STRATEGY AND ACTION PLAN

for Sustainable Land Management
in the High Pamir and Pamir-Alai Mountains

Bishkek and Dushanbe, 2011

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Foreword

The United Nations Millennium Declaration has challenged countries, including Kyrgyzstan, to transition to a sustainable form of development that can ensure a balance between socio-economic advancement and environmental conservation.

Having supported the adoption of this provision of the Declaration, Kyrgyzstan, like the other Central Asian countries, has launched a range of initiatives addressing issues of land use and of biological diversity in order to improve the livelihoods of rural communities. These initiatives include the development of national action plans, the conclusion of international treaties and agreements, and the implementation of a number of projects.

Much still remains to be done, however, in order to ensure more sustainable use of natural resources and improve people's lives – particularly the lives of people living in mountainous areas. A possible avenue for meeting this challenge is to enhance cooperation and integration at the regional level.

One such transboundary initiative was the development of the present Strategy and Action Plan for Sustainable Land Management in the High Pamir and Pamir-Alai Mountains, an endeavour undertaken as part of a GEF/UNEP/UNU project on "Sustainable Land Management in the High Pamir and Pamir-Alai Mountains – Integrated and Transboundary Initiative in Central Asia".

The present Strategy and Action Plan sets priorities for the development of the Pamir and Pamir-Alai region. It outlines concrete measures to improve the legal framework and to strengthen the region's economic, informational, and educational potentials. It also proposes concrete steps for the further development of international cooperation between the two Central Asian countries of Kyrgyzstan and Tajikistan.

The Strategy was developed on the basis of multi-level, multi-stakeholder negotiations among representatives of governmental, non-governmental, and international organisations, the scientific community, and local self-government bodies. For this reason, we expect significant progress in joint activities for sustainable land management at the local, national, and regional levels.

I sincerely hope that this Strategy will become yet another step towards closer regional cooperation in the fields of biodiversity and the sustainable development of agriculture and livestock farming in the High Pamir and Pamir-Alai mountains.

Director
State Agency on Environment Protection and Forestry
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The United Nations Resolution on the International Year of Mountains (2002) established provisions to protect mountain ecosystems, eradicate poverty, and ensure food security in mountain regions.

The present Strategy for Sustainable Land Management in the High Pamir and Pamir-Alai Mountains addresses problems related to land use systems and the degradation of land resources, with the aim of decreasing the vulnerability of fragile mountain ecosystems and, consequently, reducing poverty among the local populations. The Strategy has great practical significance, as it determines the direction of sustainable development of the High Pamir and Pamir-Alai mountains in the medium to long term.

The Strategy is based on such key interrelated dimensions as ecology, economy, and society. These three dimensions form the basis of sustainable development and ensure the necessary balance between protecting the environment and addressing socio-economic concerns, including the livelihoods of mountain people.

The Government of Tajikistan has adopted and is implementing several important strategic documents: the National Development Strategy of the Republic of Tajikistan for the Period to 2015, the Poverty Reduction Strategy for 2010-2012, the Concept of Environment Protection of the Republic of Tajikistan (2008), and the Concept of Transition to Sustainable Development of the Republic of Tajikistan by 2030. All of these documents are designed to improve the population's welfare and the state of the environment.

Three important aspects are worth mentioning with regard to these documents.

1) The Concept of Environment Protection calls on civil society and business organisations as the Government's main partners in implementing its policy on environment protection.

2) Both in the National Development Strategy and in the Poverty Reduction Strategy, environmental conservation appears as a transversal issue in nearly all socio-economic considerations.

3) One of the main concerns in implementing all of the above-mentioned documents is to find solutions to socio-economic and ecological problems facing mountain regions.

This Strategy foresees that governmental and non-governmental organisations, local communities, and international donor organisations work together to meet the mentioned challenges.

The above shows that the strategic documents as well as the main components of the present Strategy adhere to the basic principles of sustainable development. In particular, they ensure the necessary balance between environmental protection and socio-economic advancement, as well as the broad involvement and participation of civil society organisations and local communities in developing this Strategy.

Implementation of the present Strategy will help to address the challenges outlined in the Government's strategic documents with regard to the development of mountain regions. And it will provide a basis for supporting the sustainability of the productive functions in the transboundary ecosystems of the High Pamir and Pamir-Alai mountains.

Chair
Committee on Environment Protection
Under the Government of the Republic of Tajikistan
T. O. Salimov

Abbreviations

ARIS	Community Development and Investment Agency
CACILM	Central Asian Countries Initiative for Land Management
CAIAG	Central-Asian Institute of Applied Geosciences, Kyrgyzstan
CDE	Centre for Development and Environment, University of Bern, Switzerland
CIS	Commonwealth of Independent States
CSTO	Collective Security Treaty Organization
EAEC	Eurasian Economic Community
FAO	Food and Agriculture Organization
GBAO	Gorno Badakhshan Autonomous Oblast
GDP	Gross Domestic Product
GEF	Global Environment Facility
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
KR	Kyrgyz Republic
LTF	Legal Task Force (PALM Component 1.2)
NAS KR	National Academy of Sciences of the Kyrgyz Republic
NAS RT	National Academy of Sciences of the Republic of Tajikistan
NGO	Non-governmental organisation
PALM	GEF/UNEP/UNU project "Sustainable Land Management in the High Pamir and Pamir-Alai Mountains – Integrated and Transboundary Initiative in Central Asia"
PATSAP	Pamir-Alai Transboundary Strategy and Action Plan (PALM Component 1.1)
RNRMGF	Regional Natural Resources Governance Framework
RT	Republic of Tajikistan
SCO	Shanghai Cooperation Organisation
SLM	Sustainable land management
SPNA	Specially protected natural area
UNDP	United Nations Development Programme
UNE	Australian Centre for Agriculture and Law, University of New England (UNE), Australia
UNEP	United Nations Environment Programme
UNU	United Nations University
USD	United States Dollar (currency of the USA)

Local terminology

Som (KGS)	Currency of the Kyrgyz Republic
Somoni (TJS)	Currency of the Republic of Tajikistan
Oblast	First-level administrative division in the Kyrgyz Republic and the Republic of Tajikistan (an oblast is divided into rayons)
Rayon	Second-level administrative division in the Kyrgyz Republic and the Republic of Tajikistan (rayons are divided into aiyl okmotu in the Kyrgyz Republic and jamoats in the Republic of Tajikistan)
Ayil okrug	Third-level administrative division in the Kyrgyz Republic (includes several villages)
Ayil okmotu	Local authority
Jamoat	Third-level administrative division in the Republic of Tajikistan (includes several villages)
Leskhoz	Regional forestry administration
Kyrgyzgiprozem	Kyrgyz State Planning Institute for Land Management
Tojikzaminsoz	Tajik State Institute of Land Planning

Summary

This Strategy and Action Plan was written within the framework of the project on Sustainable Land Management in the High Pamir and Pamir-Alai Mountains (PALM). PALM is an integrated transboundary initiative of the governments of the Kyrgyz Republic and the Republic of Tajikistan. It aims to address the interlinked problems of land degradation and poverty within a region that is one of Central Asia's crucial sources of freshwater and a location of biodiversity hotspots.

The project is executed by the Committee on Environment Protection in Tajikistan and the National Center for Mountain Regions Development in Kyrgyzstan, with financial support from the Global Environment Facility (GEF) and other donors. The United Nations Environment Programme (UNEP) is the GEF Implementing Agency for the project, and the United Nations University (UNU) is the International Executing Agency.

This Strategy and Action Plan integrates the work of three main teams of experts, namely the Pamir-Alai Transboundary Strategy and Action Plan (PATSAP) team, the Legal Task Forces, and a team of Natural Disaster Risk specialists. The PATSAP team was coordinated by the Centre for Development and Environment (CDE), University of Bern, Switzerland. The Legal Task Force was led by the Australian Centre for Agriculture and Law of the University of New England (UNE), and responsibility for the Natural Disaster Risk assessment was with the Central-Asian Institute of Applied Geosciences (CAIAG) in Bishkek, Kyrgyzstan.

The development of the strategy took place from June 2009 to October 2010. The activities included field study tours for updating the information base with first-hand information from the local level, coordination meetings with actors from the region, and two multi-level stakeholder forums conducted in Khorog and Osh to identify priorities and to collect ideas for concrete action plans. The baseline information collected for the Strategy and Action Plan has been compiled by the experts and made available as reports[1]. A joint multi-level stakeholder forum was conducted in Jirgitol, Tajikistan, for in-depth discussion of the transboundary aspects. In August 2010, the draft Strategy and Action Plan was distributed among local, national, and international actors for consultation, and their comments were discussed at feedback forums in Khorog and Bishkek.

This Strategy and Action Plan is intended as a recommendation. Nevertheless, it proposes concrete mechanisms for implementing the proposed sustainable land management (SLM) activities: The Regional Natural Resources Governance Framework provides the legal and policy concepts, principles, and regulatory requirements needed to create an enabling environment for SLM in the High Pamir and Pamir-Alai region at the transboundary, national, and local levels. The priority directions outlined provide a framework for the elaboration of rayon-level strategies and for strategies on specific topics (forestry, livestock, etc.), as well as for further development of government programmes and international projects. The action plans may serve as a pool of concrete ideas, which can be taken up by different institutions and in smaller or larger projects. Finally, this document provides a basis for the elaboration and signing of targeted cooperation agreements on land use and management between the leaders of Osh oblast (Kyrgyz Republic), Gorno Badakhshan Autonomous Oblast, and Jirgitol rayon (Republic of Tajikistan).

[1] http://www.ehs.unu.edu/palm/article/read/expert-reports

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PROJECT TEAM

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PART 1. Introduction

(PHOTO: YVO WEIDMANN)

1 Rationale and overall goal

Changing forms of land management along with socio-economic and ecological changes in the years after independence have encouraged Central Asian countries to seek their own path towards sustainable development. In governmental institutions and NGOs in Kyrgyzstan and Tajikistan there is a growing understanding that economic development and efforts towards poverty alleviation must be linked with a basic vision of the natural resource management system. A major reasons for this is the recognition of the fact that land and water resources constitute the livelihood base of rural communities and the food source of urban dwellers, yet they are increasingly under pressure from growing and largely poor populations. In addition, household economies and agricultural uses of land and water resources are characterised by high costs and inefficiency. Such use of natural resources reduces the goods and services they provide to human populations, exacerbates existing ecological problems and leads to the emergence of new ones. Those problems are particularly vital in the remote, high mountain Pamir and Alai ranges situated in the north-eastern and southernmost parts of Tajikistan and Kyrgyzstan.

What are the most pressing problems in the High Pamir and Pamir-Alai mountains? Major problems include inefficient use of water resources, land degradation, and loss of biodiversity. Flora and fauna are being destroyed in the High Pamir and Pamir-Alai region. Negative anthropogenic impacts include uncontrolled and excessive harvesting of medicinal herbs, as well as active human pressure on forest ecosystems through cutting of trees and shrubs and even orchards in order to meet the population's energy needs. During the Soviet period the threat to biodiversity conservation was less acute; over the last 20 years, however, natural resources have reached an alarming state due to overexploitation. This harsh treatment of natural resources by mountain dwellers is linked with the difficult living conditions and poverty prevailing in mountainous areas.

The level of poverty is high throughout all mountain regions of Kyrgyzstan and Tajikistan, but in the Pamirs and the Pamir-Alai it is even higher. Industrial and agricultural production in the region is characterised by low competitiveness and is not attractive enough for investments. The economy that has developed in the region, especially in GBAO, primarily follows a strategy of reproduction ("survival strategy") rather than one of development; subsistence farming is predominant. Based on livestock farming and related secondary production, and depending on non-optimal use of pastures and agricultural resources, economic activity in the region has a negative impact on ecosystem services.

Many of the problems are directly linked to climate change: Throughout the 20th Century, change (warming) of the climate caused more than 1000 small and medium-sized glaciers in the mountains of Central Asia to melt and disappear, thereby diminishing the region's main source of drinking water and water for irrigation. This loss of strategic sources of freshwater makes the threat of food and ecological insecurity real also in the High Pamir and the Pamir-Alai. It is obvious that climate change dims the outlook for farming, as well. Soil erosion and decline of land productivity in the mountains of Kyrgyzstan and Tajikistan have already reached a critical level today. Moreover, biological resources continue to be depleted in these mountain ecosystems, which are especially sensitive to natural and anthropogenic impacts.

Why is sustainable development of the High Pamir and Pamir-Alai mountains important? The importance of the High Pamir and Pamir-Alai mountains for the wider region of Central Asia lies in their function as water towers. Irrigated agriculture not only in Kyrgyzstan and Tajikistan, but in the entire Central Asian region depends to a large extent on water resources from the High Pamir and Pamir-Alai mountains and the water regulating functions of the mountain ecosystems. Moreover, the uniqueness of flora and fauna as well as cultures and traditions are an important heritage for the entire region and the carbon stored in mountain forests and the extensive mountain pastures plays an important role in global carbon cycle. Generally, mountain environments are essential in ensuring the survival of the global ecosystem.[2] Syndromes of global change, such as climate change and socio-economic changes, manifest themselves early and distinctly in mountain areas. Finally, mountain development is crucial to achieving the Millennium Development Goals, as poverty is high in mountain regions and the challenges in development are extraordinary.[3]

Why transboundary? The adjacent Pamir and Alai mountain ranges have been traditionally used by local inhabitants as an integrated geographic unit. Currently, the 270-km long political border that separates them constrains the movement of goods, services, livestock and people across the mountain ranges as well as the collection and exchange of information on migrating wildlife species all of which are essential for the efficient and sustainable use and management of the region's resources. The Strategy and Action Plan defines specific areas that require transboundary collaboration to improve natural resource management in the area. These include (1) monitoring and study of biodiversity in the region and especially migration processes across borders, and protection of the region's biodiversity against the main threats of poaching, illegal hunting, and tourism; (2) regulation of pasture use; (3) improvement of the legal framework and legal acts on transboundary relations (border checkpoints, customs, and veterinary services), (4) development of transboundary economic relations; and (5) development of different types of tourism across the region. Further steps on those transboundary issues would depend on the extent to which the solution of the concrete problems addressed will benefit Kyrgyzstan and Tajikistan alike. Thus, they should not be seen as goals in themselves but rather as a part of a broader set of actions that need to take place at the local and national levels in Kyrgyzstan and Tajikistan in order to ensure the sustainable development of the Pamir-Alai region. As such, they are integrated in the relevant action plans for the management of the region's resources which are the basic instruments for achievement of the common overarching goal driving the development of the strategy.

