMPLEMENTING AGENCIES, EXECUTING AGENCIES, AND THE GEF SECRETARIAT

135. During the PPG, consultations have been held regarding the project with the World Bank Office representative in charge of agriculture and environment. World Bank activities in Armenia in forest management and protection are primarily focused on the northern region (Gegharkunik and Tavush regions). As mentioned in the Baseline section of this proposal, the main World Bank initiative is to adopt sustainable natural resource management practices and to alleviate rural poverty in mountainous areas. Although the WB financed project is concentrated in northern forest region, its outcomes could be assessed and evaluated for their practicality as adaptation enhancing measures. Besides, the WB is planning activities to enhance capacities of the country on sustainable land management. Communication and dialogue with WB will be maintained during the project implementation to ensure that adaptation response measures can be mainstreamed.

136. The PPG process was accompanied by periodic consultations with KfW, WWF, and WWF Armenia (see Part I of [Annex 7](#) for record of meetings with WWF). The planned activities funded under the Climate Protection Initiative of the Government of Federal Republic of Germany will concentrate on Lori and Syunik regions. Close cooperation will be maintained during the project implementation to ensure synergies of the activities in Syunik. The preparation of MOU that spells out the coordination protocol and agrees on harmonized methods to forest adaptation will be elaborated during the inception phase when the manager and a core team of the proposed project are in place.

## **PART IV – MONITORING AND EVALUATION PLAN**

137. Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures by the project team and the UNDP Country Office (UNDP-CO), with support from the UNDP/GEF Regional Coordination Unit in Bratislava. The Logical Framework Matrix

provides performance and impact indicators for project implementation along with their corresponding means of verification. The logframe is developed based on UNDP/GEF impact monitoring framework at adaptation project level, specifically, technical paper (TA) on natural resource management. Since the proposed project falls under the following broad category – “The reduction of anthropogenic stresses on resources *experiencing increased stress due to climate change*, and enhancement of the resilience and adaptive capacity of natural systems in order that they are sustained in the face of climate change” – the corresponding indicators have been customized. Main indicators are designed to help detect (i) introduction of new policies, regulatory frameworks and management plans that are devised based on scenario planning; (ii) reduction in ecosystem fragmentation containing natural resources of concern, leading to enhanced resilience (iii) Number of sites/locations where stress reduction measures are piloted (iv) learning and replication potential.. Additionally, given that the target of adaptation measures is globally significant ecosystems, the project team has been guided by the GEF’s METT (Tracking Tool for SP2- Mainstreaming Biodiversity) in identifying indicators for measuring the biodiversity benefit of additional adaptation measures. Based on a review of the METT proxy indicators, two indicators (one relating to territorial coverage (ha) and the other to integration of adaptation measures in the forest sector management planning documents) have been selected. Logframe indicators will form the basis on which the project's Monitoring and Evaluation system will be built. In addition, Output 3.3 of the project relates specifically to monitoring, evaluation and adaptive management capacities over the long term through the establishment of a long term monitoring programme. The M&E plan includes: inception report, annual project implementation reviews, quarterly operational reports, and independent mid-term and final evaluations. GORA will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

138. The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Meeting following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

## **PART V - LEGAL CONTEXT**

139. This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement (SBAA) between the Government of Armenia and the United Nations Development Programme (UNDP), signed by the parties on 8 March, 1995. The host country-implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

140. UNDP acts in this Project as Implementing Agency of the Global Environment Facility (GEF), and all rights and privileges pertaining to UNDP as per the terms of the SBAA shall be extended *mutatis mutandis* to GEF.

141. The UNDP Resident Representative is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- a) Revision of, or addition to, any of the annexes to the Project Document;
- b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- c) Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- d) Inclusion of additional annexes and attachments only as set out here in this Project Document.

## SECTION II: STRATEGIC RESULTS FRAMEWORK (LOGFRAME)

Project goal	The long-term development <b>goal</b> of this medium size project is to assist Armenia in beginning a process by which strategies to moderate, cope with, and take advantage of the consequences of climate change are enhanced, developed, and implemented in the forestry sector.				
Project Strategy	Objectively verifiable indicators				
	Indicator	Baseline	Target	Source of Verification	Risks and Assumptions
Project objective: To enhance adaptive capacities of the vulnerable mountain forest ecosystems to climate change in the Syunik region.	Enhanced resilience of mountain forest ecosystems in the Syunik region due to adaptation measures (such as better management of forest fires, pest holes)	There are no efforts currently underway to address climate change impacts on mountain forest ecosystem degradation in the Syunik region.	At least two types of resilience-enhancing measures employed by the project upon its completion, covering approximately 87% of forest covered area in Syunik (65,000 ha under the forest enterprises and 10,000 ha under SPANs)	Ecological Risk Assessment report and/ or extracts from bio-monitoring; Pilot project reports; Project annual reports	In the pilot sites, baseline activities aimed at promoting sustainable forest management in general and addressing anthropogenic pressure on forest resources including threats to biodiversity in particular are successful in meeting their baseline objectives. (The risk of this assumption not holding is low. Current developments in Armenia support better control, monitoring and management of forests. To further mitigate this risk, the project will maintain constant and close dialogue with forest and other relevant authorities to ensure that baseline sustainable forest management is seen as an essential foundation on which additional institutional and policy enhancements to specifically respond to climate change are built.)
Outcome 1: The enabling environment for integrating climate change risks into forest sector management is in place.	Forest sector management planning documents for Syunik region include adaptation measures tested through the project and provide for resources to undertake these measures so as to enhance the resilience of biodiversity to CC related risks.	Planning documents for Syunik are in the process of being developed and do not include CC adaptation measures.	By project end, at least two management plans include adaptation measures recommended and tested by the project (focusing on fire management and pest control)	Final project report; Independent evaluation	Recommendations for strengthening of forest sector documents and institutional roles and responsibilities are supported and approved by the government. (The risk of this assumption not holding is low because nationally-driven prioritization exercises have identified the importance of mainstreaming climate risks in the forest sector. To further mitigate this risk, the project will maintain constant and close dialogue with forest and other relevant authorities to ensure ownership of recommended institutional and policy enhancements to respond to climate change.)
	Institutions that need to be involved in early warning and response to CC related impacts on forests (such as the local forestry, emergency management agency, fire department) have clarity on their mandate and role in responding to CC risks	There is no clarity on roles and responsibilities. There is no practice of scenario planning that systematically takes into account climate risks as part of wildfire management and pest control	By project end, roles and responsibilities are developed and approved on the basis of the comparative advantage of each agency.  By project end scenario planning exercise becomes part of the forest management decision and routine.	Final project report; Independent evaluation	
Outcome 2: Forest and protected area management in the Syunik region integrates pilot adaptation measures to enhance adaptive capacity of mountain forest	Ability of forest areas under the jurisdiction of the Syunik (Goris), Kapan and Meghri forest enterprises to provide effective protection to the region's globally significant biodiversity against CC related risks is increased. Indicators for monitoring				Local forest enterprises and communities in the Syunik region understand climate change implications and are supportive of proposed adaptation measures in addition to their participation in ecosystem management activities. (The risk of this assumption not holding is low. In order to mitigate this risk the

Project Strategy	Objectively verifiable indicators				
	Indicator	Baseline	Target	Source of Verification	Risks and Assumptions
ecosystems.	this are based on the GEF's METT approach of using proxy indicators, as follows:				project will put specific emphasis on building awareness of the regional forest management bodies and communities (under Outcome 2; Outputs 2.1 to 2.3) and putting in place guidance and supervision of Hayantar SNCO (authorized agency of forest management in the country) as a legitimate mechanism for their active participation in the identification and implementation of adaptation measures. The project will also involve local specialized NGOs in project activities. Further, by identifying, testing, selecting and implementing proper technologies and measures that are appropriate for the pilot areas, the project will secure buy-in from local stakeholders.
	1) Landscape coverage	Forest enterprises do not take into account climate risks to biodiversity harbored in forest areas	75,000 ha of forest covered lands (65,000 ha under the forest enterprises and 10,000 ha under SPANs) will benefit from restoration measures designed specifically to address degradation pressures induced by climate change; the project will also indirectly influence 20,000 ha of non-forest covered lands under the forest enterprises	Final project report; Independent evaluation	
	2) Management practices applied				
	2a) Improved management of pest holes that are being exacerbated by climate change and variability, measured by the following indicators				
	Increase in area covered by an improved monitoring system for pest invasions	0 hectares	4,000 ha (2,000 ha will directly be brought under improved management; an additional surrounding area of 2,000 ha will also benefit)	Final project report; Independent evaluation	
	Increase in use of environmentally sound aerial pest control using biological treatment	0 hectares are subject to biological pest control	4,000 ha (2,000 ha will directly be brought under improved management; an additional surrounding area of 2,000 ha will also benefit)	Final project report; Independent evaluation	
	Increase in capacity of forest enterprises and SPAN staff to monitor and respond to pests	Currently no staff are trained in improved monitoring and application of biological control techniques	16 staff from SPANs and forest enterprises are trained	Final project report; Independent evaluation	
	2b) Improved management of forest fires that are being exacerbated by climate change and variability, measured by the following indicators:	0 hectares	75,000 ha (65,000 ha of forest covered lands under the forest enterprises and 10,000 ha under SPANs)	Final project report; Independent evaluation	
Reduction in activities that tend to lead to forest fires (agricultural waste burning and open fires in forest recreational areas in the dry season)	Agricultural waste burning is reported approximately 55 times a year	Reduction in these activities by 50% by project end	Final project report; Independent evaluation		

Project Strategy	Objectively verifiable indicators				
	Indicator	Baseline	Target	Source of Verification	Risks and Assumptions
		Open fires in recreational areas during dry season are reported approximately 70 times a year			
	Increase in awareness of local communities, NGOs, tourist organizations of the importance of fire prevention leading to behavioural change	No such awareness efforts have been undertaken. Preventive measures haven't been practiced by indentified stakeholders	By project end, targeted training workshops are held and tailored material is distributed to all identified partner groups	Final project report; Independent evaluation	
	Increase capacity of staff to implement an early warning and response system	0 staff trained	24 people trained covering foresters from forest enterprises, republican, regional and local administrations, emergency and fire departments, protected area management units and community representatives	Final project report; Independent evaluation	
	2c) Reduction in forest fragmentation to enhance ecosystem resilience to climate change and variability, including: - reforested area - recovered (rejoined) area	0 hectares	15 ha (will directly be brought under improved management and will be rejoined to forested tracts)	Final project report; Independent evaluation	
Outcome 3: Capacities for adaptive management, monitoring and evaluation, learning, and replication of project lessons are developed.	Number of forest enterprises outside the Syunik region that have initiated the process of integrating adaptation to CC in their forest management plans	Zero	6 forest enterprises	Final project report; Independent evaluation	Forest enterprises and others responsible for implementing conservation plans in other regions of Armenia are open to cooperation and trustful relations are established with neighboring communities for integrating adaptation measures. (The risk of this assumption not holding is considered medium. It will be mitigated through an emphasis on participatory and cooperative schemes for implementation of proposed measures, and inviting representatives from other regions to participate in training sessions and site visits. Local communities will be fully aware and will be involved in adaptation aimed forest works. The transparency of project activities will be ensured through periodic meetings with partners, specialized scientific institutions, NGO, as well as through the project web-site.)