[2] Chapter 13, Agenda 21, Division for Sustainable Development, UN Department of Economic and Social Affairs

[3] Wymann et al. 2006. Will International Pursuit of the Millennium Development Goals Alleviate Poverty in Mountains? Mountain Research and Development, Vol 26 No 1 Feb 2006: 4–8.

What is the overall goal? The overall goal of this Strategy is to provide a roadmap to restore, sustain, and enhance the productive and protective functions of the transboundary ecosystems of the High Pamir and Pamir-Alai mountains of Tajikistan and Kyrgyzstan, so as to improve the social and economic well-being of the rural communities and households utilising the region's ecosystem resources to meet their livelihood needs, while preserving its unique landscape and globally important biodiversity.

This requires finding a balance between natural and managed ecosystems as well as between development and conservation of the area. The Strategy takes into account two ways of achieving this balance: through better management of natural resources, on the one hand, and by taking away pressure from these resources, on the other hand. Natural disaster risk is high in this mountainous environment and may affect development in the region critically. Natural disaster risk management has, therefore, been integrated into the Strategy and Action Plan.

What can be expected from this Strategy and Action Plan? Close collaboration between ecosystem and land use specialists, social scientists, and legal experts has made it possible to develop a comprehensive picture of the current state of the region's ecosystems, socio-economics, and legal and policy frameworks. Furthermore, the document at hand has been thoroughly discussed with interested actors at the regional, national, rayon, and local levels. Finally, a particular strength of this Strategy and Action Plan is the integration of a detailed legal, institutional, and policy analysis (PART VI).

This Strategy gives an overview of problems and potentials, and indicates the general direction for future development. Illustrations highlight especially interesting aspects or provide insights into detailed case studies, all of which are presented more comprehensively in the PATSAP expert baseline reports. Four "action plans" were elaborated for the following priority directions: (1) Biodiversity and Forest Management, (2) Increasing the Efficiency of Farming, (3) Use of Mountain Pastures and Increasing the Productivity of Livestock Farming, and (4) Reducing Risks of, and Vulnerability to, Natural Hazards. These action plans are based mainly on working group discussions conducted during the various multi-level stakeholder forums, and thus provide a comprehensive list of actions needed across the different administrative levels. The action plans anticipate participation of governmental and non-governmental structures, local communities, and international donor organisations in addressing poverty, land degradation, loss of biological diversity, renewable energy production, and sustainable management of other natural resources. Three implementation phases were distinguished from short-term (up to 2 years), to mid-term (up to 5 years) to long-term (up to 10 years).

2 Geographic area

The High Pamir and Pamir-Alai mountains, as defined by the PALM project, included four distinct regions: the Kyrgyz and the Tajik Alai, the Eastern Pamirs, and the Western Pamirs, each characterised by different environmental and socio-economic conditions. This transboundary area was defined by administrative units. In Kyrgyzstan it includes the Alai, Chon-Alai and Kara-Kulja rayons, belonging to Osh oblast. In Tajikistan, it includes all of Gorno Badakhshan Autonomous Oblast (GBAO) with its seven rayons (Darwaz, Vanj, Rushan, Shugnan, Roshtkala, Ishkashim, Murghab, and Khorog) as well as the Jirgitol rayon, which belongs to the Region of Republican Subordination. The map below shows the two countries of Kyrgyzstan and Tajikistan, with the High Pamir and Pamir-Alai region, national and rayon boundaries.

(Map: CDE, University of Bern, Switzerland)

3 Approaches and methods

This Strategy and Action Plan adheres to the key components of sustainable development – ecology, economy and society – and aims to provide a roadmap for balanced development of the Pamir-Alai region through environmental conservation and socio-economic improvements of the life of mountain populations. This understanding of sustainable development complies with the Rio Declaration on Environment and Development (1992) and specifically its principles 1 and 3 guaranteeing the right to development, but requesting that it be fulfilled so as to equitably meet developmental and environmental needs of present and future generations. The Strategy also corresponds to Chapter 13 on "Managing Fragile Ecosystems: Sustainable Mountain Development", of the Agenda 21 that was adopted at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in 1992, as well as the UN Resolution of the International Year of Mountains (2002)[4] and the Bishkek Mountain Platform (2002)[5], all of which formulate the obligation to protect the planet's mountain ecosystems, alleviate poverty, and ensure food security in mountain regions.

Finally, this Strategy and Action Plan also considers the important role that mountain regions play in providing indications for climate change, as well as the fact that sustainable mountain development is a key component in achieving the Millennium Development Goals[6] as stated in the latest UN resolution on Sustainable Mountain Development (2008)[7].

3.1. FORMULATION OF THE TRANSBOUNDARY STRATEGY AND ACTION PLAN

Formulation of the Strategy and Action Plan was conducted following the approach and methods described in the guidelines for Sustainable Development Appraisal (2003 and 2009)[8] developed by the Centre for Development and Environment of the University of Bern, Switzerland. It included preparatory work, an in-depth regional study, a transdisciplinary synthesis, and the integration of different perspectives through promotion of a negotiation process.

Baseline information was obtained from secondary sources and an in-depth regional study aimed at verifying, up-dating and complementing the secondary data was carried out through field assessments covering the Alai, Chon-Alai and Kara-Kulja rayons of Osh oblast, as well as almost all rayons of Gorno-Badakhshan Autonomous Oblast and the rayon of Jirgitol. The project area was assessed using a wide range of complementary cartographic, geobotanical, economic, and sociological methods (survey, interviews, focus groups), which were combined in order to obtain more meaningful results. In addition, an analysis was carried out of all available publications and reports of other international organisations relating to the ecosystems and natural resources of the High Pamir and Pamir-Alai mountains. Own data obtained within the frameworks of other programmes and research on sustainable development of mountain regions were used, as well. Statistical information on agriculture, livestock farming, pastures, and the socio-economic situation in each rayon for the past years and over the period of the past five years was collected and analysed.[9]

The aim was to conduct an intersectoral, decentralised strategic process linked to ongoing strategic planning of government institutions and, at the same time, to draw also on non-governmental expertise and capacities. The approach taken was, therefore, characterised by participatory procedures. Stakeholders representing the High Pamir and Pamir-Alai region were invited to participate in various two-day forums, where visions for sustainable land management, detailed development objectives, and specific actions were elaborated jointly with the project experts. This included national forums in Khorog and in Osh, and a regional forum in Jirgitol, Tajikistan. Moreover, partners from the region were involved in a consultation process based on drafts of the Strategy and Action Plan. Feedback forums in Khorog (for the Pamirs) and in Bishkek (for the Alai) allowed for negotiations among actors from various levels and integration of missing points into the Strategy and Action Plan.

3.2. METHODOLOGICAL RESEARCH GUIDELINES FOR ASSESSING THE LEGAL AND REGULATORY FRAMEWORK FOR SLM

Alongside with the strategy development team, Legal Task Forces in Kyrgyzstan and Tajikistan undertook an in-depth analysis of the legal, policy, and institutional basis for SLM in the region. Specifically, the aim of the PALM project's Legal Task Forces (LTFs) was to develop a legal and policy framework that outlines conceptual approaches, principles, and regulatory requirements to create an enabling environment for SLM in the High Pamir and Pamir-Alai region at the transboundary, national, and local levels.[10] To prepare this framework, which is presented as the Regional Natural Resources Governance Framework (RNRMGF), the LTFs of the Kyrgyz Republic and the Republic of Tajikistan used the Methodological Research Guidelines (MRG)[11] prepared by the University of New England to analyse a number of selected laws and policies from each country. The MRG comprise a series of sequential modules to identify:

[4] Resolution adopted by the United Nations General Assembly on 30 January 2003: International Year of Mountains, 2002 (A/RES/57/245).

[5] Bishkek Global Mountain Summit. 2002. The Bishkek Mountain Platform. Final Declaration adopted at the Bishkek Global Mountain Summit, Bishkek, 28 October - 1 November 2002. United Nations Environment Programme. http://www.mtnforum.org/rs/oi/counter_docdown.cfm?fID=423.pdf

[6] United Nations eight Millennium Development Goals: http://www.un.org/millenniumgoals/

[7] Resolution adopted by the United Nations General Assembly on 22 February 2008: Sustainable mountain development (A/RES/62/196).

[8] Giger et al. 2003. Strategic analysis of regional development and environmental issues - Adaptation of the SDA (Sustainable Development Appraisal) methodology and tools for training workshops. Centre for Development and Environment, University of Bern, Switzerland. http://www.cde.unibe.ch/CDE/PubMed_Detail2_Cd.asp?ID=563

[9] The reports put together by the experts from Tajikistan and Kyrgyzstan are available on the following website: http://palm.unu.edu

[10] United Nations Environment Programme Global Environment Facility (GEF) Grant Request, Draft Full Project Brief (2006); Inception Report, June 2008, GEF/UNEP/UNU, Sustainable Land Management (SLM) in High Pamir and Pamir-Alai Mountains (PALM), An Integrated and Transboundary Initiative in Central Asia, Phase I: Strengthening of the Enabling Environment for SLM.

[11] University of New England (2009). Methodological Research Guidelines for Legal Task Forces, for Analysing the Capacity of Legal, Policy and Institutional Aspects of Sustainable Land Management in the High Pamir and Pamir-Alai Mountain Environment, GEF/UNEP/UNU Sustainable Land Management in the High Pamir and Pamir-Alai Mountains.

1) the main SLM issues affecting the mountain environment,
2) the main institutions with a responsibility in environmental protection and SLM, and
3) the relevant environmental laws at the national and international levels.

Moreover, they comprise a procedure to determine the capacity of environmental laws to achieve SLM based on 17 key essential elements, and a procedure to determine transboundary issues.

The analytical assessment carried out by the LTFs took account of information obtained during field studies implemented jointly with the strategy development experts. The gaps, strengths, and weaknesses in the relevant local, national, regional, and international legislation and policies for SLM, as well as the conclusions from the analysis, were verified in the course of the strategy development stakeholder consultation forums. The results of the analysis reveal targeted needs for capacity-building and reform in the region. The employed methodology also allowed the LTFs to highlight relationships and interdependencies between the international, regional, national, and local levels of environmental law and policy applicable in each of the two countries.

4 Action Plans

The action plans are based on working group discussions conducted during the various multi-level stakeholder forums, and thus provide a comprehensive list of actions needed across the different administrative levels. Furthermore, during the development of the action plans, best practices from the region and information from previous projects, such as the Pamir-Alai Transboundary Conservation Area (PATCA), were taken into account. The four action plans address the following topics and can be found as annexes to the document at hand:

Annex 1. Action Plan for Biodiversity and Forest Management
Annex 2. Action Plan for Increasing the Efficiency of Farming
Annex 3. Action Plan for Use of Mountain Pastures and Increasing the Productivity of Livestock Farming
Annex 4. Action Plan for Reducing Risks of, and Vulnerability to, Natural Hazards

While each of the action plans addresses a specific topic, all of them point out actions required in different sectors (research, education, economy, etc.). All action plans are structured in the same way and cover the different sectors in the following sequence:

- Data collection, analysis, and monitoring
- Improvement of the legal framework
- Strengthening of natural resource management infrastructure and technological support
- Strengthening of economic potential
- Strengthening of informational and educational potential
- International and transboundary cooperation

For each action the implementation phase was determined, expected outputs and outcomes were formulated, and the relevant administrative level or levels were identified. Three implementation phases were distinguished: short-term, mid-term, and long-term. A short-term phase of up to 2 years is typical for preparatory research or pilot projects. A mid-term phase of up to 5 years is needed for implementing larger projects that include various components and are aimed at upscaling. A long-term phase of up to 10 years is typically indicated for ideas or long-term visions of actions that require a considerable preparation phase and a step-by-step implementation. The administrative levels of implementation distinguished were the international, the national, the regional, and the local. At the international level, joint actions (e.g. agreements) between the Kyrgyz Republic and the Republic of Tajikistan are required, whereas at the national level, each country can tackle the relevant issues individually. Actions at the regional level focus on joint activities between at least two administrative units, such as an oblast and a rayon or two rayons, and will often be of a transboundary character. Actions at the local level are seen mainly as the responsibility of communes or municipalities.