### SECTION III: TOTAL BUDGET AND WORK PLAN

<b>Award ID:</b>	00051202
<b>Award Title:</b>	Armenia PIMS 3814 CC SPA MSP “Adaptation to Climate Change Impacts in Mountain Forest Ecosystems of Armenia”
<b>Business Unit:</b>	ARM10
<b>Project Title:</b>	Armenia PIMS 3814 CC SPA MSP “Adaptation to Climate Change Impacts in Mountain Forest Ecosystems of Armenia”
<b>Project ID: PIMS no. 3814</b>	00063634
<b>Implementing Partner (Executing Agency)</b>	Ministry of Nature Protection

GEF Outcome/Atlas Activity	Responsible Party/Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)
<b>OUTCOME 1:</b> (as per the logframe)	<b>Ministry of Nature Protection</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	16,000	21,000	14,000	0	51,000
				71300	Local Consultants	5,000	8,000	6,000	6,000	25,000
				71400	Contractual services-individuals	9,600	9,600	9,600	9,600	38,400
				71600	Travel	10,000	6,000	4,000	4,000	24,000
				72100	Contractual services-companies	7,000	11,000	9,000	6,000	33,000
				72200	Equipment	12,000	10,000	0	0	22,000
				74200	Printing Prod cost	1,000	2,000	2,000	2,000	7,000
				72400	Comm. & Audio	2,000	2,000	2,000	2,000	8,000
				74500	Miscellaneous	3,000	3,000	3,000	1,700	10,700
	<b>sub-total GEF</b>	<b>65,600</b>	<b>72,600</b>	<b>49,600</b>	<b>31,300</b>	<b>219,100</b>				
<b>OUTCOME 2:</b> (as per the logframe)	<b>Ministry of Nature Protection</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	7,000	10,000	8,000	0	25,000
				71300	Local Consultants	6,000	8,000	6,000	6,000	26,000
				71400	Contractual services-individuals	12,000	12,000	12,000	10,000	46,000
				71600	Travel	11,000	14,000	11,000	7,000	43,000
				72100	Contractual services-companies	114,000	108,000	20,000	5,000	247,000
				72200	Equipment	11,000	12,000	0	0	23,000
				72400	Comm & Audio	2,000	2,000	2,000	2,000	8,000
				74500	Miscellaneous	3,000	4,000	3,000	3,000	13,000
					<b>Total Outcome 2</b>	<b>166,000</b>	<b>170,000</b>	<b>62,000</b>	<b>33,000</b>	<b>431,000</b>
<b>OUTCOME 3:</b> (as per the logframe and M&E Plan and Budget)	<b>Ministry of Nature Protection</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	0	15,000	0	0	15,000
				71300	Local Consultants-individuals	6,000	10,000	10,000	6,000	32,000
				71600	Travel	9,500	11,500	9,000	5,000	35,000



GEF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)
				72100	Contractual services-companies	8,000	8,000	17,000	8,000	41,000
				72200	Equipment	5,000	5,000	0	0	10,000
				74200	Printing and Prod	2,000	2,000	2,000	1,500	7,500
				72400	Comm and Audio	500	500	500	500	2,000
				74100	Prof services (Audit)	0	2,500	2,500	2,500	7,500
				74500	Miscellaneous	1,000	1,500	1,400	1,000	4,900
					<b>Total Outcome 3</b>	<b>32,000</b>	<b>56,000</b>	<b>42,400</b>	<b>24,500</b>	<b>154,900</b>
<b>Project management unit</b>	<b>Ministry of Nature Protection</b>	<b>62000</b>	<b>GEF</b>	71300	Local Consultants	18,000	18,000	18,000	18,000	72,000
				74500	Miscellaneous	2,500	2,500	2,500	2,500	10,000
				72500	Supplies	4,000	3,000	3,000	3,000	13,000
					<b>Total Management</b>	<b>24,500</b>	<b>23,500</b>	<b>23,500</b>	<b>23,500</b>	<b>95,000</b>
					<b>TOTAL</b>	<b>288,100</b>	<b>322,100</b>	<b>177,500</b>	<b>112,300</b>	<b>900,000</b>

**Summary of all Funds:**

<b>GEF</b>	<b>288,100</b>	<b>322,100</b>	<b>177,500</b>	<b>112,300</b>	<b>900,000</b>
<b>GORA</b> cash parallel					<b>1,900,000</b>
Summary of Fund					<b>2,800,000</b>

Budget notes:

1) All international consultancies relate to vulnerability gap analysis, identification and detailed design of on-the-ground adaptation measures in the Syunic forest area; addressing uncertainties with scenarios. Introducing and undertaking integrated assessment and cost-benefit analysis for “no regret adaptation measures”; methodological approaches for integrating adaptation measures into forest management plans; consultations and training; and support to monitoring and evaluation;

2) National consultancies relate to data generation and update; stakeholder engagement plan and consultations; policy dialogue and implementation of mainstreaming plan of the project; Scenario development on local level, design and implementation of local forecasting schemes for the target forest areas; planning, design and undertaking adaptation measures; consultations and training; Includes cost of project management, lessons learned and dissemination; and monitoring and evaluation;

3) Local travel relates three outputs of Outcome 2 in the target geographic area; Output 2.2, 2.3, 2.4 and all Outputs of Outcome 3 and Output 1.2.

4) Contractual services relate to Output 1.2 and Output 2.2. Output 2.3. and Output 2.4 These services mainly cover early warning and monitoring systems for Syunic forest areas; forest restoration, on-the-site training in pest and fire management; local technical training and institutional capacity building; community engagement; and project’s communication and outreach strategy; This mainly includes the following tasks:

4.1) group of experts (2 persons) satellite imagery and / or GIS, geo-referenced data and thematic maps to help adjust site specific scenarios and improve vulnerability assessment of the target region - *(40 person – weeks) - \$20,000*

4.2) group of experts (3 persons), institutional functional analysis and capacity development activities; package of amendments to regulatory framework, and forest management plans, including protected area management plans and planning procedures; Design and introduce effective bio-monitoring and ecological risk assessment system that includes climate risk factors and indicators in the framework of protected area management as well as in an overall forest management system – *(50 person – weeks) - \$ 25,000*

4.3) group of experts (4 persons) – community consultation and mobilization techniques; bottom up vulnerability assessments to feed into science/evidence –based climate risk assessments; community engagement strategy and plan in adaptation processes; project mechanisms for community participation in adaptation measures, such as, wild fire management, forest habitat rehabilitation process. - *(60 person – weeks) – \$30,000*

4.4) group of experts / NGOs on project’s communication and outreach strategy, including information dissemination and awareness raising activities – *(55 people –weeks) – \$27,500*

5) Equipment does NOT relate to PMU activities but software and other for monitoring; scenario development and forecasting related under Outcome 2 and knowledge product production under outcome 3. This includes GIS and climate change scenario development software. This also includes office equipment (computer, copier and printer) for the production of the materials for workshops, training, and knowledge management related activities. The project will also purchase SUV truck (4x4); number of cars: 3, these special cars will be used for forest fire early response activities and will be transporting other envisaged early response firefighting equipment. They will be also used for pest infestation monitoring and pest management.

**SECTION IV: ADDITIONAL INFORMATION**

**PART I:**

**1. Approved MSP PIF**

**Attached as a separate document**

**2. Other agreements**

**Endorsement letter**

**Attached as a separate document**

Co-financing letter

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РЕСПУБЛИКА АРМЕНИЯ  
МИНИСТЕРСТВО  
СЕЛЬСКОГО ХОЗЯЙСТВА  
“АРМЛЕС”  
ГОСУДАРСТВЕННАЯ  
НЕКОММЕРЧЕСКАЯ ОРГАНИЗАЦИЯ  
Директор

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24.06.08 № 01-10/173

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Ms Consuelo Vidal  
UNDP Resident Representataive  
UN Resident Coordinator

Dear Ms. Vidal:

I would like to express our satisfaction by the collaboration established between the “Hayantar” SNCO and the UNDP/GEF/00048795 project “Adaptation to Climate Change Impacts in Mountain Forest Ecosystems of Armenia” executed by the Ministry of Nature Protection and implemented by the UNDP CO Armenia. Collaboration under the project was very useful and appreciated, as well as revealed opportunities to mainstream adaptation issues in forest management in Armenia, particularly in south-eastern forest region.

In my capacity of the “Hayantar” SNCO Chief Forester, I am writing to inform you that the Government of the Republic of Armenia, by three-year plan (MTEP), will allocate funds of about 1.9 million in USD equivalent aimed at implementation of forest related projects in Syunik marz over the period 2009-2011. The main objectives of the planned projects are: establishment of forest plantations and agro-technical care, natural growth promotion activities, improvement of forest planning and management, further aerial pest control to prevent forest pestholes and diseases. There are also inputs in the projected climate change adaptation measures in management of forests and forest biodiversity. We also hope that the results of the project will create opportunities of best practices’ replication in other forest regions of Armenia.

Accept, please, the assurances of highest consideration. Looking forward to our further cooperation.

Sincerely Yours,

Ruben Petrosyan  
Chief Forester  
“Hayantar” SCNO

**SIGNATURE PAGE**

**Country:** Armenia

**UNDAF Outcome 4:** Promote environmentally sound technologies and effective management of natural resources in accordance with the MDGs and PRSP

**Expected CP Outcome 4.6:** Bio-diverse resources are managed and conserved effectively

**Expected CP Outputs:** Legislative and regulatory frameworks for managing specially protected areas are adopted.  
The Cartagena Protocol and legislation for bio-safety management are adopted.  
Indicators and mechanisms for monitoring areas with biodiversity are developed.  
Guidelines for managing forests and standards on sanitary cutting and reforestation are developed.  
Initiatives for in-situ conservation of genetic plant resources and wild relatives of domestic species are implemented.  
Initiatives for sustainable use of medicinal herbs by rural communities are implemented.

**Executing Agency:** ARM-MNP  
**Implementing Agency:** UNDP

Programme Period: CPD 2005-2009, CPD 2010-2014  
Programme Component: Promoting energy efficiency and environmental sustainability  
Project Title: PIMS 3814: Adaptation to CC Impacts in Mountain Forest Ecosystems of Armenia  
Project ID: 00063634  
Project Duration: 2008 - 2012  
Management Arrangement: NEX

**Total budget:** **US\$ 2,800,000**

Allocated resources:

- GEF US\$ 900,000
- Government US\$ 1,900,000

**Agreed by (Government - Executing Agency):**

**Aram Harutyunyan**  
**Minister of Nature Protection**  
**Republic of Armenia**



*[Handwritten Signature]*  
signature

*11.12.08*  
date

**Agreed by (UNDP - Implementing Agency):**

*[Handwritten Initials]* **Consuelo Vidal**  
**Resident Representative**  
**UNDP Armenia**

*[Handwritten Signature]*  
signature

*11.12.08*  
date

## Annex 1: Biodiversity of the Syunik region

142. Forests of the Syunik region are presented with a diversity of endemic species (*Centaurea alexandri*, *Cousinia takhtajanii*, *Psephellus zangezuri*, *Psephellus zuvandicus*, *Silene chustupica*, *Astragalus sangezuricus*, *Bromopsis zangezura*, *Festuca vagravarica*, *Amygdalus nairica*, *Cotoneaster armenus*, *Crataegus armena*, *Crataegus zangezura*, *Pyrus elata*, *Pyrus hajastana*, *Pyrus sosnowskyi*, *Pyrus tamamschjanae*, *Pyrus voronovii*, *Rosa zangezura*, *Rubus takhtajanii*, *Rubus zangezurus*) and rare plant species listed in the Red Book (*Cercis griffithii*, *Tulipa sosnovskyi*, *Ophrys caucasica*, *Euonymus velutina*, *Fritillaria kurdica*, *Tulipa florenskyi*, *Punica granatum*, *Galanthus transcaucasicus*, *Steveniella satyrioides*, *Periploca graeca*, *Carpinus schuschaensis*, *Anacamptis pyramidalis*, *Cephalanthera rubra*, *Primula komarovii*, *Primula woronowii*, *Sorbus luristanica*).

143. Terrestrial vertebrates in the Syunik region are represented by about 320 species, including 4 species of amphibians, 30 species of reptiles, 225 species of birds and about 60 species of mammals. The forests of the Syunik region are crucially important for conservation of Armenian populations of big carnivores such as brown bear (*Ursus arctos syriacus*), forest cat (*Felis silvestris*), and lynx (*Lynx lynx*). The first two are included in Appendix II “Strictly Protected Fauna Species” of the Convention on the Conservation of European Wildlife and Natural Habitats (“Bern Convention”), to which Armenia is a Party. Forest massifs of the southern part of the region (Meghri and Kapan eco-regions) are a part of territories of extremely rare Vordern Asian leopard (*Panthera pardus tulliana*) included into IUCN Red List. Vertebrate fauna composition is more or less similar in all 3 territories selected for the pilot project namely Goris, Kapan and Meghri, except for species that can penetrate to the open forest of Kapan territory from the surrounding “open” landscapes.

144. The different types of forests fully or partially support populations of about 150 bird species, including such rare birds of prey as black vulture (*Aegypius monachus* – included into IUCN Red List), griffon vulture (*Gyps fulvus*), golden eagle (*Aquila chrysaetos*). The last two are included into Appendix II of Bern Convention with all the European bird of prey species.

145. Similar to those of Caucasus and Armenia, invertebrates of the Syunik region are studied quite irregularly. However, data on some relatively complete studies of higher taxons that are considered a model to follow also demonstrate high importance of the region (marz) for biodiversity conservation. For instance, of 155 mollusk species of Armenian fauna, 96 are found in Syunik, of about 4,200 beetle species more than 2,200 are found in Syunik, of 230 butterfly species 126 are found in Syunik, and of 200 orthopterous insect species 120 are found in Syunik. Extrapolating these data to the invertebrate fauna as a whole, the total number of the region’s species can be estimated at 8,500-9,000 (that is about half of the 17,000 species of Armenian fauna)<sup>23</sup>. About half of Armenian endemic animals (155 of 317 mentioned in the National Report) are represented in Syunik, with 110 species known as not found outside Syunik. Of invertebrates, the most important for biodiversity conservation in the global context are endemics of Syunik forests, such as mollusks *Euxina akramowskii* Likh. and *E.valentini* Loosjes and about 100 endemic beetle species (e.g. ground-beetle *Procerus scabrosus fallettianus*, recently identified and described in region (marz) study, longhorn beetles *Anaglyptus danilevskyi*, *Cortodera kafanica* and *Asias aghababiani*, jewel-beetles *Sphaerobothris aghababiani* and *Anthaxia superba*, etc.). There are many other rare species in the forests of Syunik, among others *Cerambyx longhorn* (*Cerambyx cerdo*), *Rosalia longhorn* (*Rosalia alpina*), Apollo butterfly (*Parnassius apollo*) (all the 3 listed in IUCN Red List), Clouded apollo butterfly (*P. mnemosyne*) (listed in Appendix II of Bern Convention), etc.

146. As studies continue, new fauna taxons, especially those of insects, are found. For example, within the last two decades, solely of beetles, more than 20 species have been identified and described. 66 species of the vertebrates in the Syunik Marz were included into the Red Book of Armenia, 23 of them had been included into the USSR Red Book, and 16 into the IUCN Red List. There is no Red Book for Armenian invertebrates, but 27 endangered insect species represented in the Syunik Marz had been included into the USSR Red Book, including 2 species of Coleoptera, 14 of Lepidoptera, 2 of Neuroptera, 6 of Hymenoptera and 1 species of Orthoptera. Eight species of

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<sup>23</sup> See the country’ National Report on Biodiversity Conservation

Armenian invertebrates included into IUCN Red List of Threatened Species are found in Syunik. Forest fauna (different groups of vertebrates and invertebrates) constitutes 40 to 60 per cent of the region's fauna, i.e. general number of forest fauna species can be estimated at about 4,000.

147. More than 35 endemic flora species and more than 150 rare and endangered species, that are included in the Armenian Red Book, are found in the Syunik Marz. It harbors unique habitat for species such as Vasilevskaja's onion (*Allium vasilevskajae*), Alexandr's centaury (*Centaurea alexandri*), Nairi's almond (*Amygdalus nairica*), Zangezur's hawthorn (*Crataegus zangezura*), and Takhtajan's fig-wort (*Scrophularia takhtajanii*).

148. Mountainous oak forests of Meghri sub-region of the Syunik Marz are very rich in biodiversity. Besides numerous endemic species, more than 20 species of rare and very decorative orchids, 3 species of irises, 2 species of fritillaries, 2 species of tulips and many others grow here.

149. From a biodiversity standpoint, oak forests of Goris sub-region of the Syunik Marz are very important for conservation as well. These forests serve as an important habitat for a number of very rare and decorative plant species included in the Armenian Red Book, such as Artjushenko's snowdrop (*Galanthus artjushenkoae*), Italian cornflag (*Gladiolus italicus*), anacamptis (*Anacamptis pyramidalis*), damsonian helleborine (*Cephalanthera damasonium*), red helleborine (*Cephalanthera rubra*), Caucasian ophrys (*Ophrys caucasica*), Rome dactylorhize (*Dactylorhiza romana*), butterfly orchid (*Platanthera chlorantha*), etc. Of endemic invertebrates, we should mention *Procerus scabrosus fallettianus*, as well as a whole series of beetles identified and described exactly from environs of Shurnukh village: some staphilinids (*Ziras stenocephalus* (representing subgenus *Hyloziras* endemic for Armenia), *Paophilus zangesuricus*, *Geostiba khnzoriani*), leaf-beetle *Haltica armeniaca*, death-watch beetle *Gastrallus phloeophagus*, etc.

150. The juniper open forest of Kapan sub-region of the Syunik Marz is very important from the standpoint of biodiversity conservation. Being characterized as a part of Ancient Mediterranean ecosystem of juniper open forests, this area serves as a principal habitat for such rare and relict plant species as peony (*Paeonia tenuifolia*), lentil (*Lens ervoides*), jujube (*Ziziphus jujuba*), water-elm (*Zelkova carpinifolia*), Luristianian service-tree (*Sorbus luristanica*), Gabrielian's cousinia (*Cousinia gabrielianae*), etc. Compared to ecosystems described above, this one is peculiar due to inhabitation of species that prefer "open" landscapes. Of vertebrates, Greek turtle (*Testudo graeca*, included into IUCN Red List), lebetina viper (*Vipera lebetina*), snake *Coluber najadum* (both included into Appendix II of Bern Convention), should be mentioned. Exactly here, and not in a deep forest, the above mentioned black vulture (*Aegypius monachus*), griffon vulture (*Gyps fulvus*), golden eagle (*Aquila chrysaetos*), etc are found. Although no special study was conducted for invertebrates of the place, certain endemic for Armenia ground-beetles (the above mentioned *Procerus scabrosus fallettianus*, *Trechus melanocephalus* Kol., blister-beetle *Lydus caucasicus* Mar., etc.) are known of this area.

#### Description of protected areas in the Syunik region

##### *Shikahogh State Reserve (established 1958; area 10,000 ha)*

151. The reserve was established in 1958. During 1961-1975 this area became Bartaz Reservation. The status of the state reserve was re-established in 1975. The reserve spreads over the southern slopes of Mountain Khustup and the northern slopes of the Meghri range, at the altitude of 700-2400 m. The Rivers Tsav and Shikahogh run through its territory with their mountain tributaries. The reserve stands out for its unique mesothermophilous flora and vegetation formed under the influence of numerous ecological factors, especially geographic location of the terrain and peculiarities of the climate. The warm and moist climate of the reserve is determined by its location. The reserve is surrounded by high mountains on three sides which prevent the northern cold and southern warm winds from entering the basins of the Rivers Tsav and Shikahogh. The fourth side, however, is open to the warm and moist air from the Caspian Sea. That is why this reserve is rich in Caucasian mesophilous plants and at the same time is famous for its mesothermophilous trees, bushes and herbs which determine the uniqueness of its flora.



152. According to approximate data there are 1100 species of vascular plants in the reserve area. About 70 species growing in the reserve are registered in the Red Data Book of Armenia, 18 – in the Red Data Book of the USSR. The reserve is also known for its numerous endemic species, most of which have the place-name “Zangezur”, for example, Zangezur pear - *Pyrus zangezura* Maleev, Zangezur blue-bell – *Campanula zangezura* (Lipsky) Kolak. et Serdjukova, Zangezur pennycress – *Thlaspi zangezorum* Tzvel. etc. The flora of the reserve is mostly mesophilous, however, it is also rich in mesothermophilous species. In the lower mountain zone up to 1000 m low height stands of Arax oak - *Q. araxina* (Trautv.) Grossh. are common. An interesting type of Mediterranean vegetation shibliak occurs here as well. In the reserve shibliak occurs on rather steep, dry and rocky slopes. Christ's thorn or Jerusalem thorn (*Paliurus spina-christi* Mill.) prevails, which is typical for shibliak. This densely branched and thorny shrub with yellow-greenish leaves and roundish fruits is of Mediterranean origin and often used as a live fence. It is accompanied by smoketree (*Cotinus coggygnea* Scop.), hackberry (*Celtis glabrata*), barberry (*Berberis vulgaris* L.) and other xerophilous shrubs and plants with the dominance of beard-grass - *Botriochloa ischaemum* (L.) Keng. The main type of vegetation of the reserve is forest which spreads at the altitude of 1000-2200 m. It consists of oak (*Q. iberica* Bieb. and *Q. macranthera*) and hornbeam (*Carpinus orientalis* Mill. and *C. betulus* L.). Oak species *Q. iberica* occurs at the altitude of 1300-1400 m, while *Q. macranthera* grows higher. Ash (*Fraxinus* L.), lime (*Tilia* L.), maple (*Acer* L.) and elm (*Ulmus* L.) occur as accompanying species. Hornbeam stands occur on the northern slopes. The only small forest of oriental beech (*Fagus orientalis* Lipsky) in the Southern Armenia grows in this reserve. The reserve is also the only place in Armenia where hornbeam stands remained at the upper limit of the forest. There are also many fruit trees in the forests such as walnut (*Juglans regia* L.), pear (*Pyrus* L.), apple (*Malus orientalis* Uglitzk.), plum (*Prunus* Mill.) as well as some mesothermophilous tree-bush species such as pistachio (*Pistacea mutica*), chestnut (*Castanea sativa* L.), persimmon (*Diospyros lotus* L.), waterelm - *Zelkova carpinifolia* (Pall.) C.Koch, pomegranate (*Punica granatum* L.), medlar (*Mespilus germanica* L.), fig (*Ficus carica* L.) and others. Yew and oriental plane also occur in the reserve in patches of groups of trees or individual trees (see as well Plane Grove Reservation). There is a group of 25-30 year-old yew trees in a dark and dense beech forest near the village Shikahogh. Above the forest zone subalpine meadow vegetation spreads over altitudes above 2200 m. In the transition zone there are numerous resiniferous species of astragalus (*Astragalus*), as well as prickly thrift (*Acantholimon*) and sainfoin (*Onobrichis cornuta*). The fauna of the reserve has not been well studied. It is known that the reserve is a habitat for reptiles (*Vipera lebetina*, *Natrix natrix*, *N. tessellata*, *Pseudopodus apodus*, *Viper raddei* etc.), birds (Caspian snowcock - *Tetraogallus caspius*, bearded eagle - *Gypaetus barbatus*, various species of vultures - *Gyps fulvus* and others) and numerous species of mammals (wolf - *Canis lupus*, fox - *Vulpes vulpes*, wild cat - *Felis silvestris*, roe – *Capreolus capreolus*, hare - *Lepus europaeus*, badger - *Meles meles*, hedgehog – *Erinaceus auritus* etc.). Wild goat (bezoar goat) and moufflon (wild sheep) also occur in the reserve. According to the local population panther (*Pantera pardus tullianus*) also occurred here in the past. Indian porcupine (*Hystrix leucura*) feeding on plants is a rare rodent species of the reserve. Most of the mentioned animals are registered in the Red Data Book of Armenia. Mtnadzor (“dark gorge” in Armenian) covering almost the half of the reserve territory makes it unique.

*Plane Grove Reservation (established in 1959, area 64.2 ha)*

153. This reservation is located in the vicinity of Shikahogh State Reserve at the altitude of 700-800 m in the valley of the River Tsav which is a left tributary to the River Arax starting from the Khustup Mountains. The grove (10 km long and 50-200 m wide) stretches along the bed of the River Tsav. It continues as much downstream of the River Tsav. Oriental plane (*Platanus orientalis* L.) is a long-lived tree (up to 2000 years). According to references five thousand 200-250 year-old trees with the height of 30-45 m and trunk diameter of 2 m were growing in the grove. Century-old trees with hollows also occurred. Natural regeneration by seeds was intensive. In the 1980s the part of the plane grove became a settlement with standard housing where Nerkin Hund village was resettled. Since then the artificial clearings in the grove have been used for agricultural purposes while nowadays permanent presence of residents endangers the ecological integrity of the grove.