5 Additional outputs

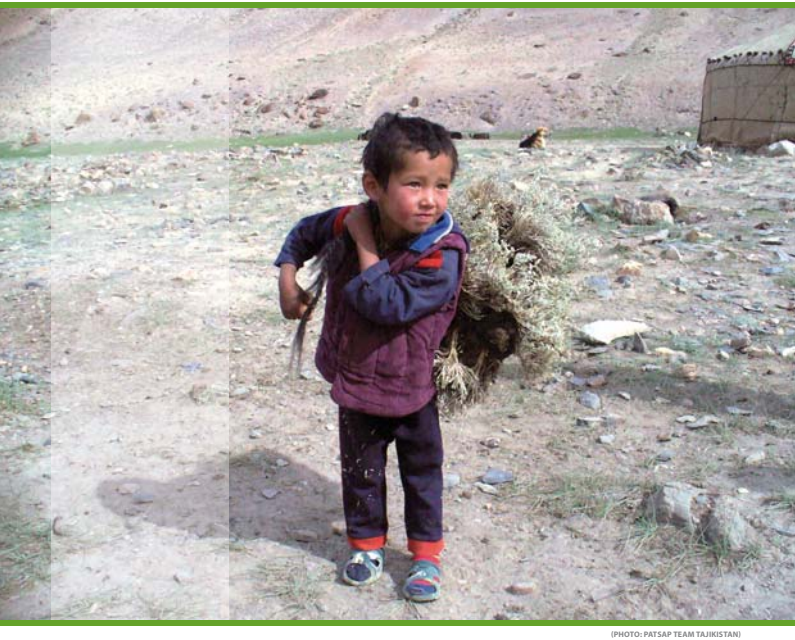
The expert teams from Kyrgyzstan and Tajikistan working on the High Pamir and Pamir-Alai Transboundary Strategy and Action Plan (PATSAP) elaborated baseline reports in the following fields: ecology, agronomy, livestock farming, economy and sociology. These expert reports are available for each country separately, in Russian. Additionally, summary reports at the country level, integrating the information from the different experts were compiled and are available in Russian and English.

The LTFs elaborated country reports as well as an integrated report on the analysis of the legislative, political and institutional system of the Kyrgyz Republic and Republic of Tajikistan. All reports are available in Russian and English.

The assessment of natural disaster risk in the High Pamir and Pamir-Alai region conducted under the lead of CAIAG resulted in a***n Atlas of Natural Disaster Risks of the High Pamir-Alai of the Kyrgyz Republic and the Republic of Tajikistan***, published in 2010, in Bishkek. The atlas is available in Russian.

All these reports are available on CD-ROM as additional information to the Strategy and Action Plan. They can also be downloaded from the PALM website: http://www.ehs.unu.edu/palm/article/read/expert-reports.

PART 2. Analysis of problems and the current situation in the region



(PHOTO: PATSAP TEAM TAJIKISTAN)

The High Pamir and Pamir-Alai region is located in high-mountain terrain, at altitudes ranging from around 2000 to 7495 m above sea level. Like the majority of the world's high-mountain territories it is characterised by severe climatic conditions, a complex and highly segmented topography, passes, and steep slopes, which determine the spatial isolation of mountain settlements and the settlement patterns of the local population. These natural geographical features as well as poor accessibility constitute objective conditions that make human habitation and activities difficult and hamper sustainable development in mountainous areas.

The region's high-mountain settlements are located at altitudes between 2000 and 4200 m and at a great distance from the major economic and cultural centres of the two neighbouring republics – Bishkek, Dushanbe, Khorog, and Osh. As a result, they are closed off and isolated regarding access to information, among other things, and have poorly developed economic and cultural ties. In developed countries, the current level of infrastructure makes it possible to greatly reduce the impact of these factors on living conditions in mountain regions; in Kyrgyzstan and Tajikistan, like in other poor mountainous countries, they remain crucial.

1 Infrastructure

High-altitude mountain villages are mostly situated at great distances from roads of inter-regional significance. Dirt access roads to settlements are of poor quality and frequently destroyed. The network of transport connections that existed in Soviet times has ceased to function, and the cost of travel has since become incompatible with the real income of the population. The lack of transport infrastructure also significantly increases the costs of imported as well as exported goods due to higher costs for cargo transportation. In addition to these objective conditions affecting accessibility by transport, there are many factors of a subjective nature, including issues of management decisions at all levels regarding repair and rehabilitation activities and the establishment of transport services, among other things.

2 Natural Hazards

Important objective factors affecting life in the mountains also include natural disasters and phenomena occurring in the natural environment, such as earthquakes, landslides, rockfalls, mudflows, floods, avalanches, and others. They are due to the geomorphological, climatic, and altitudinal characteristics as well as the geological structure of the environment in which they occur.

Among these types of destructive processes occurring in the region under consideration, earthquakes are the most hazardous. At the same time, practically the entire region is located in a zone of high seismic hazard, with 8-9 or more points on the 12-point Medvedev-Sponheuer-Karnik (MSK-64) scale.

The region is also affected by frequent landslides and avalanches, the number of which is increasing from year to year due to an activation of interrelated modern geodynamic movements and seismicity, a rise in groundwater levels, an abnormal abundance of atmospheric precipitation, as well as human engineering and land use activities.

Mudflows, floods, and, in some cases, outbreaks of glacial lakes owing to accumulation of snow cover in the alpine zone, snowmelt, and torrential rains, likewise constitute great hazards.

Snow avalanches are a further serious threat in the mountains. Their intense activity is due to abundance of precipitation and the presence of a permanent deep snow cover. In certain cases there have been avalanches of more than 1 million m^3. The most dangerous period with regard to avalanches extends from December to April.

During the period from 1997 to 2007, a total of around 700 emergencies of all types occurred in the rayons constituting the study area. Among them were around 200 landslides, 100-105 avalanches, and 200 mudslides and floods.

NATURAL DISASTERS

The High Pamir and Pamir-Alai region is frequently affected by natural disasters. Its vulnerability is increasing due to its remoteness and the limited capacities of the local population and the responsible government structures. Climate variations might lead to an increase in the number of extreme events (floods, glacial lake outburst floods, etc.) in the region.

(Photo: Stéphane Henriod)

These various natural phenomena often lead to human casualties, damage human health and the environment, entail considerable material losses, and disrupt the population's everyday lives.

It is therefore extremely important to develop preventive measures and ensure human safety in areas prone to extreme natural disasters.

3 Climate change

In the past decades the number of landslides and mudflows has been increasing from year to year – a development that is most likely due to climate change. Instrumental data from the mountainous areas of the Kyrgyz Republic indicate that over the 20th Century the annual mean temperatures increased by an average of 1.6 °C, with values varying between 0.6 and 2.4 °C across the territory.[12]

In the Eastern Pamirs, an additional seasonal climate change over the past 50-60 years has been observed. This has reduced the productivity of pastures by 10-15%. Some plant species (***Astragalus chomutowii*** B. Fedtsch., ***Astragalus lasiosemius*** Boiss., ***Oxytropis pagobia*** Bge.) have no longer been able to reach the generative development stage; other species (e.g. ***Hordeum brevisubulatum (Trin.)*** Link., ***Astragalus chadjanensis*** Franch., ***Astragalus alpinus*** L., ***Artemisia persica*** Boiss.) have been unable to develop mature seeds, which has impacted on the reproduction of these plants.

Projections by scientists indicate that by the year 2100, climate warming under different scenarios will range from 1.8 to 4.4 °C for annual mean temperatures and from 1.3 to 4.8 °C for seasonal temperatures. Precipitation scenarios for the year 2100 indicate a trend reversal from a decrease by 6% to an increase by 54% for total annual precipitation, and from a decrease by 20% to an increase by 84% for seasonal precipitation. These changes in the climate will impact not only on water, land, and forest resources and on biodiversity, but also on human health and the condition of livestock.

[12] Глобальные экологические конвенции: возможности Кыргызстана (Global Ecological Conventions: The Capacities of Kyrgyzstan). In Russian. Bishkek, 2004.

4 Loss of biodiversity

VEGETATION

Limited opportunities for crop production and low biological productivity of dry and semi-dry farming led to pasture development schemes during Soviet times and also forced mountain communities, in the period of privatisation, to use virgin plots for cultural phytocoenoses, replacing natural ecosystems by anthropogenic ones. This practice of reclaiming mountain areas has led to destruction of the region's biota, a loss of biodiversity, and destabilisation of ecosystems and landscapes.

This destruction of natural ecosystems and uncontrolled use of biological resources constitutes the main threat to biodiversity conservation. Under the influence of anthropogenic factors such as livestock grazing, mowing, recreational use, road construction, and introduction and planting of trees and gardens, changes have occurred in the floristic composition and the productivity of plant communities, natural phytocoenoses have been replaced by artificial ones, and the formation and types of vegetation have changed.

The situation is particularly difficult for juniper forests. Over the last 60-70 years they suffered a process of severe degradation: along with environmental causes (dry climate, slow growth of juniper plants), the social and economic conditions (demand for firewood and overgrazing) have led to a reduction of this resource by 60%.[13] Logging of other tree and shrub species, especially in forests near and around settlements, has increased, as well, and young juniper shoots of natural origin are being destroyed. This has led to severe thinning of forests, desertification of slopes, and to erosion in the lower mountain areas (Alai and Chon-Alai). In some valley bottoms of the Western Pamirs there are remains of dense forest areas which contrast with the desert landscape around. They survived only because they are located at too great a distance from the villages of the upper Bartang valley.

In Kyrgyzstan, existing legal protection (including protected areas) covers only 8% of the total forests and an even smaller percentage of juniper forests.[14]

Herbaceous vegetation is destroyed, and forests and pastures are covered with weeds and plants that are not eaten by animals. In the Eastern Pamirs, teresken (***Ceratoides papposa*** Botsch. et Ikonn.) is being exploited to a degree that has brought teresken ecosystems to the brink of extinction (Eastern Pamir). Teresken is not only fuel and fodder for animals, but also a shrub with an important erosion-controlling ecosystem function. Destruction of teresken causes soil erosion to spread rapidly, leading to a decline in productivity of high-mountain arid pastures and to their desertification and thus increasing the risk of natural disasters.

WILDLIFE

The deterioration of desert ecosystems directly affects the populations of herbivorous mammals such as Marco Polo sheep (***Ovis amon polii*** Blyth.), Siberian ibex (***Capra sibirica alaiana*** Noack), golden marmot (***Marmota caudata*** Geoff.), Tolai hare (***Lepus tolai*** Pall.), as well as birds, such as the Tibetan sandgrouse (***Syrrhaptes tibetanus*** Pall.), as these wildlife depend on teresken communities as a habitat.

As a result of destruction of natural ecosystems and uncontrolled use of biological resources, many species are on the verge of extinction or at risk. In the Western Pamirs, the urial (***Ovis vignei***

[13] Ж. Бютю, И. Юнусова. Современные аспекты для многофункционального устойчивого использования арчовых лесов на юге Кыргызстана (G. Buttu and I. Yunusova. Current aspects of multifunctional sustainable use of juniper forests in southern Kyrgyzstan). In: Материалы международного симпозиума (Material from an International Symposium on "The Problems of Juniper Forests"). In Russian. Osh, 2001, pp. 12-22. Б.А. Токторалиев и др. Современное состояние арчовых лесов Кыргызстана и пути их стабилизации (B.A. Toktoraliev et al. The current status of Kyrgyzstan's juniper forests and ways towards their stabilisation.) In: Материалы международного симпозиума (Material from an International Symposium on "The Problems of Juniper Forests"). In Russian. Osh, 2001, pp. 186-188.

[14] Second Environmental Performance Review of Kyrgyzstan, United Nations, New York and Geneva, 2009.

bocharensis Nasonov) became extinct around 10-12 years ago. The populations of Marco Polo sheep (***Ovis ammon polii*** Blyth.) and brown bear (***Ursus arctos*** L.) are dwindling, and the Siberian ibex (***Capra sibirica alaiana*** Noack) is rarely seen. In the period from 1990 to the present, the number of snow leopards (***Uncia uncia*** Schreber) has dropped by a factor of 2-10, depending on the area. During the past decades the corsac fox (***Vulpes corsac*** L.) and golden marmot (***Marmota caudata*** Geoff.) became objects of hunting; and due to habitat destruction the Central Asian otter (***Lutra lutra*** seistanica) may disappear, along with the Alai mole vole (***Ellobius alaicus*** Vorontsov), which is known only from the Alai mountains.

In view of this situation, the main objective today is to create a system of specially protected natural areas (SPNAs) and upgrade the efficiency of state services to ensure ecological security. The SPNA network in Alai and Chon-Alai is insufficiently developed. In the Eastern and Western Pamirs there are three protected areas, including the Tajik National Park, which has been in existence for almost 20 years and covers an area of more than two million hectares. The Park was established to preserve the unique high-mountain flora and fauna; however, due to civil war in Tajikistan from 1992 to 1997 and subsequent economic problems, the Park has not achieved many of its objectives. Trophy hunting (against foreign currency payment) and poaching are still occurring within its boundaries. This situation is exacerbated by the absence of a hunting law in Tajikistan. The country is not a member of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Governmental protection services have few and unprofessional personnel and lack financial incentives to combat illegal activities. Moreover, several factors contribute indirectly to domestic as well as cross-border poaching, such as lack of financial, human, and infrastructural resources, lack of material and technical equipment for monitoring the environment, and a weak legal framework with regard to transboundary relations.

Finally, the low standard of living and high level of poverty are some of the main reasons for population's unsparing attitude towards biological resources.