*Boghakar Reservation (established 1989; area 2,728 ha)*

154. The main protected objects are endemic and rare and fauna species.

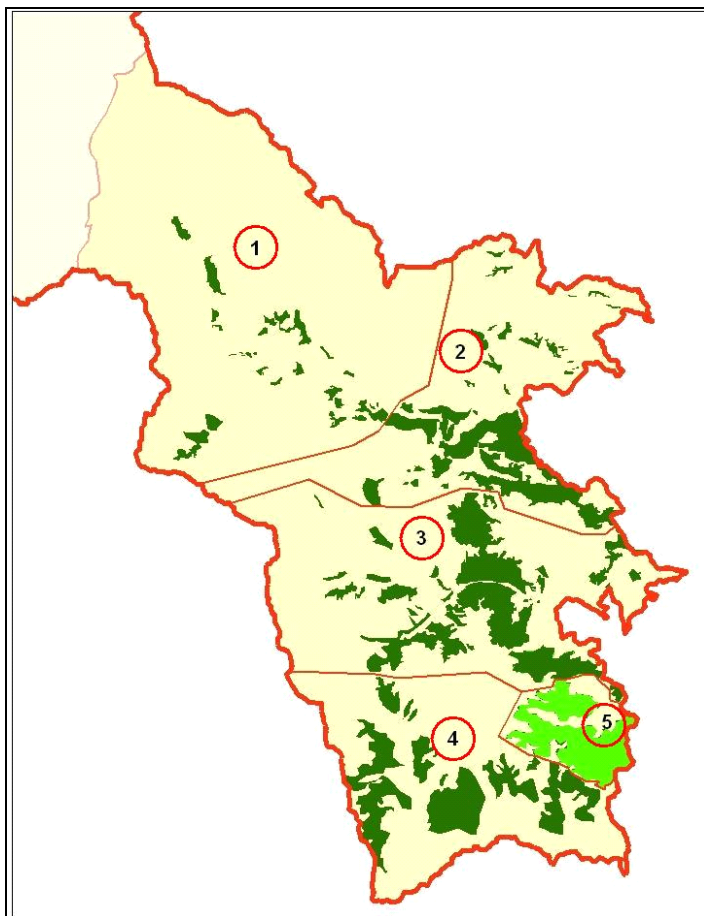
*Goris Reservation (established 1972; area 1,850 ha)*

155. This area was established to protect threatened species of flora and fauna in the forest ecosystems typical for the region.

*Sev Lich Reservation (established 1987; area 240 ha)*

156. This area was established to protect the natural complex of the relict volcanic lake.

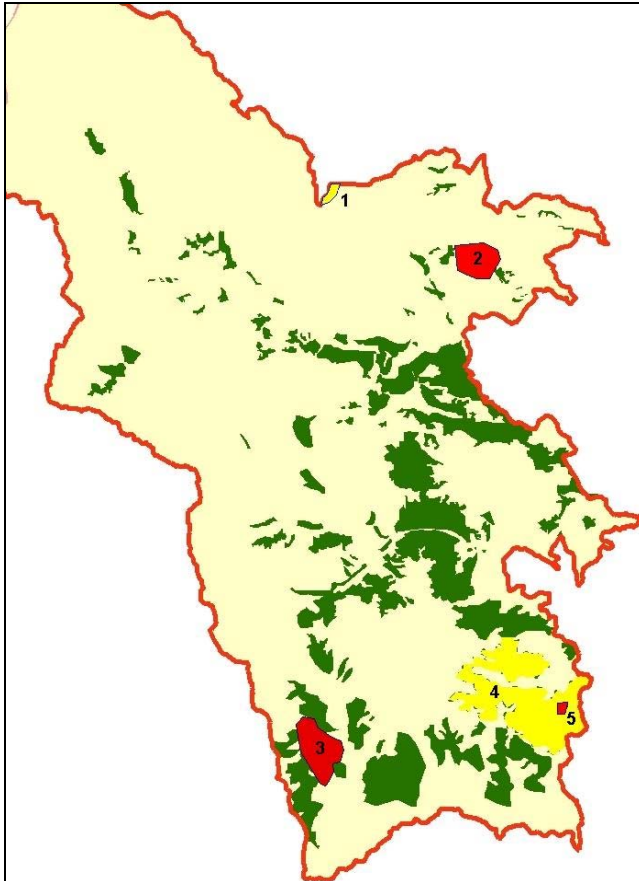
**Map 1: Forest Administration (Forest Enterprises and Shikahogh State Reserve) in the Syunik region of Armenia**



**Legend**

- 1 Sisian Forest Enterprise
- 2 Syuniq(Goris) Forest Enterprise
- 3 Kapan Forest Enterprise
- 4 Meghri Forest Enterprise
- 5 Shikahogh State Reserve

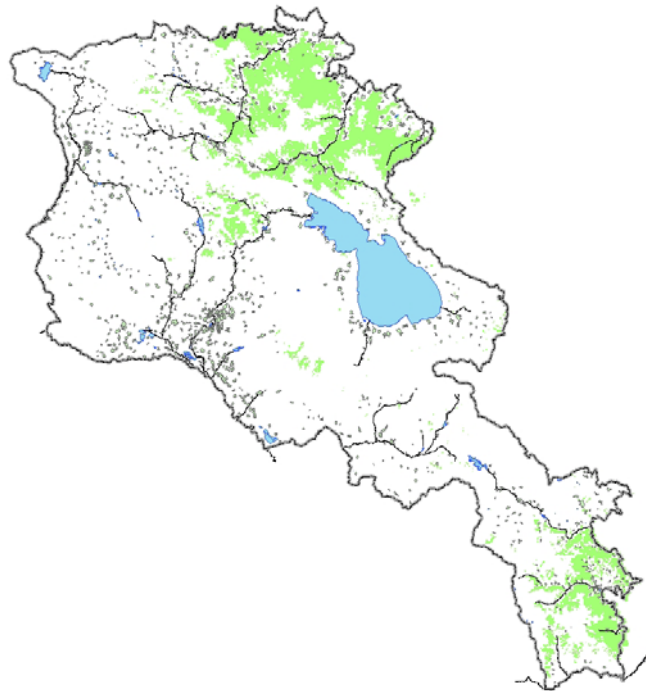
**Map 2: Protected areas in the Syunik region**



**Legend**

1. "Sev Litch" Reservation
2. "Goris" Reservation
3. "Boghakar" Reservation
4. "Shikahogh" State Reserve
5. "Plane Grove" Reservation

**Map 3: Forest cover of Armenia (according to the satellite images, Landsat, 2006)**



**Annex 2: Assessment of priority area under the Vulnerability and Adaptation Section of the Stocktaking Exercise (Summary Evaluation Matrix)**

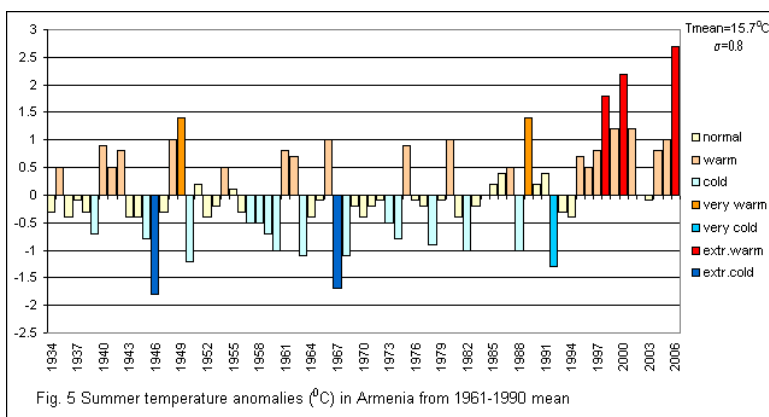
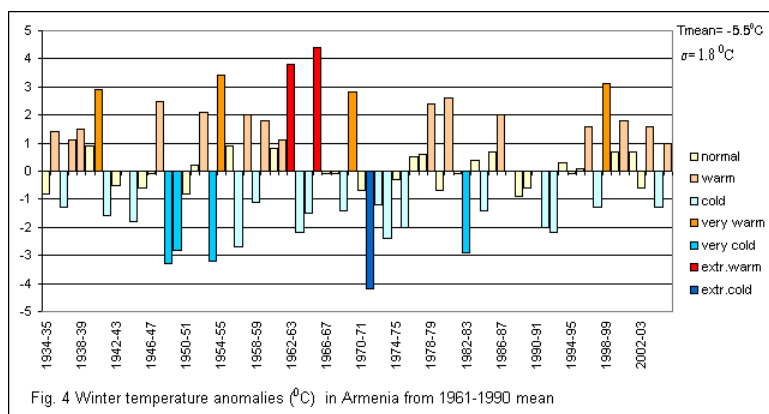
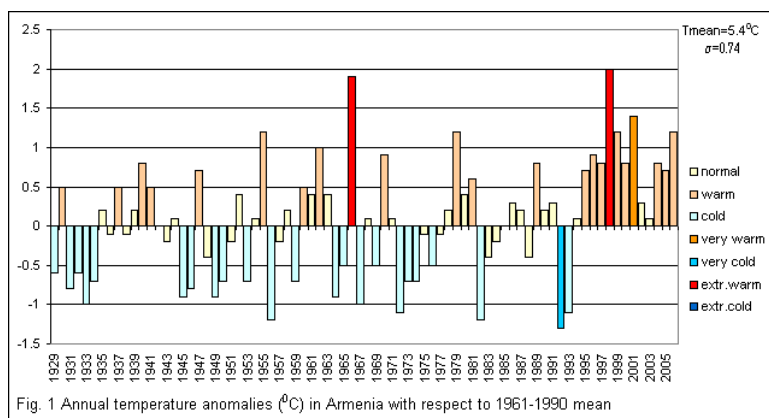
157. The stocktaking analysis was undertaken for Armenia's most vulnerable regions that were most in need for adapting to climate change and variability. These regions were the Armavir marz, Gegarkuniq marz and Syunik marz. When the analysis was narrowed down further, from overall adaptation covering all sectors to forest ecosystems in particular, it was found that the scale of vulnerability, relevance to national priorities and development benefits were highest in the Syunik region (note green highlighted rows in table below).

Sub area Administrative Unit	Sector (sub-sector)	Scale of Vulnerability	Relevance to National Development Priorities	Development Benefits	Data availability	Sub Area Total
Armavir marz	<i>climate</i>	+++	++	+++	+++	11
	<i>water</i>	+++	+++	+++	+++	12
	<i>agriculture</i>	+++	+++	+++	+++	12
	<i>energy</i>	+	+	+	+++	6
	<i>forest</i>	+	++	++	++	7
	<i>combat</i>	+++	+++	+++	+++	12
	<i>biodiversity</i>	++	++	++	+++	9
	<i>fish</i>	+	+	+	+++	6
	<i>nat. ecosyst.</i>	+++	+++	+++	++	11
	<i>health</i>	+++	+++	+++	+++	12
Gegarkuniq marz	<i>climate</i>	+++	+++	+++	+++	12
	<i>water</i>	+++	+++	+++	+++	12
	<i>agriculture</i>	++	++	++	++	8
	<i>energy</i>	+	+	++	+++	7
	<i>forest</i>	+	++	++	++	7
	<i>combat</i>	++	++	++	++	8
	<i>biodiversity</i>	++	+++	+++	+++	11
	<i>fish</i>	+++	+++	+++	+++	12
	<i>nat. ecosyst.</i>	+++	++	+++	+++	11
	<i>health</i>	+	+	+	++	5
Syunik marz	<i>climate</i>	++	+	++	++	7
	<i>water</i>	++	++	++	++	8
	<i>agriculture</i>	++	+++	++	++	9
	<i>energy</i>	++	++	++	+++	9
	<i>forest</i>	+++	+++	+++	++	11
	<i>combat</i>	+++	+++	+++	++	11
	<i>biodiversity</i>	++	++	+++	++	9
	<i>fish</i>	+	+	+	++	5
	<i>nat. ecosyst.</i>	++	+++	++	++	9
	<i>health</i>	+	+	++	++	6

### ANNEX 3: CLIMATE VARIABILITY AND RELATED IMPACTS IN ARMENIA

158. Hydrometeorological observations in Armenia are being carried out by the Armenian State Hydrometeorological SNCO currently under the Ministry of Emergency Situations, according to the instructions and recommendations of the Global Climate Observation Systems. The analysis of the air temperature for the period 1929-2006 in the territory of Armenia shows that starting from 1994 the average annual and average summer temperature anomalies have been positive. Particularly the summer of 2006 has been the hottest within the studied period. On an annual basis, the warmest year was 1998. Winters also have a tendency of warming, which is however, quite insignificant.