5 Livestock

In the High Pamir and Pamir-Alai region, livestock is the mainstay of agricultural production. At the same time it constitutes the main asset for the livelihoods of local communities. As objects of sale and exchange, large and small livestock such as cattle, yaks, sheep, and goats serve as assets to support the costs of children's tuition, clothes, food, and other essential goods. However, villagers lack the understanding that an increase in livestock entails a higher stocking density on pastures and, consequently, a decrease in their productivity. The following figures provide an overview of the growth of livestock numbers in the project area: in recent years (2002-2008) large livestock (cattle, yaks) has increased from 22,510 to 26,444 heads in Kara-Kulja rayon, and from 17,189 to 24,695 in Alai rayon. Growing herds have been recorded in the Pamirs, as well: in 2008 livestock numbers amounted to 15,924 in Murghab rayon (Eastern Pamir), 85,669 in the rayons of the Western Pamir, and 21,022 in Jirgitol rayon.[15]

Meanwhile, despite the change in the structure of livestock farming and the increase in livestock numbers, corresponding changes in veterinary services have not taken place. This has led to spreading of diseases among livestock and infection of people with these diseases. The previously effective system of veterinary services has become unbalanced and has ceased to operate efficiently. There is no clear government policy on developing cooperation between the public and the private sectors. In this situation, adequate monitoring and control of animal diseases are not guaranteed.

Development of livestock farming is constrained by a lack of systematically operating processing enterprises in the region, poor development of market research, and lack of marketing groups for developing and marketing meat products. Procurers and small processors face great difficulties in financing the purchase of large quantities of raw material necessary for processing.

Extension services with regard to selection and breeding management, as well as ways of increasing livestock productivity by improving feed efficiency and reducing livestock mortality rather than by increasing livestock numbers, are poorly developed. Household heads and members of their families do not have the latest knowledge in livestock farming and management practices. The institutional setting and the management system are poorly developed in the agricultural services market.

Imperfect legislation and regulatory acts governing transboundary relations complicate the population's relations with border officials, customs officials, and veterinary and sanitary services when it comes to marketing essential commodities.

[15] Data taken from the report by PATSAP experts (available at http://palm.unu.edu).

6 Pastures and grazing areas

Problems of cattle farming cannot be addressed without sustained and effective management of natural pastures. Pastures account for a large portion of agricultural land: in Osh oblast, they occupy 337,882 hectares or 41.5% of the total agricultural land. This proportion varies greatly between the rayons, with a share of 8.4% in Kara-Kulja rayon, 13.9% in Alai rayon, and 23% in Chon-Alai rayon. In the Soviet era, these pastures were used by collective and state farms from neighbouring rayons, as well as from the Tajik and Uzbek Soviet Socialist Republics. According to data from local self-government bodies and Kyrgyzgiprozem for the period of 1985-2009 the area of pastures near villages was reduced most in the pilot areas of Zhosholu in Alai rayon and Alaiku in Kara-Kulja rayon, where it decreased by 83.3% and 84.0%, respectively. By contrast, in the aiyl okmotu of Kashka-Suu in Chon-Alai rayon, grazing areas increased by 38%. During the same period, the total reserve of forage in the aiyl okmotu of Zhosholu and V.I. Lenin in Alai rayon declined by 62.9% and 68.5%, respectively.

This decline in forage supply went along with a corresponding decrease in the feeding ration to 620 to 700 kg of feed units per large animal unit, or little more than a third of the current zootechnical norm of no less than 1800 kg. Both the quality and the quantity of feed are low, leading to low productivity and high mortality of animals.

ALAI

Comparison and analysis of data on the actual forage reserve and the annual demand showed that in 2008, the most critical situation with regard to forage supply occurred at the pilot site of Zhosholu, where it dropped to 42.3% of the annual demand. In other aiyl okmotu this figure is higher, e.g. 73.7% in Alaiku and 80.0% in Kashka-Suu.

EASTERN PAMIRS

The productivity of pastures in the Pamirs is very low, at around 0.05-1.20 tons/hectare of dry matter. Thus, at the Chechektu pilot site in Murghab rayon, in 2008 the lack of forage amounted to 35% for large livestock (cattle, yaks) and 30% for small livestock (sheep, goats). Currently, the total forage supply in the Pamirs amounts to 60-70% of the full feeding ration in summer and 35-50% in winter.

This fodder shortage is also due to a decrease in the area under forage. According to the Statistics Committee of GBAO the area under forage in Murghab rayon decreased by a factor of 15, from 2651 hectares in 1990 to 172 hectares in 2000.

JIRGITOL

More favourable highly productive pastures are located in Jirgitol rayon, where the total area of pastures amounts to 3718 hectares. At high altitudes (above 3000 m) there are sub-alpine and alpine meadows that are rich in nutritious grasses. Livestock from all parts of southern Tajikistan is brought here to graze on these mountain meadows from June through September.

Over the last 20 years the forms of grazing have changed, as well. Pastures near villages are being used more heavily. As a result, the vegetation cover on pasturelands near villages is degrading (some pastures have become 100% degraded). Remote pastures are underutilised for several reasons, including limited financial resources of many small livestock owners to hire transport, damaged infrastructure (roads, bridges) and other facilities, and absence of boundaries for livestock grazing by households as well as transhumance routes. Moreover, and most importantly, there are no organisational structures in place to provide transport of livestock to remote pastures.

PASTURE LAW

The pasture management system that existed in Kyrgyzstan prior to the adoption of the recent new Law on Pastures (2009) created a certain confusion with regard to the use of pasture resources. This was due primarily to shared administrative responsibility for conservation, redistribution, and use of different types of pastures between state authorities (oblast and rayon authorities, aiyl okmotu or village authorities, the State Registry, and the State Agency of Environment Protection and Forestry). The organisational responsibility for pastures near villages, for example, was attributed to the aiyl okmotu, whereas the authority of decision-making on remote pastures was given to the oblast and rayon authorities. These and other issues raised distrust among villagers in the fairness of pasture distribution by oblast and rayon administrations.

The recently adopted new Kyrgyz Law on Pastures has created a legal basis for establishing an integrated, socially and environmentally sustainable system of pasture management and use, by transferring the relevant authority and responsibilities to the local communities and guaranteeing active participation of community members in pasture management.

Next steps in this direction will now be taken through a set of measures directed towards elaborating the corresponding regulatory acts and implementing the Law on Pastures. These will regulate the establishment of pasture boundaries, introduction of an entirely new system of payment for pasture use based on livestock numbers, empowerment and strengthening of local communities, and further measures for sustainable and effective management, use, and improvement of pastures.

However, while at this point no law for pasture management exists in Tajikistan, the recommendation for the development of such a law is one of the key outcomes of the investigation of the Legal Task Force. Additional statements are made about this proposal in Part VI.

7 Crop farming

Natural characteristics are the main determinants with regard to crop farming in the High Pamir and Pamir-Alai region – an activity fraught with high risks and low productivity. Very few areas in this mountain environment are suitable for agriculture, and parcellation (fragmentation) of land use is widespread. This is reflected in the results of field research conducted in 2009, which show that the landholdings of individual farms are small. In the Western Pamirs, farms operate on less than 0.05 hectares of arable land per household member, with around 70% of this land being situated at altitudes of 2000 m and above. In the Alai and Chon-Alai rayons, there is an average of 0.16 hectares per person. This small scale of production, combined with low fertility, is not only economically unprofitable, but also fails to provide families in the Western Pamirs with produce for more than 3-4 months per year.

By comparison, in the Chuy Valley in the north of Kyrgyzstan the average size of land parcels is 0.30 hectares per capita. The area needed per capita in order to ensure ecological sustainability as well as the satisfaction of material needs and the psychological comfort of an average person living in Western Europe or North America has been determined at 2 hectares.[16] This is the so-called "ecological density". Of these 2 hectares, 0.6 ha are necessary for food production, 0.2 ha for settlement and industrial needs, and 1.2 ha should remain untouched to ensure environmental sustainability of the biosphere, as well as for recreation and travel. This is 40 or 12.5 times more, respectively, than the size of land parcels available per inhabitant in the region under study; in addition, this figure was calculated for the land resources of the global West, a large portion of which are situated in lowlands and are much more productive than those in the study region.

In the Eastern Pamirs, agriculture is virtually absent due to climatic constraints. In the rural communities of Alai and Chon-Alai, the conditions for growing crops are slightly better, but there are a number of problems and factors affecting ecosystem services. These include underutilisation of land due to remoteness, swampiness, salinity and stoniness. In 2008, for example, 1,637 hectares of dryland in Alai rayon and 1,324 hectares in Chon-Alai rayon were underutilised due to remoteness and stoniness.

Moreover, the productivity of arable land in the High Pamir and Pamir-Alai region is constrained by a lack of mineral and organic fertilisers as well as means of protecting plants against diseases, pests, and weeds; the absence of agricultural technology suitable for a high-mountain environment; high fuel prices; the absence of a regulated product marketing system; and the use of arable land for hay production.

Shortage of irrigation water due to uneven distribution has become a painful problem for the region's population. According to data from a sociological survey conducted in 2009, more than 47% of households indicated that their irrigation needs were only half met. For example, at one of the pilot sites in Ishkashim rayon (Western Pamirs), half of the plots were fully supplied with water, while for the other half, access to irrigation water was limited to 4 hours once a week. Another factor limiting water use is the poor condition of the irrigation network. The existing irrigation infrastructure (channels, distribution points, pipes) was built in Soviet times, and its current poor condition (breaks, leaks, etc.) leads to great water losses. Similar problems exist in other parts of the project area, such as Jirgitol rayon.

[16] Ю. Одум. Основы экологии. Издательство «Мир». Москоw, 1975. (Russian translation of E.P. Odum. Fundamentals of Ecology. Philadelphia, 1971.)

8 Socio-economics

LACK OF ENERGY SOURCES

One of the main natural resources used as fuel by the local population in Murghab rayon of GBAO (Pamirs) is teresken (Ceratoides papposa). Over the past 15 years, teresken has been extracted for use as firewood within a radius of 40 km around the settlements of Murghab rayon. The cutting area is growing from year to year due to continued lack of energy supplies, especially in wintertime. Excessive extraction of teresken is one of the factors leading to rapid desertification and deterioration of high-mountain desert ecosystems and a reduction in the populations of herbivorous mammals. (Photo: PATSAP Team Tajikistan)

Life is especially hard for people in the High Pamir and Pamir-Alai region in winter, when the poorly developed standard of infrastructure causes failures in electricity supply (Alai, Chon-Alai, Kara-Kulja rayons). Murghab rayon (Eastern Pamir) is practically not supplied with electricity at all; there is only one small hydroelectric power station that is heavily outdated and in need of reconstruction. In the Western Pamirs, around 43% of the villages lack power supply in winter, and 10% do not have power at all. The heating season lasts 7-8 months, requiring large quantities of coal (6-7 tons). However, people lack the means for its acquisition.

Organised forms of energy supply in the villages are non-existent, making it difficult to supply them with fuel at affordable prices. This situation leads to cutting of forest and shrub vegetation in the areas nearest to villages, causing environmental damage. Teresken (***Ceratoides papposa*** Botsch. et Ikonn.) – another alternative source of energy – is being exterminated. Overall, there is a tendency throughout the region to return to traditional, low-productivity forms of management.

The population in the High Pamir and Pamir-Alai region is growing. The Alai, Chon-Alai and Kara-Kulja rayons currently have a total of 184,900 inhabitants, which amounts to 16.7% of the total population of Osh oblast. The total area of these three rayons is 18,151 km^2 or 62.2% of the total area of Osh oblast. Although the overall population density is low at 10 persons per km^2, the physiological density is much higher, especially when taking into account the high rates of population growth. According to the UN Population Fund (2007), population reproduction in the region will grow in the foreseeable future. Projections estimate the population of the Kyrgyz Republic in 2025 at 6.6 million and in 2050 at 8.1 million. For Tajikistan, projections predict populations of 9.4 million in 2025 and 11.4 million in 2050. The capacity of ecological-agricultural systems (for example, in the Chon-Alai and Kara-Kulja rayons) has declined significantly and continues to decrease by comparison with mountainous rayons in northern Kyrgyzstan; moreover, the region's agro-ecological potential does not allow for producing grain crops up to the calculated economic standards.[17] The reduction in the region's biological capacity is due to population growth combined with limited resources.

MIGRATION

Active migration processes in the region are changing the sex and age composition of the local population is changing. This, in turn, results in a change of land use and management practices.
(Photo: Nevelina Pachova)

Infrastructure in the region is poorly developed, including information infrastructure. The tourism sector is represented only by the organisation Sary-Mogol (Alai) and the Murghab Ecotourism Association (Eastern Pamirs). Moreover, visitors need a special permit in addition to the regular entry visa to Tajikistan in order to travel to Murghab rayon or any other rayon of GBAO. This requirement hampers the flow of tourists and limits household incomes in these regions.

In this regard, the development and application of information and communication technologies, knowledge dissemination, and sharing of experiences through a network of connections is an element critical to achieving development in many spheres of activity in the region, including education, cultural norms, technology, economy, and addressing of tourism-related environmental problems.

Employment opportunities outside the agricultural sector are limited, leading to high unemployment in the area. According to official data of the local statistics offices, the unemployment rate (percentage of the economically active population) is 24.7% in Alai rayon, 11.9% in Chon-Alai rayon, 23% in Kara-Kulja rayon. However, hidden unemployment is 2-3 times higher according to the surveys carried out in the project area. The actual unemployment rates recorded in Murghab rayon (Eastern Pamirs) and in Roshtkala and Shugnan rayons (Western Pamirs) amounted to an average of 20.1%, whereas the official figures for GBAO range from 3 to 5%.