**Figure 15. Average annual winter and summer temperature anomalies (deviation from 1961-90 norm)**



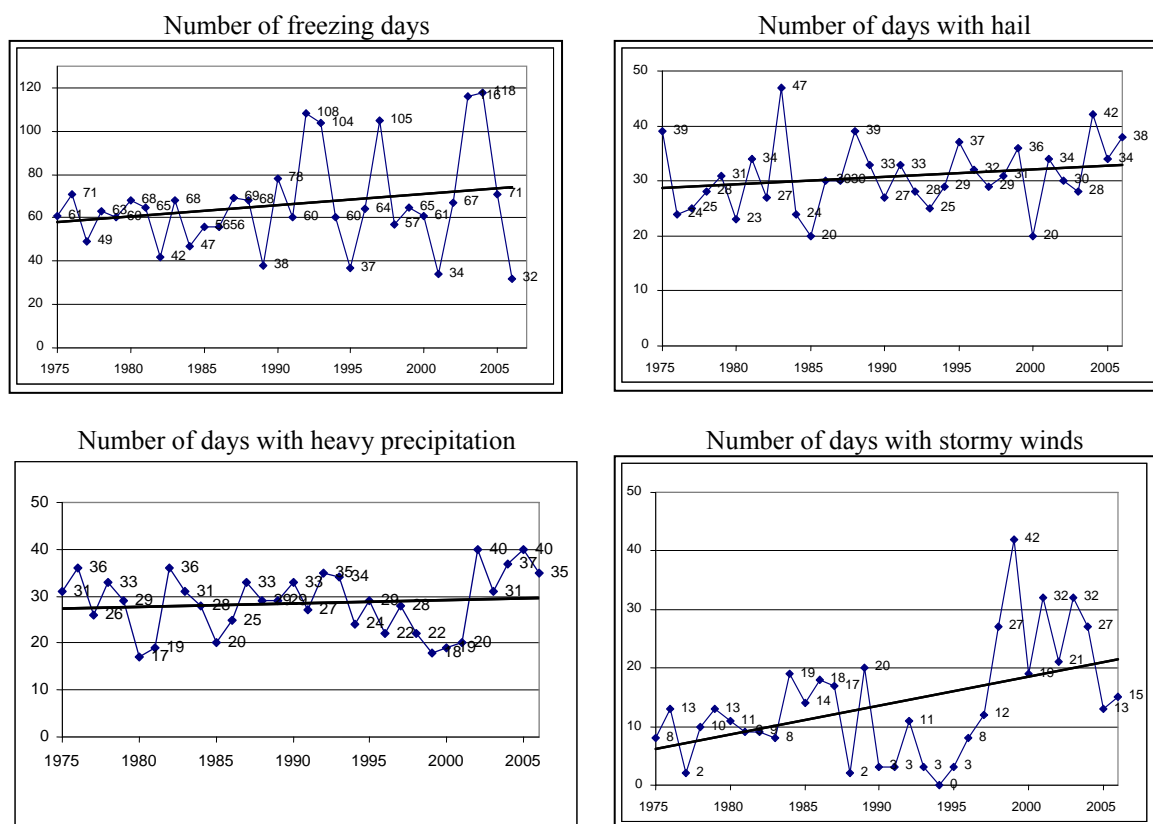
*Source: Armenian State Hydrometeorological Service*

159. During the past years, climate change has also impacted the country in the form of more acute climatic hazards. Among the natural hazards, Armenia is mostly affected by droughts, early spring chills, heat/cold waves, hailstorms, mudflows, landslides, storms, fogs and forest fires. Of the above-mentioned hydrometeorological hazards, the following have caused the most damage: severe drought

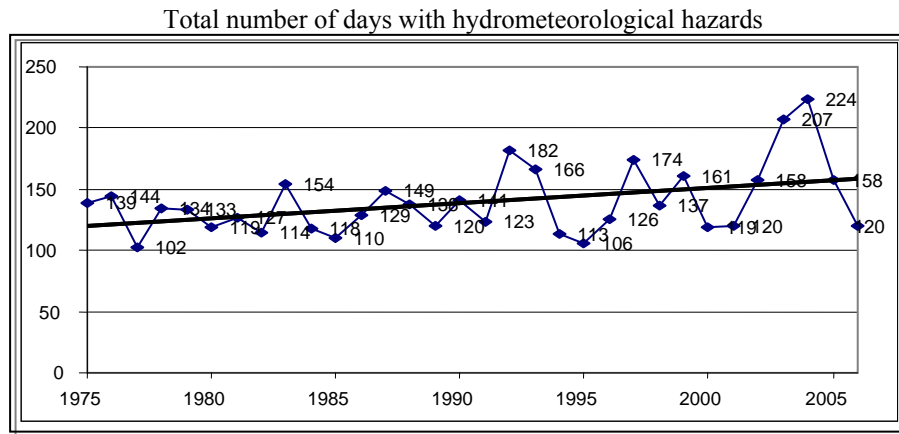
observed in July-August, 2000; unprecedented cold wave in December 2002; spring flooding in 2004 and 2007 caused by heavy rainfalls, intensive snow-melting due to unusual warm weather and stormy winds: freezing occurred on April 1-5, 2004 in Ararat valley; and prolonged and dense fog observed in the months December-January in 2006 and 2007. According to the estimates of World Bank experts, the average annual damage caused by hydrometeorological hazards in Armenia stands at 35 billion AMD annually for the period 2000-2005<sup>24</sup>.

160. The analysis of hydrometeorological hazards recorded in 1975-2006 shows that on average every day some hazardous event occurs in some location. Direct damage caused by hazardous events is rather high. As seen from the figures below, the most days with hydrometeorological hazards were recorded in 2003 and 2004. Most cases of hail are recorded in Shirak Valley, heavy precipitation in Tashir and Ijevan regions, freezing in Ararat Valley and sub-mountainous regions, storms in mountain passes, Sevan basin and the Syunik region. The sum of hydrometeorological hazards over the last 30 years has increased by 1.2 cases annually, and in recent 20 years it has increased by 2.1 cases annually.

**Figure 16. The frequency of hydrometeorological hazards over Armenia during the period 1975-2006**



<sup>24</sup> IBRD & State Service of Hydrometeorology and Monitoring of Armenia (April 2007); "Assessment of effectiveness of the hydrometeorological services", Report in the frame of pilot assessment of weather/climate services in Europe and Central Asia.



*Source: Armenian State Hydrometeorological Service*

161. According to the First National Communication, climate change impacts are observed in terms of more frequent occurrence of extreme weather events and disasters, climate aridization and changes in biota, as well as a decrease of land productivity. Climate change also causes water stress and health issues. A brief description of the above-mentioned impacts is presented below:

162. **Extreme weather events and disasters:** During the past decade an increase of frequency of extreme weather and climate events (such as droughts, spring frosts, hails, floods, mudflows, winds and forest fires) have been recorded. The recorded number of hailstorms during 2001-2006 reached 46 cases (hailstone diameter 22-35mm, on average); heavy floods during the past decade even resulted in human losses. In 2000, losses to the agriculture sector from droughts amounted in \$66.7 million, constituting 10.1% of agricultural gross product. This includes 35% share of potato yield, 20% of cereals, and 16% of vegetables. In 2005, the crop yield losses from hail, floods and frost together made up about \$15 million.

163. **Climate aridization and changes in biota:** Research based on observations from 50 meteorological stations during 1930-1990 shows that the average annual precipitation has decreased by 5.8% and temperature has increased by 0.7°C in Armenia. This is expected to worsen in light of anticipated climate change scenarios. The effects of climate aridization are already being felt in arid Armenia. During the last millennium the forest areas have significantly reduced, the semi-desert and steppe vegetation belts have expanded and the Alpine vegetation belt has reduced. Increased occurrence of forest fires and pest outbreaks are another consequence of climate aridization that negatively impact forests in Armenia. At present, the forest area damaged annually by insects is approximately 14,500ha (on average).

164. **Land productivity:** According to the climate change forecasts the humidity of soil will decrease by 10-30% by mid century and subsequent moisture deficit will impact the plants' growing capacity. According to the First National Communication the productivity of cereals will be reduced on the average by 9-13%, vegetables – by 7-14%, potatoes – by 8-10% and horticulture by 5-8%.

165. **Water stress:** The observed climate warming will impact the runoff formation that largely depends on snow cover in Armenia. The water reserves in snow on whole territory have already decreased by 5-10% during the baseline period (1961-1990). Water balance in Lake Sevan is also affected by the increasing evaporation from its surface.

166. **Health issues:** It is also forecasted that the incidence of cardio-vascular system diseases will increase, especially among the risk groups. Increase in number of malaria morbidities has been detected (e.g., in 1998 the number of people contracting three-day malaria reached 1,156). Increase in number of cholera vibrio of group 01 (El Tor vibrio) from 1.4 to 2.4% in Armavir region of Armenia was observed during 1998-2001.

#### **ANNEX 4: MOST VULNERABLE FOREST AREAS IN THE SYUNIK REGION AND SELECTED TARGET AREAS FOR PILOT PROJECTS**

##### *Syunik (Goris) subregion (25.8 ha)*

167. In the forest lands of Goris, there are many degraded areas. For instance, in the south-eastern part of the 15th and the 16th lots of the 21st square in Syunik (Goris) forest subenterprise, there are mixed natural sparse tree-growth areas (oak, hornbeam, ash-tree) as well as burned areas on 35-40° slope and with completeness/ integrity 0.2. On the 13th lot of the 6th square in the same forest subenterprise, there are burned areas under 30 year-old species of pine-trees and oaks on 40° slope. On the 1st lot of the 31st square in Shurnukh forest area, areas with no natural recovery are notable. Among the above-mentioned degraded forest areas, Shurnukh forest area was selected as reforestation target within the pilot project. The target treeless area of 15 ha is located on the 1st lot of the 31st square and surrounded by fifth growth-class natural oak-wood (8 oaks to 2 hornbeams). The area is located in the south-west, on 20° slope, at 1450 m above sea level. According to afforestation projects, natural recovery on that area is expected since 1979, yet no natural growth is evident up to date.

##### *Kapan subregion (90 ha)*

168. In Kapan forest lands, there are also many forest ecosystems degraded due to a variety of circumstances (burned, drying out pest-affected leaves forest, illegally cut, land erosion). The junipers of Davit Bek forest area, which was burned in 2006, have been selected as reforestation targets within the pilot project. The total burned area reaches 90 ha. The pilot project envisages to reforest 20 ha of the burned area's lower part, located at 1600 m above sea level, on slope exceeding 45°.