High levels of unemployment, low wages in state-financed positions, lack of financial means for establishing private businesses, and shortage of land for young families force people – predominantly the working-age population – to leave the region in search for temporary jobs, often leading to their taking up permanent residence abroad, in near and far countries. According to sociological studies carried out by Kyrgyz experts and involving interviews with 113 household heads, in 2008 at least one family member had migrated to Russia in 36.3% of the households, to Kazakhstan in 11.5% of the households, to another foreign country in 1 household (0.9%), and to other areas within the Kyrgyz Republic in 4.4% of the households interviewed. The results of surveys carried out by the Tajik experts in GBAO in 2008 show that over 40% of household heads confirmed migration of at least one family member, while the number of migrants registered by the GBAO statistics authority amounted to 12.5% of the total population.

Thus, although poverty has declined over the past 5 years, its level in Alai rayon is still at 66.5% (V.I.Lenin aiyl okrug) and 68.5% (Zhosholu aiyl okrug); in Chon-Alai it is 57.5% (Kashka Suu aiyl okrug); and in Kara-Kulja it is 55% (Alaiku aiyl okrug).[18] According to Tajik experts, this figure is even higher in both the Eastern and the Western Pamirs, ranging from 80% to 85%[19]. Even taking into account the fact that people – especially in mountain villages – tend to understate incomes, the vast majority of respondents at the pilot sites reported that their material situation had declined. The level of incomes and wages is significantly lower in mountain villages than in lowland villages. In 2008, employees of state-financed institutions earned average monthly wages of KGS 3870 (USD 105) in Alai, KGS 4900 (USD 133) in Chon-Alai, and KGS 3280 (USD 88) in Kara-Kulja. The average wage in Gorno-Badakhshan Autonomous Oblast was TJS 213 (USD 48), while the subsistence level was TJS 370 (USD 85). Expenditures on food amounted to 42.4% of the budget, and thus constituted the most expensive part of the budget.

Several conclusions can be drawn from this socio-economic analysis. First of all, a majority of the population living in the region are unemployed during 7-9 months of the year; secondly, employment opportunities outside the agricultural sector are limited or absent; thirdly, the actual migration flows are much higher than indicated by official data; and fourth, the biological capacity of the region is decreasing while the population continues to grow, which may lead to future aggravation of the conflict of interests between nature and man.

[17] Report of the Institute of Mountain Physiology of the National Academy of Sciences of the Kyrgyz Republic for 2009.

[18] The poverty line in Kyrgyzstan for 2008 was at KGS 963.10 (USD 22.2) per month, the extreme poverty line at KGS 640.10 (USD 14.8) per month.

[19] The poverty line in Tajikistan for 2008 was at TJS 240 (USD 53.81) per month.

PART III. Analysis of strengths, weaknesses, and threats

(PHOTO: PATSAP TEAM TAJIKISTAN)

The research results obtained in the environmental, economic, and social assessment of the High Pamir and Pamir-Alai region, as well as their analysis and systematisation, have provided a basis for describing the current situation and identifying a number of issues specific to the project area. Strengths and weaknesses were identified, demonstrating the region's potentials, on the one hand, and the factors constraining development, on the other (Table 1). Moreover, the threats facing mountain ecosystems – forest and biodiversity, agricultural productivity, and livestock productivity – were specified (Tables 2, 3, and 4) and the risks affecting the safety of people's livelihoods in areas prone to natural hazards were identified (Table 5).

1 Strengths and weaknesses of the High Pamir and Pamir-Alai region

Components	Strengths	Weaknesses
Political	• Both countries are members of several regional organisations: CIS, EAEC, CSTO, SCO.	
Legal	• Bilateral agreements between the Kyrgyz Republic and the Republic of Tajikistan. • Existence of certain legal acts in both countries which require harmonisation between the two countries.	
Institutional	• Local governments in Kyrgyzstan are empowered with a certain degree of authority regarding environmental protection and sustainable management of natural resources.	• Weak institutional framework in the field of natural resource management; • The relations between local authorities and specialised state institutions (e.g. forestry, protected areas) are not institutionalised and/or fixed; • Civil society is practically inactive or poorly developed and community involvement in SLM/NRM decision-making is limited;
Economic	• Abundant and cheap human resources (workforce). • Recreational resources that can be transformed into sources of income. • Local breeds of domestic animals and plants adapted to high-mountain conditions. • Potential for hunting activities. • Water and mineral resources. • Pharmacological resources (medicinal plants).	• Insufficient attractiveness for investment. • Local markets for goods and services are extremely small and limited by low paying capacity. • Inaccessibility of national and foreign markets for goods and services due to remoteness of region, poor infrastructure and political barriers. • Poorly developed transport and telecommunications infrastructure. • Seasonal unemployment due to limitations of agricultural sector (majority of the population is seasonally unemployed for 7 to 9 months per year). • High costs of mining. • Risky and unproductive agriculture, parcellated farming.
Financial	• Presence of bank branches and credit programmes.	• Population lacks financial resources and savings for developing small and medium businesses; • Limiting credit conditions (high interests, short duration, collaterals); • Inaccessibility of microcredits for poor citizens; • Small scales of financial organisations (banks, investment unions, enterprises)
Knowledge and technology	• Relatively high educational level of the population (compared with many poor mountain countries such as Nepal, Afghanistan, Bhutan, and others); • Population is interested in learning, including the Russian and English languages, and in retraining; • Availability of traditional knowledge and technologies for processing and storage of agricultural products.	• Declining quality of education provided in schools and institutions of higher education; • Technological underdevelopment of the region, lack of stable telephone and Internet connections; • Low and unstable energy supply; • Collapse of norms of collective farming and traditional resource-saving management schemes; • Lack of information on issues of business organisation, new technologies, and entrepreneurship.

Components	Strengths	Weaknesses
Social and cultural	• Openness of population to agrotechnological innovation as well as various forms of unions and associations (user associations, groups of mutual help). • Traditional willingness to assist neighbours. • Traditional Asian hospitality. • Existence of traditional knowledge.	• Migration of socially active part of population to other regions and countries and to the sector of low-skilled labour. • Poor development of infrastructure, including social and medical. • Widespread poverty • Much traditional knowledge is being lost. • Cultural stereotypes oriented towards isolated survival schemes based on subsistence farming. • Particularities of life of the local populations. Customs and traditions imply high material costs.
Ecological	• Very rich landscape diversity; • Endemic animal, bird, insect, and plant species; • Enormous potential for tourism; • Central sources of domestic plants and animals; • Unpolluted environment; • Unique cultural organisation: formation of the spiritual world of a person, dissemination of spiritual ideas about conservation of the mountain environment.	• Vulnerability of mountain landscapes; • Severity and harshness of climate, high risk of living in areas prone to natural disasters (mudflows, landslides, earthquakes, floods); • Risk of environmental deterioration under high recreational and tourist pressure; • Threat of loss of certain breeds and varieties, as well as species, of flora and fauna.

2 Threats to mountain ecosystems (forests and biodiversity)

Threats	Consequences
Illegal cutting of trees and shrubs.	Severe thinning of forests; Aridification and desertification of slopes; Development of erosion processes in the lower mountain areas.
Introduction of alien species from seed and planting material and products.	Competition and possible displacement of native species.
Over-collection of medicinal and food plants.	Depletion and poor renewal of these resources; Deterioration of genetic structure of populations.
Extraction of teresken for fuel.	Degradation of natural pasturelands of wild and domestic ungulates; Death of livestock in winter due to fodder shortage; Deterioration of protective and feeding conditions for small mammals and birds; Erosion and desertification.
Intensive ploughing of previously untilled land.	Destruction of native steppe and meadow vegetation; Depletion of species composition.
Intensive and uncontrolled livestock grazing.	Destruction of young tree and herbaceous growth of natural origin; Change in productivity of phytocoenoses and their floristic composition; Threat to plants included in the Red List.
Incompleteness of environmental legislation.	Growth of all threats to biodiversity.
Poor equipment of rangers and foresters with means of transportation as well as field gear and equipment.	Efforts to prevent poaching and illegal cutting of trees and shrubs are hampered.
Weak financial stimulation of workers of specially protected areas and regional forest administrations (leskhozes) to stop illegal use of natural resources.	Lack of incentives to enhance efforts to stop poaching and illegal cutting of trees and shrubs.
Lack of awareness of local people regarding environmental protection and lack of incentives to encourage biodiversity conservation.	Local communities do not participate in natural resource management, in implementation of programmes and projects on conservation and restoration of biodiversity, or in efforts to prevent poaching.
Poaching.	Extermination of large predators, wild ungulates, and commercially hunted species of birds; Degradation of populations and their genetic structure.
Low awareness and education of population with regard to legislation.	Ignorance among population of their civil rights; Increase in incidence of offences; Reduced sense of responsibility for consequences of offences.
Lack of research and monitoring of mountain ecosystems.	Incomplete database in the field of biodiversity; gaps in research skills and knowledge.

3 Threats to agricultural productivity

Threats	Consequences
Peaks in numbers of outbreaks of mass pests.	Crop losses, deterioration of quality of agricultural products.
Use of arable land for other purposes.	Reduction of already limited arable land.
Swidden cultivation of arable lands.	Destruction of soil and plant cover; Annihilation of soil microflora and fauna.
Soil nutrient depletion (inappropriate management and lack of mineral fertilisers).	Soil degradation, reduced fertility, yield losses.
Lack of qualified agronomists, economists, and marketers on the agricultural product market.	Lack or shortage of certain products (cereals: buckwheat, oatmeal; vegetables: salads, various forms of cabbage); Difficulties in selling excess production; Low profitability of farms.
Lack of processing enterprises and storage facilities.	Obstacle to transition from production of low-price raw produce to industrial production; Loss of grown and harvested crop in winter and springtime; Low economic benefits; Reduced supply of consumer market with essential goods.
Lack of seeds and planting material adapted to the local conditions.	Reduction in crop yield; Failure of certain crops to ripen; Vulnerability to pests and diseases.
Lack of crop rotation because of limited availability of land.	Soil degradation; Increase in pests and plant pathogens; Reduction of yield levels.
Ageing of gardens.	Loss of local registered varieties of fruit trees; Yield reduction.
Changing seasonal temperature regimes due to global climate change.	Failure of many varieties to mature and reduced productivity.

4 Threats to pasture use and productivity of livestock farming

Threats	Consequences
Intensive and uncontrolled livestock grazing.	Pasture degradation; Desertification.
Excessive stocking of pastures near villages (winter) because of difficulties in using remote pastures.	Irreversible changes in the productivity of pastures, requiring special restoration measures.
Lack of qualified livestock specialists, veterinarians, and grassland specialists.	Deterioration in the quality of selection work; Risk of increased incidence of epizootic diseases; Unsustainable pasture management.
Lack of fixed allocation of pastures to specific individuals or legal entities.	Absence of responsibility for degradation of pastures as well as a system of measures for conservation and restoration of their productivity.
Reduction of mowing and fodder production.	Shortage of winter fodder for livestock; Increasing loss of livestock.
Lack of monitoring, research, and improvement of pastures.	Lack of up-to-date data for development of pasture management plans.

5 Threats to human safety in areas prone to natural hazards

Threats	Consequences
Earthquakes, landslides, mudslides and mudflows, floods, and snow avalanches.	Total or partial destruction of infrastructure (houses, roads, bridges, electrotechnical connections); Loss of human lives, physical injuries; Inhabitants left without a home or means of subsistence; Damage to agricultural land and forests; Disruption of livelihood conditions; Economic loss.

PART IV. Goals, priority directions, and objectives

(PHOTO: YVO WEIDMANN)

Overcoming the obstacles identified requires extra efforts on the part of the local communities as well as the administration. Compliance with legislation and investments are absolutely necessary. In order to bring together the efforts of different sectors, to be initiated at different administrative levels and by multiple stakeholders from government and non-government institutions, clear goals are needed.

1 Overall goal

The overall goal of this Strategy is to provide a roadmap to restore, sustain, and enhance, the productive and protective functions of the trans-boundary ecosystems of the High Pamir and Pamir-Alai mountains, of Tajikistan and Kyrgyzstan, so as to improve the social and economic well-being of the rural communities and households utilising the region's ecosystem resources to meet their livelihood needs, while preserving its unique landscape and globally important biodiversity.

2 The four main goals

1. Improvement of the socio-economic situation in the region and poverty alleviation.
2. Provision of safe livelihood conditions in areas prone to natural hazards.
3. Maintenance of sustainability and the productive function of the transboundary ecosystems.
4. Preservation of the diversity of landscapes and biological diversity.

Special attention must be paid to two general issues that apply to all priority directions and actions plans. First, climate change is affecting the High Pamir and Pamir-Alai region. Even though there is insufficient reliable information available so far about its impact on temperature and precipitation regimes in the region, observations such as shorter vegetative periods in the Western Pamirs are being widely discussed. Over the next decades, the effects of climate change and extremes on ecosystems, cropland and pasture management, and on the risk of natural disasters will likely increase. Sustainable land use is seen as a way to increase communities' resilience to climate change. The actions proposed in the field of research and monitoring of natural resources are expected to produce data and information that will be crucial when taking decisions on adapting to climate change.

Second, the past two decades of transformation from a planned economy to a market economy were characterised by heavy reliance of the rural population on subsistence farming and by the resulting high pressure on natural resources, which, in turn, led to land degradation. Furthermore, both the region's infrastructure and its educational system have been deteriorating. It must be acknowledged that restoration and rehabilitation of land resources becomes more expensive as degradation progresses. The same applies to infrastructure, where costs for reconstruction increase as deterioration progresses, and to the educational system, where widening educational gaps at all levels necessitate ever greater investments to respond to societal and market demands. In order to stop these vicious circles, immediate and joint actions are required.

3 Priority directions and related objectives

PRIORITY DIRECTION 1: CONSERVATION OF NATURAL ECOSYSTEMS

Objectives

1.1. Expansion and optimisation of specially protected natural area (SPNA) network
1.2. Monitoring of status of biodiversity and studies on restoration of species and ecosystems
1.3. Control of natural resource use and of conformity with environmental legislation, fight against poaching
1.4. Forest resource management and strengthening of control of illegal cutting
1.5. Improvement of food supply for wild ungulates, regulation of livestock grazing in forests and on pastures, prevention of degradation of wildlife habitats
1.6. Improvement of legal framework
1.7. Involvement of local population in biodiversity management and mainstreaming of environmental knowledge
1.8. International and transboundary cooperation in biodiversity conservation, poaching control, and environmental education

PRIORITY DIRECTION 2: SUPPORT OF AGRICULTURE, INCLUDING CROPLAND AND PASTURE MANAGEMENT, AND RELATED INDUSTRIES

2.1. Increasing the efficiency of crop growing

Objectives

2.1.1. Enlargement of farms, cooperation among individual private households, and support of experience of most successful and profitable farms
2.1.2. Optimisation of use of arable land for main crops;
2.1.3. Introduction of soil and water conservation technologies;
2.1.4. Creation of cooperation-based material and technical foundation for the agricultural sector and establishment of research farms for seed selection and production aimed at increasing productivity and introducing modern technologies
2.1.5. Development and intensification of horticulture and vegetable cropping
2.1.6. Development of processing, storage and marketing of agricultural products
2.1.7. Enhancement of professional qualifications of specialists in agronomy, zootechnics, veterinary sciences, and breeding, and of public awareness of the availability of modern technologies

2.2. Sustainable pasture management and enhancement of productivity of livestock farming

Objectives

2.2.1. Consolidation of pasture resource management
2.2.2. Optimisation of management practices for pastures near villages (maintenance of pasture rotation, grazing control, weed control, etc.)
2.2.3. Removal of barriers to use of summer pastures
2.2.4. Control of livestock disease and reproduction
2.2.5. Intensification of breeding activities
2.2.6. Enhancement of farmers' knowledge and skills
2.2.7. Creation of marketing groups for pre-processing and marketing of meat and dairy products
2.2.8. Establishment of credit unions and other associations for mutual support and management of livestock farming resources

PRIORITY DIRECTION 3: DEVELOPMENT OF COMPETITIVE NON-AGRICULTURAL SECTORS OF ECONOMY

Objectives

3.1. Development of telecommunications infrastructure
3.2. Development of transport infrastructure
3.3. Development of tourism infrastructure (scientific, ecological, adventure, extreme, etc.)
3.4. Development of potentials for alternative and additional employment opportunities;
3.5. Development of potential for energy supply and energy efficiency
3.6. Management of labour migration flows
3.7. Establishment of centres for distance learning

PRIORITY DIRECTION 4: PROVISION OF SAFE LIVELIHOOD CONDITIONS IN AREAS PRONE TO NATURAL HAZARDS

Objectives

4.1. Strengthening of capacity for monitoring and forecasting emergencies based on developing technologies
4.2. Identification of areas prone to natural hazards and emergencies under consideration of development trends in these regards
4.3. Development of a legal framework to regulate emergency preparedness activities;
4.4. Enhancement of public awareness and training of the population and officials taking managerial decisions on emergencies, as well as timely alerting of the population in case of emergencies.

PART V. Main actions for each priority direction

(PHOTO: NEVELINA PACHOVA)

1 Conservation of natural ecosystems

1.1. EXPANSION AND OPTIMISATION OF SPECIALLY PROTECTED NATURAL AREA (SPNA) NETWORK

For preserving the region's natural ecosystems, and especially rare, endangered and endemic species of flora and fauna, it is necessary to expand the network of specially protected natural areas. In the Alai area there is now practically only one small national park on the northern slopes of the Alai Range. In Tajikistan, where SNPAs cover a large area, and especially in the Tajik National Park, the area must be clearly zoned, with regimes of protection and limited use to be established for each zone. For continuous monitoring it is necessary to support SNPAs in improving their material and technical basis: field gear, binoculars, photo and video equipment.

1.2. MONITORING OF STATUS OF BIODIVERSITY AND STUDIES ON RESTORATION OF SPECIES AND ECOSYSTEMS

Based on specially protected natural areas (SPNA), scientific research on the status of severely threatened and endemic species should be conducted, along with long-term monitoring involving scientists of the SPNAs and the academies of sciences. Results of these studies will provide a scientific basis for developing specific actions for conservation of wild flora and fauna and for defining adequate limits of natural resource use.

1.3. CONTROL OF NATURAL RESOURCE USE AND OF CONFORMITY WITH ENVIRONMENTAL LEGISLATION, FIGHT AGAINST POACHING

Outside SNPAs, there should be limited use of biological resources (wild ungulates, medicinal and fruit plants, wood and shrub species). This necessitates a definition of limits, periods, and locations of use, attributing them to specific users (enterprises, farms, cooperatives, NGOs). After inventorying the available reserves, land should be transferred to users for a certain period of time, with the possibility of terminating agreements on the use of natural resources in cases of violation of extraction and collection norms and other environmental regulations.

It is considered expedient to train the local populations in sustainable resource management through workshops involving local and foreign experts.

Given that harvesting of herbs, mushrooms, and berries is done mainly by women, it is necessary to conduct targeted training of this user group in sustainable management of the relevant resources, including norms and periods for harvesting, storage and use.

Funding should be attracted from foundations and sponsors to create mobile and technically advanced anti-poaching groups. NGOs and other environmental organisations should be involved in this work and monitor the enforcement of court decisions related to violations of environmental laws.

1.4. FOREST RESOURCE MANAGEMENT AND INTENSIFICATION OF CONTROL OF ILLEGAL CUTTING

Forest management on the land of state forestry units and on forest-covered land of other users is to target restoration and a reduction of the exploitation of wild-growing forest species. Restoration can be accomplished by establishing forest species nurseries and carrying out restoration planting. Establishment of plantations of rapidly growing forest species will provide the local population with an alternative source of heating energy. At the same time it is necessary to intensify monitoring of compliance with laws as well as prevention of illegal cutting.

EXPERIENCE IN FOREST MANAGEMENT IN GBAO

The Joint Forest Management (JFM) project , implemented by the forestry agency of GBAO and GTZ in the rayons of Ishkashim and Roshtkala of GBAO, Tajikistan, is one of the good practices in the region with regard to sustainable forest management. The project has already achieved positive results: since its launch in 2007, the condition of forests has improved on an area of more than 100 ha. The main project idea is that the local population rents forests and signs joint forest management contracts with the local forest management authorities. These contracts outline the rights and obligations of both parties in accordance with the laws of the Republic of Tajikistan. The setting benefits both parties: local people have access to forest products, and local forest management authorities achieve their objectives with regard to protection and rehabilitation of forests. The income generation component provides an incentive for local communities to preserve their local forests. (Photo: PATSAP Team Tajikistan)

1.5. IMPROVEMENT OF FOOD SUPPLY FOR WILD UNGULATES, REGULATION OF LIVESTOCK GRAZING IN FORESTS AND ON PASTURES, PREVENTION OF DEGRADATION OF WILDLIFE HABITATS

In order to restore forest resources and food supply for wild ungulates, it is necessary to introduce a 2- to 3-year seasonal moratorium in Kyrgyzstan and restrictions in Tajikistan on grazing of domestic livestock on forestland, and later to reduce the number of domestic livestock grazed on forestland.

1.6. IMPROVEMENT OF LEGAL FRAMEWORK

Environmental laws in both countries must be improved and harmonised with a view to saving exploited species of flora and fauna of the region. This work is to be based pilot projects to find the best legal solutions. State bodies for monitoring enforcement of environmental laws need to be strengthened. Proposed draft laws in both countries need to be subjected to broad discussion.

1.7. INVOLVEMENT OF LOCAL POPULATION IN BIODIVERSITY MANAGEMENT AND MAINSTREAMING OF ENVIRONMENTAL KNOWLEDGE

Involving local populations in biodiversity management requires development of financial mechanisms to increase income shares from use of natural resources. Public protected areas with different protection regimes (seasonal reserves, micro-reserves, recreational areas, etc.) need to be introduced.

Targeted environmental education and training with different programmes for youth, adults, farmers, hunters, and collectors are important means of increasing local people's involvement in environmental conservation.

Moreover, local traditions, customs, and religious canons play an important role in biodiversity conservation. It is therefore necessary to involve local governments, elders, priests, and local historians in conservation activities. Topic-related folk legends and parables need to be collected and published.

Children's clubs need to be established in schools and based on SPNAs – e.g., young ornithologists, young foresters, or young ecologists. Existing environmental NGOs in the region must create youth and children's sections in order to attract young people to actively participate in nature conservation work. They should also establish forest patrols and public inspectors.

1.8. INTERNATIONAL AND TRANSBOUNDARY COOPERATION IN BIODIVERSITY CONSERVATION, POACHING CONTROL, AND ENVIRONMENTAL EDUCATION

Efforts to conserve particularly vulnerable ecosystems and species need to be concentrated by means of transboundary and international projects and programmes on research and monitoring of the status of rare species and endangered ecosystems. Results obtained and technologies developed must be implemented in activities for protection and restoration of particularly endangered species of flora and fauna.

2 Support of agriculture, including cropland and pasture management, and related industries

2.1. INCREASING THE EFFICIENCY OF CROP GROWING

2.1.1. Enlargement of farms, cooperation among individual private households, support of experience of most successful and profitable farms

In order to increase soil productivity and crop yields it is necessary to introduce crop rotation. This is not possible under the current system of individual households with small plots. First of all, therefore, various forms of cooperation and merging of fields need to be introduced. This process can be promoted and enhanced through legal, organisational and financial support of the most successful cooperators (tax relief, microcredit schemes, assistance in repairing irrigation facilities, etc.).

Vulnerable population segments (elderly, families with many children, disabled persons, and others) need to be given socially targeted support, to be provided by the state and private structures (free medical assistance, supply of medication, price reductions on energy carriers, etc.).

2.1.2. Optimisation of use of arable land for main crops

Optimal use of land resources cannot be achieved without assessing soil types and soil fertility. All land resources need to be surveyed and soil maps produced or updated. This is to be done with support from the relevant scientific institutions.

Sound scientific foundations must be elaborated for introducing polycropping, identifying crop species and varieties that are best adapted to mountain conditions. Hydrothermal sources should be used for greenhouse and hothouse cultivation of vegetables and orchard crops.

Moreover, possibilities should be examined for creating plantations of medicinal plants and aromatic herbs, which are more profitable in economic terms.

2.1.3. Introduction of soil and water conservation technologies

In the conditions of a mountain landscape, with shortage of arable land and an arid climate, efficient use of water and land resources is particularly important. The traditional system of irrigation channels (aryki) needs to be complemented with modern water-saving irrigation technologies, such as drip irrigation, sprinklers, drainage and root irrigation, and hydraulic rams. In addition, damaged irrigation systems must be repaired. This will not only increase water efficiency but also reduce the risk of mudslides.

Soil conservation technologies that promote sustainable use of land resources (stone terraces, terracing of slopes, mulching, etc.) need to be widely disseminated and applied. This work can be based on experience of the NGO CAMP-Alatoo, which, in cooperation with "Naryn Rural Agricultural Service" recorded and documented around 120 soil and water conservation technologies. This material can be used for training.

Furthermore, it is advisable to establish water users' associations to achieve sustainable and equitable water allocation.

2.1.4. Creation of cooperation-based material and technical foundation for the agricultural sector and establishment of research farms for seed selection and production aimed at increasing productivity and introducing modern technologies

Decrease in soil and crop productivity is substantially connected with insufficient supply of agrochemicals (organic and mineral fertilisers, protective agents), absence of high-quality seed and planting stock adapted to the local conditions. Small-scale farmers cannot solve these problems on their own. Therefore, it is necessary to establish cooperative centres that will ensure supply of agrochemical agents and of approved high-quality, high-productivity seed and planting stock.

2.1.5. Development and intensification of horticulture and vegetable cropping

Sustainable use of land, including land within settlements, should be promoted by developing adaptive horticulture. New crops and varieties must be introduced, and "aging" gardens need to be rejuvenated. Polycropping should be established, since the area available for gardens is limited, and in many areas their expansion is not possible.

In horticultural areas, nursery gardens need to be created and restored, at the same time improving the composition of fruit tree varieties with approved, winter-hardy varieties by inoculation. Crops considered suitable for this purpose grow in Jirgitol rayon and on the northern slopes of the Alai Range and include the apple varieties Zhumgal (Жумгал), Asyl (Асыл), Star Crimson, Golden Delicious, and Aychurok (Айчурок), the plum varieties Urkuya (Уркуя), Kyrgyz Excellent (Кыргызская превосходная), Zhibek (Жибек), and Sabzak (Сабзак), the Hardenpont pear, and others. Other suitable fruit crops include currants, strawberries, raspberries, and others. These need to be covered in soil during wintertime.

Hedges should be planted for greening and erosion control. Plants suitable for this purpose, provided they are irrigated and fertilised, include privet, catalpa, birch, different varieties of maple, linden, spiraea, and forsythia, as well as winter-hardy, salt-resistant and drought-resistant varieties of other trees and shrubs (Chinese elm, different varieties of hawthorn, ***Viburnum opulus, Caragana boisii,*** amorpha, sea-buckthorn, Meyer's currant).

Moreover, biological pest control methods in horticulture need to be studied and introduced and research focusing on the adaptation of vegetable cropping to climate change need to be conducted.