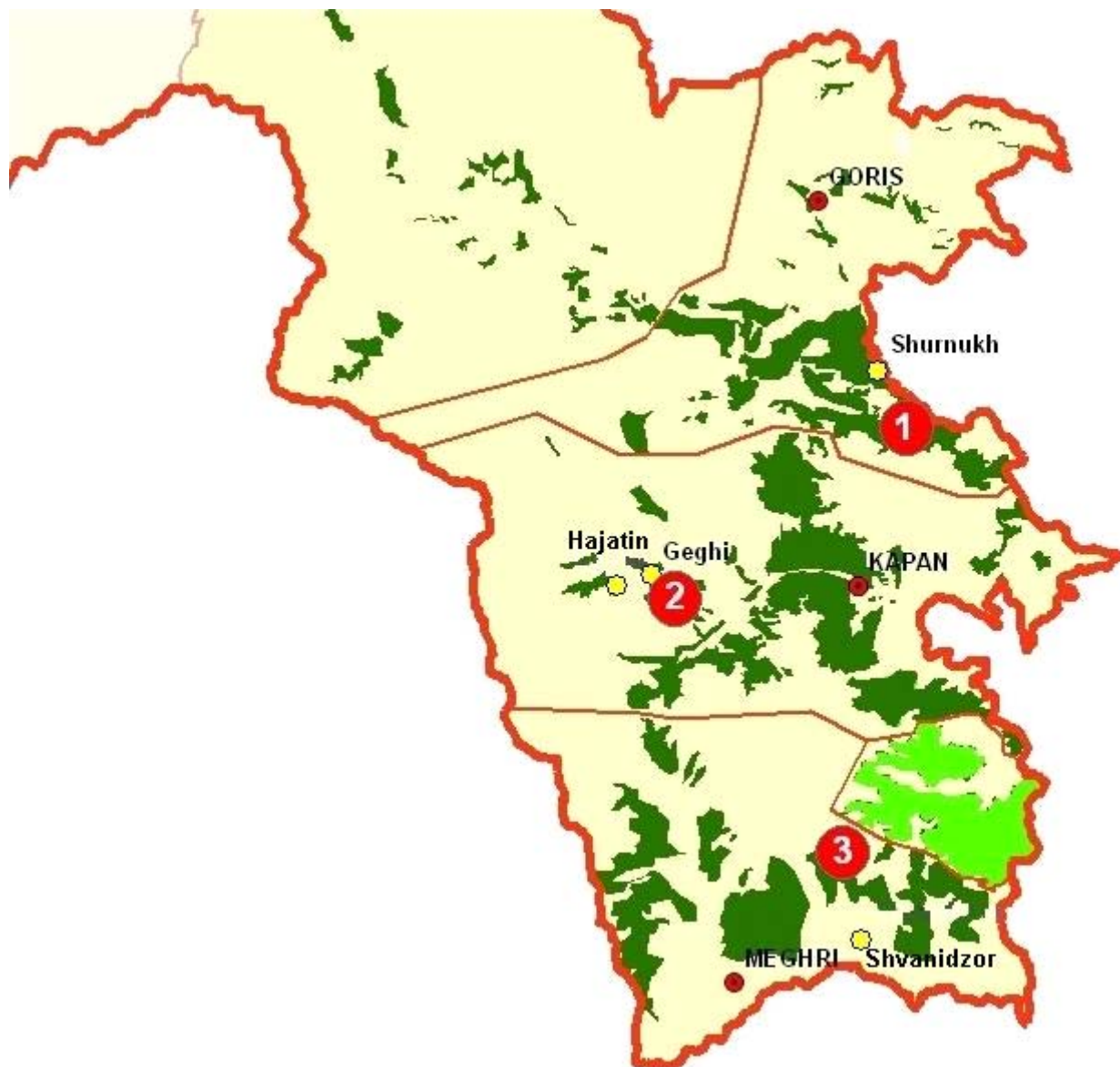
##### *Meghri subregion (220 ha)*

169. In the forest lands of Meghri, there are many forest ecosystems that are degraded due to a variety of circumstances. A part is destroyed by fire, others due to mass reproduction of pests or as a result of soil erosion. According to research findings, there are 2270 ha degraded forest areas within the forest lands of Meghri, including 2050 ha of forest with pest-affected leaves (on 540 ha leaves already dried out) and 220 ha burned by fires. Among degraded forest areas of Meghri, Shvanidzor forest area was selected as a target for reforestation. The target site of 20 ha to be reforested is affected by leaf-consuming pests (due to their mass reproduction in 1999-2001) and was then burned due to forest fires (in 2001). The area is mainly under oaks; it is located in the south-western part of the forest, on 30° slope, at 1600 m above sea level.



Name of forest enterprise	Name of forest area	Drying out pest-affected			Destroyed by fire				Degraded, deforested area			Selected target areas		
		square /lot	main tree species	area, ha	year	square /lot	main tree species	area, ha	square /lot	main tree species	area, ha	square /lot	main tree species	area, ha
Syunik (Goris)	Shurnukh				2005	sq. 26 lot 6	oak	10	sq. 31 lot 1	oak	15	sq.31 lot 1	oak	15
	Goris				2006	sq. 21, lot 15, 16	oak, hornbeam, spelt	8,8						
					2006	sq. 6 lot 13	pine-tree	7						
<b>Total in Syunik (Goris)</b>								25,8			15			<b>15</b>
<b>Kapan</b>	<b>Davit Bek</b>				2006	sq. 12, 13 lot 2, 3, 4, 5, 7, 8	juniper	90				sq. 12, 13 lot 2, 3, 4, 5, 7, 8	juniper	20
<b>Total in Kapan</b>								90						<b>20</b>
<b>Meghri</b>	<b>Litchq</b>	sq. 24, 25, 29, 30, 31, 37	oak	1186	2006	sq. 15,16	juniper	200						
	<b>Shvanidzor</b>	sq. 1, 26, 27, 31, 32	oak	864	2001	sq.1, 6	oak	20				sq.1, 6	oak	20
<b>Total in Meghri</b>				2050				220						<b>20</b>
<b>Total in Syunik marz</b>				2050				335,8			15			<b>55</b>

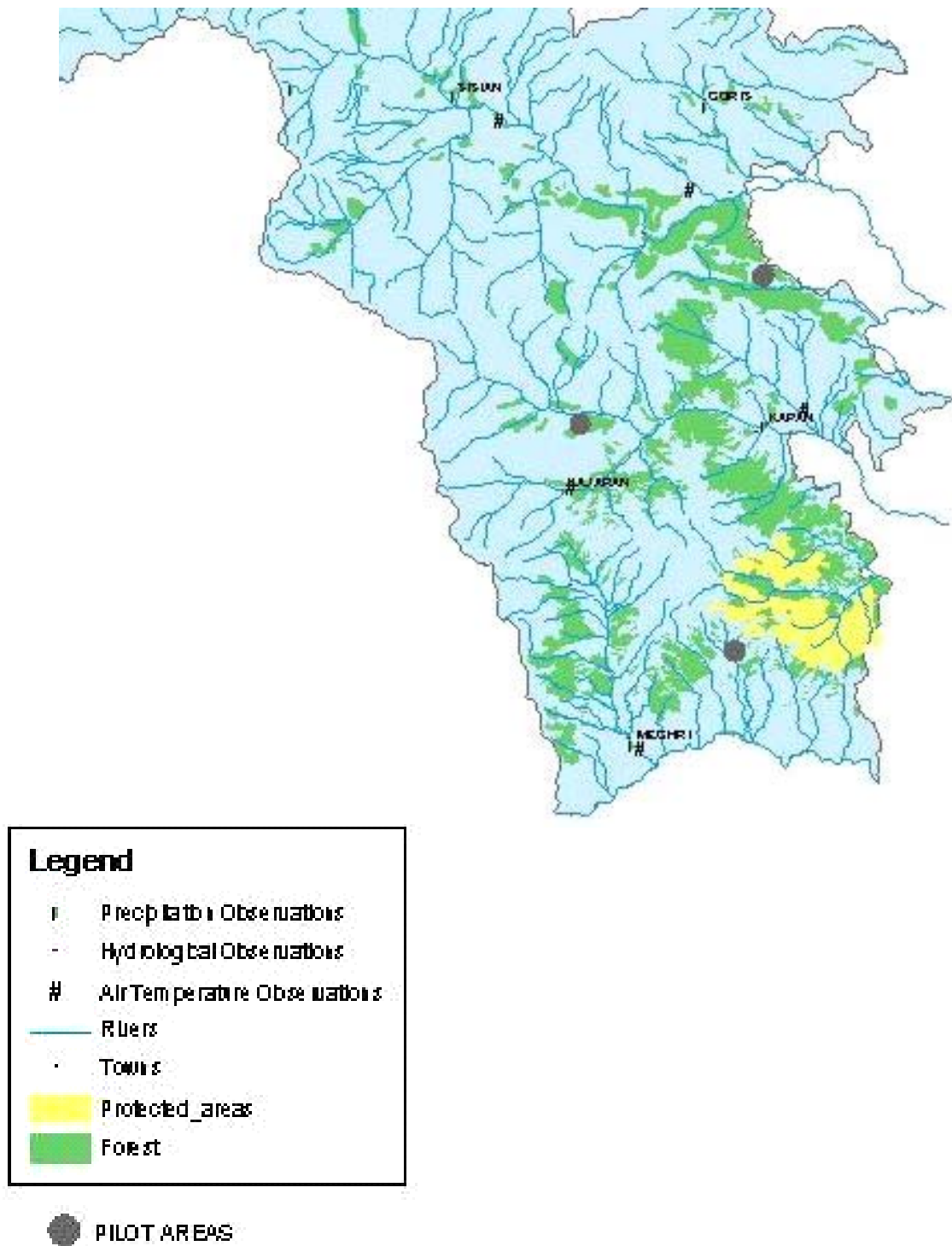
**Map 4: Selected target areas for piloting adaptation measures in the Syunik region**



**Legend**

- 1 Shurnukh Forest Area, Syunig (Goris) Forest Enterprise
- 2 Davit Bek Forest Area, Kapan Forest Enterprise
- 3 Shvanidzor Forest Area, Meghri Forest Enterprise
- 4 Shikahogh State Reserve

Map 5: Hydrometeorological observation points in the vicinity of pilot areas, Syunik Marz

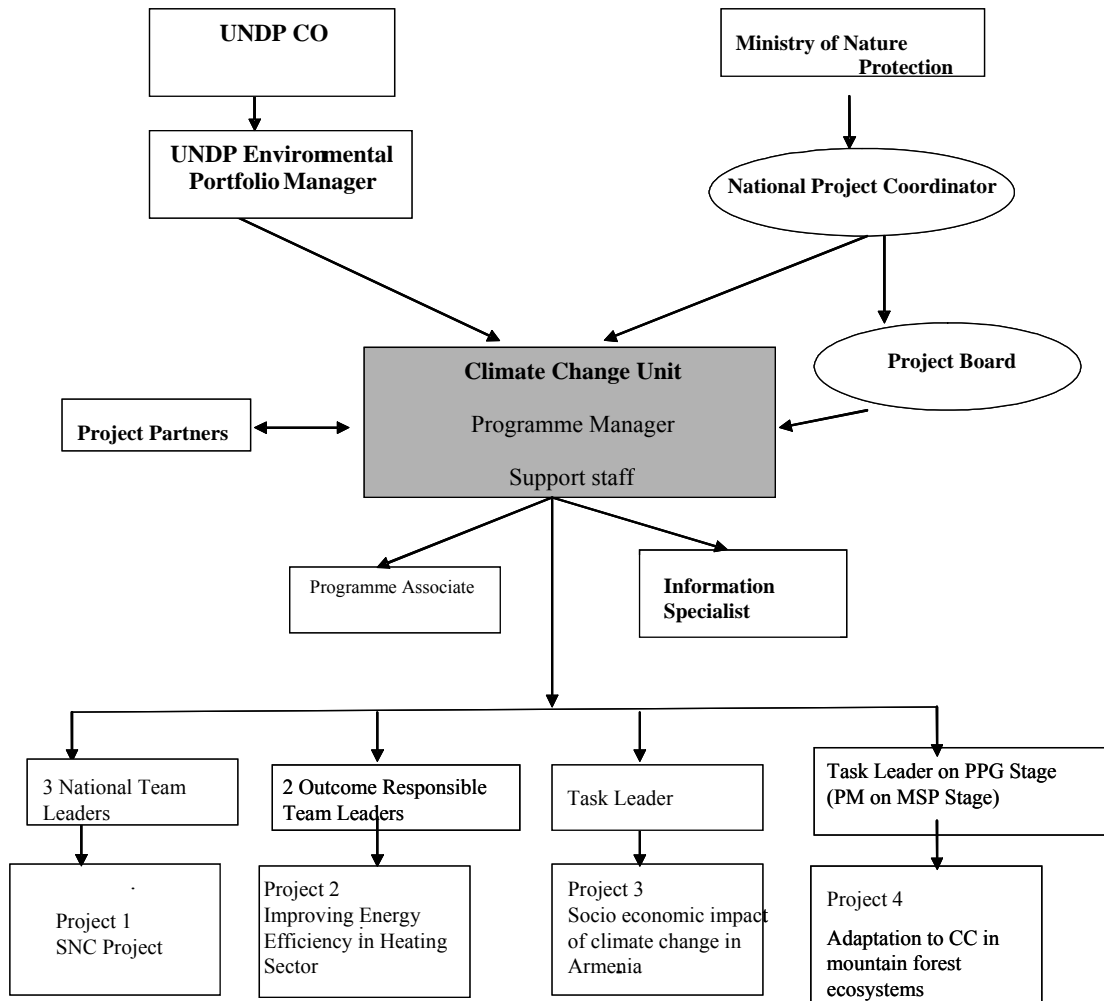


## ANNEX 5: INCREMENTAL COST MATRIX

Benefits and Costs	Baseline	Alternative	Increment
Global benefits	Habitats of globally threatened species in Syunik region's mountain forest ecosystems under threat from climate change, including variability	Management of forest ecosystems include consideration of threats to global biodiversity values from climate change	Capacity of globally significant ecological systems in the Syunik region to adapt to climate change is enhanced.
National and local benefits	Local communities relying on the natural resource base are adversely affected by impacts of climate change, including variability, on ecological systems	Local communities can mainstream adaptation responses into their economic activities relying on the natural resource base	Long-term economic and ecological sustainability for local communities
1. The enabling environment for integrating climate change risks into management of forest ecosystem is in place	Sustainable Management of Natural Resources in the South Caucasus: Institutional development, reform of legal framework, human capacity development, and enhanced public awareness to ensure that sustainable management is better integrated into public and private sectors and society.  4,600,000	The Alternative will include the following add-on measures to strengthen the policy and institutional basis for integrating climate risks in management of forest ecosystems  Forest and Protected Area Management plans reflect climate risks Institutional roles and responsibilities for a climate early warning and response system are clarified and mandated	GoRA (Hayantar SNCO)  615,000
	Sub total baseline  4,600,000	Sub total Alternative  5,434,100	GEF  219,100  Sub total Increment  834,100
2. Pilot projects demonstrating integration of climate risks into management of forest ecosystems are implemented, along with associated capacity development activities	Sustainable Development of Mountain Regions of the Caucasus: Local Agenda 21: Activities in Shvanidzor (Meghri sub-region, Syunik Marz) will help reduce for reduce human induced threats to forest ecosystems by diversifying incomes and reducing direct dependence on forest resources.  193,857	The Alternative will include the following measures to mainstream climate risks into management of forest ecosystems  Identification and implementation of specific adaptation response measures to address forest fires, pest outbreaks, and forest fragmentation exacerbated by climate change and variability	GoRA (Hayantar SNCO)  857,000
	Biodiversity Protection and Community Development: Implementing Ecoregional Conservation Plan Targets in Southern Armenia. Among other things, the project will strengthen Shikahogh State Reserve in order to effectively protect biodiversity, manage protected area in a sustainable manner, and integrate concerns of the local population  270,000	Community capacities to understand climate impacts developed; Capacities of local administrations, foresters, protected area management units, emergency management agencies to understand climate impacts and the need for response measures is enhanced	GEF  431,000