2.1.6. Development of processing, storage, and marketing of agricultural products

With relatively small amounts of agricultural products, it is necessary to create small enterprises for processing, storage, and marketing of these products in the largest villages of each rayon. Marketing of products, including horticultural produce and vegetable cropping, will encourage domestic and transboundary trade fairs.

2.1.7. Enhancement of professional qualifications of specialists in agronomy, zootechnics, veterinary sciences, and breeding, and of public awareness of the availability of modern technologies

Small private farms face financial difficulties in bringing in agronomists for advice. Cooperation among farmers in this regard needs to be encouraged. Moreover, annual regional information workshops should be organised for the local populations. Education (secondary and specialised secondary) in the villages must be tailored to the needs of agriculture, and courses in basic agronomy should be introduced for the higher classes.

2.2. SUSTAINABLE PASTURE MANAGEMENT AND ENHANCEMENT OF PRODUCTIVITY OF LIVESTOCK FARMING

2.2.1. Consolidation of pasture resource management

In connection with the introduction of the new Kyrgyz "Law on Pastures", local governments and communities must be supported in decentralised management of pastures and assisted during the transition to unified management of grazing resources.

Radical improvement of pastures and pasture use depends on their consolidated management at the level of rural municipalities and practical actions undertaken by local services and the inhabitants with regard to pasture use. Local communities must be supported in the development of pasture management plans.

PASTURE MANAGEMENT

One of the good examples of pasture management in the region is the project on Sustainable Pasture Management in the Watersheds of Jergetal and Otuk (Kyrgyzstan) implemented by the local NGO CAMP Alatoo. Project results include the following: awareness of the project has been raised and the motivation to participate increased among the local population; pasture groups have been established in 8 villages; and preparatory work has been done for the establishment of a pasture users' association and a pasture committee. (Photo: CAMP Alatoo)

Lobbying efforts must be made towards adoption of a Law on Pastures in the Republic of Tajikistan, without which radical improvement of pastures and pasture use in GBAO will be difficult to achieve.

2.2.2. Optimisation of management practices for pastures near villages (maintenance of pasture rotation, grazing control, weed control, etc.)

Optimal pasture stocking densities must be observed, at the same time maintaining a system of seasonal use of pastures with alternating periods and frequency of heavy grazing, i.e. rotational grazing. Use of these methods can increase pasture capacity by 25-30%. In mountainous conditions grazing should be controlled, with allotment of enclosures to be grazed off successively.

2.2.3. Removal of barriers to use of summer pastures

An inventory of pastures needs to be drawn up, including mapping of plots and identification of their capacity. Basic information about pastures to be allocated (location, boundaries, carrying capacity, etc.) and about the regimes of their use need to be brought in line with legislation.

The transfer of pastures to applicants must be made transparent and open. Use of resources needs to be balanced between communities and individuals.

Maps of livestock relocation routes to remote pastures need to be developed, taking into account the current condition of road surfaces, destroyed bridges, etc. This work can be based on the experience of ARIS and the NGO CAMP-Alatoo, who have been implementing this type of activities for a long time.

2.2.4. Control of livestock disease and reproduction

Many problems in the region's rural communities are linked to episodes of various infectious diseases (brucellosis, foot-and-mouth, and others). Efforts to combat disease should place special emphasis on public awareness and participation of farmers in control and vaccination programmes. In addition, it is necessary to observe rules and take precautions during calving or lambing, as well as boiling milk.

At the local level, public and private associations for professional veterinary services need to be created in order to ensure monitoring and treatment of diseases, supply of medication, and surveillance and reporting. The activities of veterinary services need to be adapted to the market conditions.

2.2.5. Intensification of breeding activities

With a view to increasing the productivity of livestock farming, it is important to strengthen breeding efforts and use modern zootechnical methods.

2.2.6. Enhancement of farmers' knowledge and skills

In order to improve the condition of pastures, farmers' knowledge of grazing methods must be enhanced; they need to be trained in the use of various techniques and tools such as reseeding, weed control, fertiliser application, irrigation, regrassing, etc.

2.2.7. Creation of marketing groups for pre-processing and marketing of meat and dairy products

Assistance should be provided in the establishment of marketing groups for processing local products, as well as with regard to cooperation among households in production, processing, and marketing of products.

A demonstration farm should be created, covering the entire production process from growing to processing and marketing, in line with the principle of "farmer-producer – processing unit – market".

It is important to support creation of professional associations for protecting farmers' interests, and to promote establishment of beneficial relationships between farmers and processors. Organic products should be marketed on Russian and foreign markets.

2.2.8. Establishment of credit unions and other associations for mutual support and management of livestock farming resources

Systems for providing long-term and simplified credits at favourable conditions should be established with financial and institutional support from the government in order to promote inhabitants' initiatives. These systems can take the form of credit cooperatives or investment unions, for which it is necessary to create simplified conditions for registration and activities.

3 Development of competitive non-agricultural sectors of economy

3.1. DEVELOPMENT OF TELECOMMUNICATIONS INFRASTRUCTURE

Governmental support is needed for developing the information and communication technologies infrastructure. Modern telecommunication technologies may make it possible to solve certain problems of education by means of distance learning and the Internet.

Granting the population access to modern management methods and technologies as a basis for generating additional income and overcoming poverty is no less important. For example, involving and training the population in collection and cultivation of medicinal herbs or dye plants can encourage livelihood diversification and support people in seeking their own "survival niches".

In this respect, in collaboration with donor organisations such as the School of Professional and Continuing Education of the University of Central Asia, it is possible to develop a curriculum for mountain populations on soil and water conservation and water management technologies, irrigation, yak-farming, production of organic products, improved pasture use, modern bee-keeping, and cultivation and collection of medicinal plants.

Implementation of information and training programmes is possible based on satellite technology developed by the Russian State University for the Humanities in Moscow, which has branches in Dushanbe, Bishkek, and Osh, as well as through the Internet.

The network of primary and secondary schools should be restructured using business resources for training specialists in software and communication technologies. Favourable conditions for development of the information and communication technologies sector need to be promoted in the region.

3.2. DEVELOPMENT OF ROAD AND TRANSPORT INFRASTRUCTURE

Many problems in transport communication can be solved by attracting state and foreign investments. This is currently relevant with regard to reconstruction of the road from Osh to Irkeshtam, which was scheduled for completion in 2008 with financial support from China and the Asian Development Bank, as well as the routes from Dushanbe through Jirgitol and Osh to Irkeshtam, and from Dushanbe through Kulyab to Khorog.

Of equal importance is construction of the road segment from Sary-Tash village to the Kyzyl-Art pass (493 km) of the high-mountain road from Osh to Khorog, which is called "lifeline" by residents of Murghab rayon. Rehabilitation of these roads would make it possible to develop infrastructure in remote mountain areas and recover trade, production, and service activities. In addition, it would provide access to external markets (China) and allow for development of channels for exchange of goods within the High Pamir and Pamir-Alai region.

3.3. DEVELOPMENT OF TOURISM INFRASTRUCTURE (SCIENTIFIC, ECOLOGICAL, ADVENTURE, EXTREME, ETC.)

Tourism in all its varieties, especially adventure and scientific tourism, are the main sources of income from foreign tourists. Even in countries where the flow of tourists is relatively low, these varieties of tourism can play an important role in the economy. Where tourism activities are properly managed, it is possible and necessary to involve the local population in developing this industry and to receive financial and other benefits from these activities.

There are opportunities for tourism development in the region through provision of seasonal housing. It is possible to develop combined offers of temporary lodging and board, hunting services, rental of hunting equipment, horse rental for riding, excursion services, and others. A single family offering housing for rent may have a multiplying effect on employment for other families in the same village and in the rayon as a whole.

In accordance with the needs of the population and ensuring that there are no negative effects on biodiversity and land use systems, training of specialists in tourism, service, catering, and related activities should be promoted. It is important to make use of the ability of mountain people to rapidly adopt positive experiences from one another.

3.4. DEVELOPMENT OF POTENTIALS FOR ALTERNATIVE AND ADDITIONAL EMPLOYMENT OPPORTUNITIES

It is necessary to engage mechanisms to withdraw excess labour force from agriculture by promoting an accelerated increase in efficiency of agricultural production and a corresponding raise of income levels in the sector. Increased income for farmers will lead to growing demand for services in the villages and, thereby, to natural formation of a normal labour market.

TOURISM DEVELOPMENT

Upon development of tourism in the region, the local population is ready to provide the following services: 11.5% could work as a guide, 69,3% could organise a homestay, national food, horses etc., 11,5% could produce and sell souvenirs, and 7.7% could organise national/local games. (Source: interview of households in the pilot areas in Kyrgyzstan). (Photo: Simon Eggenberger)

Venture businesses aimed at diversification of agricultural production should be encouraged and supported by the government. For example, entrepreneurs processing fruits and vegetables who are interested in investing in raw materials may venture growing oil crops, the profitability of which has increased on the world markets over the past years. In traditional milk-producing areas, intensive fattening with succulent feed could be introduced.

Processing of yak, sheep, and goat products such as meat and wool should be established as an alternative source of employment. Development of these sectors will provide the population with low-cost dietary meat, milk, sheep's and goat's wool, and raw hides and skins, which, because of their ecologically clean production, may sell on domestic and even foreign markets and may become an important source of income in the region.

Another important source of additional employment in rural communities is home crafts and artisanry. Home crafts, currently satisfying mainly the domestic needs of the population, include processing of cowhide into warm outerwear, containers for liquid products, cattle-breeding equipment, and saddlery products. Horse hair (mane and tail) and yak wool (fringes) traditionally serve as an excellent raw material for manufacturing strong thick rope for lassoes. Sheep's wool is one of the basic raw materials widely used in every family for making felt products and quilted beddings and blankets. Skins of fur-bearing animals can be used for sewing hats.

In GBAO important crafted products are typical traditional garments made of wool, cotton, and flax (skull-caps, gowns, etc.), jewellery made of precious stones and metal (necklaces, beads,

earrings, rings, bracelets, etc.), typical traditional utensils and tools made of wood (spoons, ladles, cups, musical instruments, baskets, etc.), as well as various souvenirs that are very popular among tourists.

ENERGY SUPPLY

The Pamirs have a large potential for hydropower generation. The total length of rivers longer than 10 km is 4.9 thousand km. The gross energy potential created by their steep gradient is estimated at 13.3 million kilowatts. More than 90% of this potential is concentrated in the Western Pamirs. According to the Hydroproject Institute, the hydropower resources of the Panj river allow for construction of eight large hydropower plants with a total installed capacity of 9370 kilowatts and a potential power output of 46.1 billion kWh, and an additional 40 small hydropower stations with capacities from 100 to 2600 kW. In addition to hydropower resources, the Pamirs have a strong potential for solar energy production owing to the large number of sunny days per year and the increase in direct solar radiation with increasing altitudes. (Photo: Bettina Wolfgramm)

3.5. DEVELOPMENT OF POTENTIAL FOR ENERGY SUPPLY AND ENERGY EFFICIENCY

3.5.1. Renewable energy sources

An assessment of the region's natural and climatic conditions has shown that use energy from renewable sources, particularly wind and solar energy, is a possible option and can simultaneously contribute to creating sources of alternative employment.

The National Academy of Sciences of the Kyrgyz Republic and the Academy of Sciences of the Republic of Tajikistan have developed a micro hydroelectric power plant with an output of 4-10 kW, photovoltaic arrays, solar cookers, solar collectors and water heaters, biogasification units for biogas production from organic wastes, and wind power units. Their use can mitigate the acuteness of energy shortage in the mountainous rayons.

Under appropriate conditions (presence of a mountain stream with a certain slope), micro-hydroelectric power plants can be used directly in villages, on pastures, and in places of remote (seasonal) livestock farming. Solar power technologies (photovoltaic arrays) can likewise be used in all of these locations.

3.5.2. Possibilities of active and passive architecture for energy saving in residential areas

There are two approaches to heating buildings by means of solar energy: use of active and of passive systems. Active use of solar radiation for heating buildings requires a set of technical devices, such as solar collectors, heat accumulators, heat distribution systems, control and management devices, heating appliances, and others.

Passive solar heating is achieved by applying special spatial planning and design solutions and using certain materials with specific thermophysical properties in the construction of buildings. In passive solar systems, the processes of absorption, accumulation, and distribution of heat occur naturally, without forced changes in energy flows. Passive solar heating systems offer a way of increasing heat efficiency by relatively simple means.

In mountain regions, locally available raw materials such as gypsum can be used as a resource- and energy-saving element for construction of housing and farm buildings. Simple technologies involving addition of mineral supplements make it possible to produce stable construction elements that can enhance sustainability of the construction industry.

3.6. MANAGEMENT OF LABOUR MIGRATION FLOWS

With a view to exporting labour abroad, it is necessary to guarantee labour migrants access to training programmes of resource centres (Kyrgyzstan already has such a centre) on required professions. Ways need to be found of co-financing on-the-job training in the most demanded professions, following reorientation of some technical colleges towards providing training that is better suited to current market needs and to training a qualified workforce.

Oblast state administrations and local authorities should jointly monitor migration markets and the demand for temporary employment and constantly inform the population about developments in this regard, as well as about existing intergovernmental agreements, primarily with Russia.

Local authorities should make use of existing experience in cooperation between Russia, Tajikistan, and Kyrgyzstan on organised recruitment of professionally trained personnel for work in Russia and other countries.

3.7. ESTABLISHMENT OF CENTRES FOR DISTANCE LEARNING

Centres for distance learning of languages (Russian, English and other foreign languages) need to be established at Khorog State University, with special attention to quality training in the language as well as the cultural "norms" of the relevant host country.