Benefits and Costs	Baseline	Alternative	Increment
	<p>2012 Protected Areas (Caucasus Ecoregion): activities in Armenia will also benefit SPANs in the Syunik region 172,250</p> <p>Projects under the CEPF and WWF to strengthen biodiversity conservation. This programme has various components aimed at promoting conservation and sustainable management of the critical forest ecosystems in the Caucasus region (including Armenia) through strengthening existing SPANs and establishing new ones. It also includes activities for increasing public participation in EIAs of infrastructure programs in the region, and alternative livelihoods for communities living near SPANs 842,000</p> <p>Syunik Forest Enterprises' expenditures on forest management: Forest management activities of the Syunik region's Forest Enterprises such as, preservation and protection of the forest fund, reforestation activities, ensuring sustainable use of forest resources, forest monitoring, stocktaking and accounting 3,000,000</p> <p>Sub total baseline 4,478,107</p>	<p>Sub total Alternative 5,766,107</p>	<p>Sub total Increment 1,288,000</p>
3. Capacities for adaptive management, monitoring and evaluation, learning, and replication of project lessons are developed	<p>Study of the present state of populations of amphibians and reptiles as a base for updating the Red Data List of Armenia and IUCN 18,000</p> <p>Sub total baseline 18,000</p>	<p>The Alternative will ensure appropriate M&amp;E and replication of the new targeted measures proposed by the project</p> <p>Sub total Alternative 458,900</p>	<p>GoRA (Hayantar SNCO) 286,000</p> <p>GEF 154,900</p> <p>Sub total Increment 440,900</p>
Project Management	0	237,000	<p>GoRA (Hayantar SNCO) 142,000</p> <p>GEF 95,000</p>
	TOTAL BASELINE 9,096,107	TOTAL ALTERNATIVE 11,896,107	TOTAL INCREMENT 2,800,000

**Structure of Climate Change Program Unit**



<sup>25</sup> Terms of reference for subcontracts will be developed during the inception phase of the project.

## **Job Description for National Project Coordinator**

### **Duties and Responsibilities**

170. The MONP has been designated by GORA to oversee the national execution (NEX) of the UNDP-supported project on its behalf.

171. The National Project Coordinator (NPC), appointed by the MONP, is a government representative, responsible for supporting implementation of the project. The NPC serves as the focal point on the part of MONP and as such ensures effective communication between the government and other relevant national stakeholders/actors and monitors the progress towards expected outputs and strategic results under the project.

172. Specifically, the NPC's major responsibilities, in close collaboration with UNDP CO and the MONP are:

- Undertake project advocacy at the policy level to ensure national commitment and contribution to the project objectives;
- Undertake policy level negotiations and other activities to facilitate effective and efficient project implementation and maximize its impact;
- Provide policy guidance to the PMU congruent with national policies, including for the selection of local consultancy, training and other specialist services;
- In consultation with the Ministry of Finance (MOF) and the Designated institution concerned, ensures that requisite financial allocations are contained in the national budget, in accordance with the cost-sharing budgets;
- Ensures that the project document revisions requiring Government's approval are processed in accordance with established procedures;
- Participate in the finalization and approve the Project Annual and Quarterly Work Plans and budget, in close discussion with the UNDP, to maximize the leverage of the project resources in order to achieve the desired overall state of development and immediate objectives set out in the project document; s/he may also approve individual payments on a day-to-day basis.
- Supervise and approve the project budget revision and NEX delivery report;
- Review jointly with the PMU success indicators and progress benchmarks against expected project outputs so that progress can be assessed, and review and clear Annual Project Progress and Terminal Reports;
- Conduct regular monitoring sessions with UNDP and the PMU, including Project Appraisal Committee (PAC) Meeting, Annual and Terminal Tripartite Review Meetings to measure progress made or achieved towards the project objectives, and comment on Project Review and Evaluation Reports;
- Report regularly to the Project Board on the project progress, in conjunction with the PMU staff;
- Assess on regular basis staff work performance in the PMU, including that of National Project Manager, Administrative & Finance Assistant and other staff;
- Establishes close linkages with other UNDP and UN supported as well as other donor or nationally funded projects/programmes in the same sector.

### **Job Description for National Project Manager**

173. The Project Manager will be responsible for achieving the outputs and, hence, objectives of the project, and ensuring the co-operation and support from the executing and implementing agent(s).

174. The PM will be responsible for managing the implementation of the project, which includes personnel, subcontracts, training, equipment, administrative support and financial reporting. The specific responsibilities of the PM will be to:

- Set up and manage the project office, including staff facilities and services, in accordance with the project work plan;
- Prepare and update project workplans, and submit these to the UNDP CO Energy and Environment Portfolio Manager for clearance and ensure their implementation consistent with the provisions of the project document.
- Ensure that all agreements with designated project implementing agencies are prepared, negotiated and signed.
- With respect to external project implementing agencies:
  - ensure that they mobilize and deliver the inputs in accordance with their implementation agreement and contract, and
  - provide overall supervision and/or coordination of their work to ensure the production of the corresponding project outputs.
- Act as a principal representative of the project during review meetings, evaluations and in discussions and, hence, be responsible for preparation of review and evaluation reports such as the Annual Project Report (APR) for the consideration of the Climate Change Programme Manager.
- Ensure the timely mobilization and utilization of project personnel, subcontracts, training and equipment inputs, whether these are procured by the Executing Agent itself or by other implementing agents:
  - identify potential candidates, national and international, for posts under the project;
  - in cooperation with international technical adviser elaborate the ToRs, in consultation with the implementing agent and subcontractors;
  - prepare training programmes (in consultation with the implementing agents) designed for staff, with particular emphasis on developing an overall training plan.
  - draw up specifications for the equipment required under the project; procure such equipment according to Government and UNDP rules and procedures governing such procurement.
- *Assume direct responsibility for managing the project budget ensuring that:*
  - project funds are made available when needed, and are disbursed properly;
  - accounting records and supporting documents are kept;
  - required financial reports are prepared;
  - financial operations are transparent and financial procedures/regulations for NEX projects are applied; and
  - the project is ready to stand up to audit at any time.
- Exercise overall technical and administrative oversight of the project, including supervision of national and international personnel assigned to the project.
- Report regularly to UNDP CO on project progress and problems, if any.
- Ensure timely preparation and submission of required reports, including technical, financial, and study tour/fellowship reports;
- Perform others coordinating tasks as appropriate for the successful implementation of the project in accordance with the project document
- Oversee the maintenance and update of the corresponding page of the project on the Climate Change Information Center web page ([www.nature-ic.am](http://www.nature-ic.am)).

### **Responsibilities on project completion and follow-up**

175. In order to ensure the efficient termination of project activities, the PM will:



- Prepare a draft Terminal Report for consideration at the Terminal Tripartite Review meeting (PB Meeting), and submits a copy of this report to the UNDP Resident Representative and designated Executing Agency's official for comments at least 8 weeks before the completion of the project;
- Make a final check of all equipment purchased under the project through a physical inventory, indicating the condition of each equipment item and its location; discusses and agrees with the UNDP and the implementing agent(s) the mode of disposition of such equipment and follow up on the exchange of letters among the UNDP, Government and implementing agent(s) on the agreed manner of disposition of project equipment; take action to implement the agreed disposition of equipment in consultation with the project parties.
- Ensure all terminal arrangements relating to project personnel are completed at the final closure of the project.

### **Accountability**

176. The PM will work under the general guidance of and report to the National Project Coordinator. The PM is accountable to UNDP for the manner in which he/she discharges the assigned functions.

177. The PM shall discharge his/her duties in line with the rules and procedures set forth in the UNDP User Guide on Programming for Results and other project management guidelines including, where applicable, the provisions of the agreements concluded with cost-sharing donors. The PM acts as the Certifying Officer. As such, he/she is responsible for the actions taken in the course of his/her official duties. The PM may be held personally responsible and financially liable for the consequences of actions taken in breach of the prevailing financial rules and regulations.

### **General qualifications**

Education: Advanced University Degree (preferable academic background)  
 Experience: At least 5 years work experience in the relevant area;  
 Demonstrated management experience and organizational capacity;  
 Previous experience/ familiarity with UNDP (or other donors) an asset.  
 Skills: Good analytical skill  
 Good interpersonal and communication skills  
 Good computer skill  
 Language: Fluent in English and Armenian

## **Job Description for Technical Task Leader**

### **Tasks and responsibilities:**

178. The Project Technical Task Leader (PTT) will work under the supervision of the MSP Project Manager and will provide crucial substantive technical, analytical and managerial support to the MSP Project Manager in the implementation process of the MSP project and report back to him/her accordingly. More specifically he/she will perform the following tasks:

- Provide technical backstopping and guidance to the MSP Project Manager and to the national team of experts in methods, approaches, tools, data etc needed for the implementation of the MSP components.
- Monitors, analyses and provides recommendations to the MSP Project Manager on the adequacy and content of the technical reports, project deliverables and on the status of the implementation of the relevant activities to be carried out for the achievement of the project outcomes/outputs.
- Provide substantive support to the MSP Project Manager in identifying and recruiting the motivated and competent staff, formulating their responsibilities as well as appraising their performance.
- Assist the Manager in formulating and developing cooperative activities with other climate change projects falling under the UNDP Climate Change Program.
- Provide substantive support in the development and monitoring of the MSP work plan as part of the Climate Change Program;
- Coordinates the development of networking and information system activities relevant to the MSP implementation and to the whole Climate Change Program work;
- Search for, collect, analyse and synthesize the necessary technical updated information on the different aspects and issues raised during the project implementation. Develop a database of the sources of the information relevant to the implementation of the MSP technical components;
- Liaise and cooperate with relevant local authorities and representatives of the programs/project under the implementation at local level (Syunik marz) and work to ensure the achievement of project objectives at local ground ;
- Liaise with similar project teams and assist the MSP Manager in developing cooperative activities with partners conducting similar activities on the project site, ensure sharing information, lessons learnt and good practices;
- Provides substantive technical support to the consultative process, workshops, and other meetings to be organized on different aspects relevant to the MSP implementation; prepares briefing notes, background papers; makes presentations; and guide the national experts in performing their assignment;
- Participates in the planning, review and preparation of the MSP budgets and prepares related documents;
- Participates and facilitates the development of follow-up or/and other adaptation projects on relevant issues as necessary.
- Performs other duties as required.

### **Qualifications required:**

- Advanced University Degree in environmental/forest management or other field relevant to the project. Biology /natural resources related background is highly desirable.
- Minimum of 5 years of working experience in project -based and mechanisms;
- Experience and good knowledge of the forest sector and its relations to CC and adaptation issues.
- Demonstrated ability in co-operating with stakeholders such as government officials, scientific institutions, NGOs, private sector and international financing institutions; Experience with UNDP-GEF project implementation and procedures is highly desirable;
- Strong management and interpersonal skills; and
- Good knowledge of the English language, with exceptional writing skills
- Good knowledge of computer software (Ms Word Excel, PowerPoint; web applications Access)
- Ability to review, prepare, present training material and make oral presentations, both in Armenian and English.

### **Job Description for Administrative and Finance Assistant**

179. The Administrative and Finance Assistant will work under the direct supervision of the National Project Manager and provide assistance to project implementation in the mobilization of inputs, the organization of training activities and financial management and reporting.

#### **Job content**

180. The Administrative and Finance Assistant will be responsible of the following duties:

- Prepare all payment requests, financial record-keeping and preparation of financial reports required in line with NEX financial rules and procedures
- Assistance to the recruitment and procurement processes, checking the conformity with UNDP and the Government rules and procedures
- Assistance to the organization of in-country training activities, ensuring logistical arrangements
- Preparation of internal and external travel arrangements for project personnel
- Maintenance of equipment ledgers and other data base for the project
- Routine translation/interpretation during projects meetings and drafting of correspondence as required
- Maintain project filing
- Other duties which may be required

#### **Qualifications**

Education: University Degree, some training in business and/or administration desirable (finance or accounting)

Experience: At least five years administrative experience

Skills: Good organizational skills  
Good computer skills, including spread-sheets and database

Languages: Fluent in Armenian and English

### **Project Board (PB)**

181. The Project Board will be charged with inter-institutional coordination, overseeing and advising Project on the execution of Project activities and will have decision-making power.

182. The project will be implemented under the overall coordination of PB, the latter together with the Implementing Agency (UNDP) is responsible for project progress and continuous monitoring to achieve the goals under the UN Framework Convention on Climate Change.

#### **The PB has the following duties:**

- Provide assistance and political support to the National Project Coordinator, National Project Manager and national experts and counterparts during the implementation process of all project activities;
- Oversee project progress and provide general consultation for project implementation policy ensuring the project's consistency with the other ongoing processes in the country;
- Promote the relevant data collection and ensure constant information exchange between stakeholders;
- Facilitate the communication between the project and respective sectors and promote the decision-making effectiveness;
- Received information from the NPC on the status of implementation of project activities, technical constraints, which may hinder project timely implementation and make recommendations;
- Review and make necessary comments for draft documents prepared by the project;
- Meet not less than once in a year. In special cases the PB shall meet upon the initiative of the NPC.

## ANNEX 7: RECORD OF CONSULTATIONS WITH STAKEHOLDERS

### PART I

### MINUTES OF THE MEETING

#### AFFORESTATION PROJECTS FUNDED BY GERMAN GOVERNMENT

“Energy Efficiency and Atmosphere Protection” UNDP / GEF AWP Office  
Ministry of Nature Protection, Yerevan, Armenia

April 2 and 4, 2008

#### Attendance:

Dr. Magnus Silven	- International Team Leader, WWF
Mr. Rolf Schulzke	- Senior Forest Officer, WWF
Dr. Karen Manvelyan	- WWF Armenia Director
Ms. Eleonora Grigoryan	- Adviser to the Minister of Nature of Nature Protection, WWF Focal Point in MONP
Dr. Aram Gabrielyan	- Head of Environmental Protection Department of the MNP, UNFCCC Focal Point
Dr. Diana Harutyunyan	- Programme (AWP) Manager, UNDO CO Armenia
Mr. Aram Ter-Zakaryan	- National Expert/Task Leader on Forest Adaptation to Climate Change, UNDP CO Armenia
Dr. Armen Nalbandyan	- National Expert on Forest Sector Adaptation Assessment, UNDP CO Armenia
Ms Marianna Arzangulyan	- Expert Team Assistant, UNDP CO Armenia

#### Agenda:

##### Projects’ Coverage Overlaps and Ways of Cooperation in Implementation

*Dr. Silven* presented WWF projects in the region and informed that the German Government allocates 600 million euros annually worldwide for projects. Starting from this year 20 million euros are allocated for projects in four countries: Armenia, Azerbaijan, Georgia and Turkey (North-East of); the first installment covers three years activities. He noted that by the end of April 2008 they would present the formulated idea/proposal of the project to German Government for funding and the full-fledged program development would start in May.

In Armenia, WWF is going to design projects in South and North forest regions. The former would aim at forest adaptive capacity as ecosystem and locates its activities in Syunik region (marz) where WWF has been undertaking conservation projects recently. The latter would base on the recent CDM project within TACIS framework and will be performed in Lori region (marz). This is an approach based inter alia on the recent meetings/discussions, including earlier meetings with Aram Gabrielyan and Diana Harutyunyan.

*Ms. Harutyunyan* presented the current activities on the “Mountain Forest Adaptation to Climate Change” MSP preparation in the framework of its PPG. She emphasized the restricted yet deliberately arranged timeline of the project. As GEF requires co-funding, WWF participation and their envisaged project in Syunik region can complement to the Mountain Forest Adaptation project of GEF/UNDP. It is also beneficial that the timelines largely coincided and it

can be considered as parallel funding. She proposed to continue consultations on site selection, identification of activities and synergizing efforts. She also noted that the project in Lori would need further elaboration on land eligibility (unlike the project in Syunik, where there are no ownership and eligibility issues), and relations with communities.

*Mr. Schulzke* presented his impression from the sites of visits, his experience in different methods of afforestation and forest preservation and discussed their applicability to the areas. He mentioned their earlier intention to start activities of the CDM-based project in Lori since activities in the South might need preparation. However now they agree that the project in South might start earlier taking into account the argumentation on land ownership and eligibility. He also shared his team's impressions of the visit to Margahovit nursery and recent field trip to mountain forests of Arajadzor, Shikahogh, Meghri and Shvanidzor. Thus far, the team visited fire-burnt forests, forests which need regeneration activities and limitation of grazing pressure. He mentioned dried springs in affected forest areas the team visited and stressed importance of water and forest management as being interconnected. He also mentioned that despite the forest degradation in South forest diversity is still rich that allows undertaking of efficient forest restoration activities.

*Mr. Gabrielyan* discussed various measures for selection of species for northern and southern mountain slopes as well as for ensuring biodiversity in the forest ecosystems.

*Mr. Nalbandyan* emphasized alarming situation in pest-affected forests, specifically in Kapan, Goris and Meghri in Syunik region. Replying to the requests, he addressed the current state of Armenian forests and presented his views on better targeting management efforts and preservation activities.

Parties expressed mutual interest in each other's plans and activities and agreed to perform joint activities in cases of both projects. Parties agreed to exchange letters of intent with regard to parallel financing of the Mountain Forest Adaptation project in Syunik region, as well as to further provide each other with the relevant information on their respective projects in order to plan future steps in agreed format.

Parties specifically stressed that WWF prefers to perform planting activities while GEF focuses mainly on technical assistance and capacity building; so the parties could arrange their activities complementary to each other and in this way achieve synergy in their performance.

Parties emphasized the problem of forest management and planning, and agreed on importance of following key aspects: (i) ecosystem (including species, geography, water, etc.), (ii) agricultural pressure reduction, and (iii) community involvement/development issues (social impact of the project).

Besides, *Dr. Silven* informed that WWF project in Shirak marz (Ashotsk and Amasia) on establishing Specially Protected Area would pertaining climate change impact study and research on application of renewable energy sources.

## PART II



# “Adaptation to Climate Change Impacts in Mountain Forest Ecosystems of Armenia” project proposal

UNDP/GEF/00048795



## BRIEF NOTES OF THE S E M I N A R

### Vulnerability of South-East Forests in Armenia and Adaptation to Climate Change Impacts in Mountain Forest Ecosystems of the Marz of Syunik

*Kapan, Syunik*  
*24-25 May 2008*

- OBJECTIVE:** Discuss findings and the proposed strategy under the preparation of the medium-sized project documents.
- NECESSITY:** Presenting preliminary results of GEF Medium-sized Project preparation activities to principal stakeholders (local actors) of the selected target area to include their responses into the final document to be submitted to the GEF
- PARTICIPANTS:** Representatives of national and local level stakeholder organizations participates in the seminar:

#### **Organizations:**

Ministry of Nature Protection of RA  
Ministry of Agriculture of RA  
Ministry of Emergency Situations of RA  
UNDP CO Armenia  
Agency of Bio-resources Management, MONP  
Syunik Regional (marz) Administration  
Syunik Regional Environmental Inspectorate, MONP  
“ArmStateHydroMet” SNCO, MOES  
“Hayantar” SNCO, MOA  
“Shikahogh State Reserve” SNCO, MONP  
Forest Enterprises (Sisian, Syunik (Goris), Kapan, and Meghri), MOA  
National Academy of Sciences of RA  
REC Caucasus Yerevan Branch Office  
Armenia Tree Project  
Public Environmental Information (Aarhus) Center in Kapan town, Syunik  
“Khustup” NGO

#### **AGENDA**

The first day of the seminar was devoted to two field visits: (i) degraded forest area in Shurnukh forest area of Syunik (Goris) forest enterprise (a treeless areas surrounded by fifth growth-class natural oak-wood, 15 ha for a pilot project selected), and (ii) burned forest area in Davit Bek forest area of the Kapan forest enterprise (juniper forest burned in 2006, 20 ha (of total 90 ha) selected for a pilot project).

The second day of the seminar was devoted to discussion of the project findings and strategy. The participants were provided with additional information through presentations on GEF approaches

within UNFCCC and support to adaptation, Climate Change and its consequences for forest vulnerability and adaptation issues, substantiation of strategy and activities proposed within the drafted MSP proposal. They further discussed the visited areas in terms of MSP strategy discussion and possible adaptations measures from standpoints of the project's main beneficiaries: forestry enterprises of "HayAntar" SNCO in Syunik marz, communities of the marz and NGO representatives.

Additional clarifications were required on UNFCCC framework implications, choice of scenarios, stakeholder cooperation issues, use of statistical data for presentations, target area selection, biodiversity issues coverage.

## **RESULTS**

Climate Change impact on the areas selected as targets for the pilot project implementation was confirmed by a number of diverse evidences including springs drying out in the hottest months, precipitation decrease in the spring season, decrease in the depth of snow cover, and in the flow of surface waters.

Following the project team presentations, the participant stakeholder representatives expressed willingness to support the project activities to the highest extent possible; they also agreed with institutional framework of the project implementation.

Concerning reforestation activities implementation in treeless areas, necessity of wild fruit tree species planting was stressed since some of them fell under purposeful cutting in the recent years. In this regard, participants mentioned availability of an extensive range of endemic and aborigine plant species grown in a number of reservations of Syunik region (marz).

In the selected target areas, the grass is not mowed for a number of years as well as is not used as pasture due to livestock reduction. As a result, surfaces of dry grass originate that catches fire easily. To avoid that, stakeholders proposed to mow the grass before it dries out with at least two meter width along both sides of the region's (marz's) roads.

Juniper woods reforestation necessity was emphasized as this specie performs land formation and land protection as well as water protection and water regulation functions. In this connection, as well as for joint funding of the project, participants referred to mining and processing plant of Kajaran. The plant is currently building a dam on river Geghi and is experienced in environmental activities implementation. Junipers grow on mountain slopes down to river Geghi and are important for both water flow regulation of the dam and soil protection on the slopes.

For Specially Protected Areas of Nature (SPAN) as zones of prohibited immediate interference, participants emphasized importance of fire-prevention activities, in the first place, of quick response system improvement, particularly, formation of mobile fire-fighter groups.

**SIGNATURE PAGE**

**Country:** Armenia

**UNDAF Outcome 4:** Promote environmentally sound technologies and effective management of natural resources in accordance with the MDGs and PRSP

**Expected CP Outcome 4.6:** Bio-diverse resources are managed and conserved effectively

**Expected CP Outputs:** Legislative and regulatory frameworks for managing specially protected areas are adopted.  
The Cartagena Protocol and legislation for bio-safety management are adopted.  
Indicators and mechanisms for monitoring areas with biodiversity are developed.  
Guidelines for managing forests and standards on sanitary cutting and reforestation are developed.  
Initiatives for in-situ conservation of genetic plant resources and wild relatives of domestic species are implemented.  
Initiatives for sustainable use of medicinal herbs by rural communities are implemented.

**Executing Agency:**

ARM-MNP

**Implementing Agency:**

UNDP

Programme Period: CPD 2005-2009, CPD 2010-2014  
Programme Component: Promoting energy efficiency and environmental sustainability  
Project Title: PIMS 3814: Adaptation to CC Impacts in Mountain Forest Ecosystems of Armenia  
Project ID: 00063634  
Project Duration: 2008 - 2012  
Management Arrangement: NEX

**Total budget:** **US\$ 2,800,000**  
**Allocated resources:**  
• GEF US\$ 900,000  
• Government US\$ 1,900,000

**Agreed by (Government - Executing Agency):**

**Aram Harutyunyan**  
**Minister of Nature Protection**  
**Republic of Armenia**



signature

date

11.12.08

**Agreed by (UNDP - Implementing Agency):**

**Consuelo Vidal**  
**Resident Representative**  
**UNDP Armenia**

signature

date

11.12.08