Projects for strategic partnerships between educational institutions in GBAO and foreign organisations of professional education should be developed.

4 Provision of safe livelihood conditions in areas prone to natural hazards

4.1. STRENGTHENING OF CAPACITY FOR MONITORING AND FORECASTING EMERGENCIES BASED ON DEVELOPING TECHNOLOGIES

It is necessary to improve the monitoring systems – including satellite remote sensing – for particularly dangerous sources of risk of natural hazards (glacial lake outbreaks, landslides, avalanches above roads), as well as for weather data and the parameters of the main watercourses.

Based on monitoring, high-resolution satellite imagery must be interpreted and analysed with a view to identifying changes in the Earth's surface. A GIS database of the observed parameters needs to be established as a basis for operational decision-making.

4.2. IDENTIFICATION OF AREAS PRONE TO NATURAL HAZARDS AND EMERGENCIES UNDER CONSIDERATION OF DEVELOPMENT TRENDS IN THESE REGARDS

Priority sites and areas need to be identified, where preventive measures are necessary to protect the population and the land against natural hazards.

Settlements have to be ranked based on the degree of risk and exposure to natural hazards. Action plans must be elaborated for their protection through engineering measures.

Moreover, studies need to be carried out regarding possibilities of resettling parts of the population from the most hazardous zones to less hazardous areas that share similar natural and climatic conditions, with the aim of preserving these populations' social and cultural specificities and their traditional knowledge of coexisting with nature.

4.3. DEVELOPMENT OF A LEGAL FRAMEWORK TO REGULATE EMERGENCY PREPAREDNESS ACTIVITIES

It is important for stakeholders to participate in the development of normative legal acts related to the Kyrgyz Law "On Civil Defence" with regard to empowerment of local state administrations, local self-government bodies and organisations, and the population, as well as to international cooperation and funding for civil protection activities.

4.4. ENHANCEMENT OF PUBLIC AWARENESS AND TRAINING OF THE POPULATION AND OFFICIALS TAKING MANAGERIAL DECISIONS REGARDING EMERGENCIES

Workshops need to be conducted for both decision-makers and inhabitants on natural hazards in their places of residence and on how to respond and protect themselves during emergencies. Printed material about possible emergencies needs to be prepared and disseminated among the local population. An early warning system needs to be established to enable timely alerting of the population in case of emergencies.

(Photo: CAIAG)

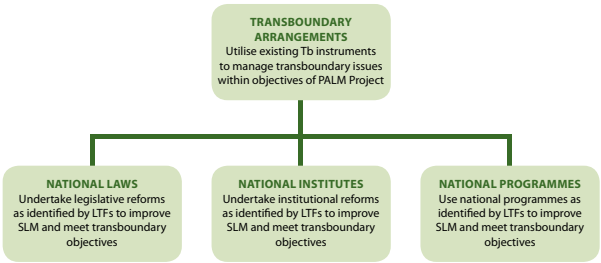
PART VI. Assessment of legal, institutional, and policy status, and need for action

(PHOTO: PATSAP TEAM TAJIKISTAN)

The legal, policy, and institutional reform advocated in the Integrated LTF Report[20], through the implementation of a Regional Natural Resources Management Governance Framework (RNRMGF), is viewed as a priority action to achieve SLM for the High Pamir and Pamir-Alai region. The RNRMGF is perceived as an essential component of the procedure to achieve integrated natural resources management under the Strategy and Action Plan at the local, national, and transboundary levels. The Framework is also an essential part of the process to improve participatory procedures, helping to establish markets, build partnerships, and protect the natural environment. The RNRMGF outlines governance and institutional capacities and acts as a mechanism to integrate SLM in the various transboundary and joint instruments developed between Kyrgyzstan and Tajikistan for the High Pamir and Pamir-Alai region.

[20] ***Integrated Report on Analysis of Legislative, Political and Institutional System of the Kyrgyz Republic and Republic of Tajikistan.*** Project GEF/UNEP/UNU "Sustainable land management (SLM) in High Pamir and Pamir-Alai Mountains – integrated trans-boundary initiative in the Central Asia", Bishkek-Dushanbe 6 October 2010 (The Integrated LTF Report).

THE MAIN COMPONENTS OF THE RNRMGF APPEAR IN DIAGRAM 1



1 Existing legal framework at the national, bilateral, and international levels

In general, Kyrgyzstan and Tajikistan have developed a national legislative basis to regulate natural resources management, protect the environment, and guarantee the sustainable use of natural resources. Each of these countries protects a science-based combination of environmental and economic interests, where the priority is to protect human health and the inaliable human rights to a favourable environment. However, priority is given to the economy when decisions are made on these issues.

Some aspects of land use issues are better regulated and resolved in the lowlands than in the mountainous and remote region of the High Pamirs and the Pamir-Alai. This can be explained with the low level of implementation and of awareness among local communities of legislation in environmental management in the High Pamir and Pamir-Alai region.

The Constitutions of the Kyrgyz Republic and the Republic of Tajikistan provide a good starting point to develop effective legislation to protect the environment. According to Article 34 of the Constitution of the Kyrgyz Republic, the "Citizens of the Kyrgyz Republic have a right to an environment favourable to their lives and health and recovery of damages caused to their health or property by actions in nature management". In the Republic of Tajikistan, wilderness management and sustainable use of the environment are regulated by the Constitution. In accordance with Article 13 of the Constitution, the land and its mineral resources, airspace, fauna, flora, and other natural resources are the exclusive property of the state for assurance of their sustainable use in the interest of the people.

The social and political transformations in Kyrgyzstan and Tajikistan that took place over the past 20 years were accompanied by the development of national legislation for environmental protection and its improvement by way of its harmonisation with sectoral legislation and with the corresponding aspects of regional development. An overview of these changes is provided in the following paragraphs.

KYRGYZSTAN

In Kyrgyzstan, in 1999 the Environment Protection Law, Fauna Law, and Land and Forest Codes were passed, followed by the Flora Protection and Use Law in 2001, the Mountain Regions Law in 2002, and the Water Code in 2005. A new Pasture Law was passed in 2009. Corresponding revisions and additions have been made to a number of statutory legal acts.

Among the Central Asian countries, the Kyrgyz Republic was one of the first to introduce a National Environment Protection Action Plan (NEPAP), which was adopted in 1995 for the period of 1995-1997. In 1997, the Country Environmental Safety Concept was approved by the Security Council.

Three important documents designed to consolidate the efforts of the world's countries towards solving the problems of mountain regions and their sustainable development, were passed at the Bishkek Global Mountain Summit in 2002.

Various documents were developed in preparation for the World Sustainable Development Summit (Johannesburg 2002), including the Agenda of the Kyrgyz Republic for the XXI Century and the Concept for the Transition of the Kyrgyz Republic to Sustainable Development until 2010.

During the 5th European Environment Ministers' Conference (Kiev 2003) the Environmental Strategy of Eastern Europe, Caucasus and Central Asia (EECCA) was approved, among other key strategies relevant to Kyrgyzstan.

TAJIKISTAN

Tajikistan has adopted a number of laws relevant to sustainable land management as follows:

- Land Code of RT of 13 December 1996, № 23
- Forest Code of RT of 24 June 1993, № 770
- Water Code of RT of 29 November 2000, № 34c
- Law of the RT "On Nature Protection" of 27 December 1993, № 905
- Law of the RT "On Natural Protected Areas and Objects" of 13 December 1996, № 328
- Law of the RT "On Land Tenure" of 5 January 2008, № 356
- Law of the RT "On Dehkan (Farming) Activities" of 19 May 2009, №526
- Law of the RT "On Protection of the Soils of the RT" of 3 October 2009, №685

Presently, the provisions of the Land Code and the Law on Environment Protection regulate responsibilities for the protection and sustainable use of land and other natural resources and also the implementation of state control over them.

2 Institutional analysis and need for action

The Kyrgyz and Tajik LTFs examined a series of primary laws of the Kyrgyz Republic and the Republic of Tajikistan, along with a number of agreements between the two countries. The laws and agreements examined are listed in detail in Sections 1 and 5 of the Integrated LTF Report.

An analytical assessment of the state institutions that are relevant to sustainable land management was carried out in order to determine the effectiveness of the existing state structures in fulfilling their functions. Section 1 of the Integrated LTF Report examines in detail the political and institutional governance systems of the two countries, and Section 5 discusses the political documents of each country regulating activities relevant to land use.

As is indicated in the report, the main responsibility for land resources management in Tajikistan is with the State Committee on Land Tenure and Geodesy of the Republic of Tajikistan (Goskomzem) and with the Committee on Environment Protection, which are both part of the Government of Republic of Tajikistan. Goskomzem is responsible for regulating land tenure and land use in rural localities. This agency is also authorised to prepare proposals for the protection of land from contamination and degradation.

The Committee on Environment Protection of the Government of the Republic of Tajikistan is responsible for monitoring and the implementation of state programmes to prevent the degradation of land resources and the contamination of the atmosphere and water resources, as well as programmes on the protection and sustainable use of flora, fauna, and fish resources, and on the conservation of protected natural areas, including forest resources. Moreover, the Committee is also responsible for control over the management of all types of waste.

The responsibility for SLM at the local and regional levels is with the authorities of the oblasts, rayons, and jamoats or aiyl okmotu, as well as the government authorities. However, implementation of this system is not effective enough due to the diffusion of responsibilities and excessive adjustments between higher-level and lower-level authorities.

The mechanisms and procedures for implementation of laws in by-laws are either insufficient or absent. Frequently by-laws either contradict or conflict with the corresponding provisions in many of the principal laws. In addition, there are instances where intradepartmental narrow sectoral and corporate interests directly contradict state policy. These situations lead to violation of the law and inadequate management of natural resources. Internal contradictions and conflict between statutory laws, lack of clear principles of hierarchy, and lack of control over the mechanisms for implementing statutory laws and over the consistency of newly approved statutory laws with existing legislation, but also insufficient monitoring of the rapidly changing natural and social conditions combine to present many barriers to the implementation of national nature conservation measures and to fulfilling international obligations.

Until now, despite the recent increase in attention of the international community to problems in mountain regions, there are no international norms directly aimed at sustainable development and regulation of nature management in mountain regions. Specialised national legislation concerning mountain regions is either under development (Kyrgyzstan) or altogether inexistent (Tajikistan).

The analytical assessment showed that, for several objective and subjective reasons, the wide range of state and non-governmental

organisations working in the sphere of environmental management duplicate each other's tasks and partly compete with each other. The analysis also revealed that the lack of a clear differentiation of functions and responsibilities for the protection of land resources hampers effective action and systematic exchange of information. Moreover, there is an obvious lack of financial support in the sphere of environmental management.

The fact that Kyrgyzstan and Tajikistan have made environmental conservation one of the priorities of state policy, obligates them to continue to improve their national legislation based on international standards and in regional and international cooperation.

This can and must be done based on the significant authority of the parliaments of Kyrgyzstan and Tajikistan, which play a key legislative role in the resolution of natural resource problems in these countries. The competencies of the parliaments include the development and improvement of land, water, and forestry legislation, and the ratification of interstate treaties that provide for land use rights, matters of security and protection, and the resolution of land regulation matters. This significant authority enables each parliament to launch initiatives towards sustainable natural resource management in the respective country.

ACTIONS RECOMMENDED FOR KYRGYZSTAN

- Transfer of land use monitoring functions to a state agency which is equipped with sufficient human, material, and technical resources, in accordance with the procedure established in Kyrgyz legislation;
- Strengthening of interaction between the National Agency for Local Self-government Affairs, the Ministry of Natural Resources, and the Agency Agency on Environment Protection and Forestry regarding the implementation of state policy on environmental and livelihood security issues;
- Systematic conduct of training courses for specialists of state institutions and local self-government bodies in matters of sustainable land management;
- Involvement of local self-government bodies in the organisation of control over use of natural resources on the territory they govern;
- Attraction of non-government, scientific, and private organisations in the development of land management programmes, normative legal acts, etc.
- Establishment a system to provide legal assistance to farmers and rural residents, based on local self-government bodies;
- Ensuring of participation of local communities at all stages of development and implementation of plans and strategies for rural development and intensification of the activities of local communities towards sustainable use of natural resources via training courses.

ACTIONS RECOMMENDED FOR TAJIKISTAN:

- Clear definition, within the established system, of the functions and tasks of the government, the relevant ministries and agencies, and local authorities in the sphere of protection and sustainable use of land;
- Legislative determination of the functions and tasks of primary and secondary land users, irrespective of tenure arrangements;
- In the Law on Farming Activities, it is necessary to provide farm operations the status of a legal entity and expand their authority concerning the use of natural resources;
- Develop concrete activities with secured funding, including from international organisations, to effectively implement the State Programme on Developing Livestock Husbandry of 2007;

The Agreement on Basic Intergovernmental Relations between the Republic of Tajikistan and the Kyrgyz Republic

The Agreement on Basic Intergovernmental Relations between the Republic of Tajikistan and the Kyrgyz Republic (concluded in Dushanbe on 12 July 1996) contains a number of articles that should be enhanced to achieve the objectives of the PALM Project in relation to transboundary management of natural resources. The respective governments should consider introducing additional provisions relevant to SLM into the Agreement to improve their ability to tackle the numerous shared problems raised in the present Strategy and Action Plan. More specifically, this concerns the following articles of the Agreement:

- Article 4, which addresses linguistic needs of Tajiks in the Kyrgyz Republic and Kyrgyz in the Republic of Tajikistan;
- Article 7, which focuses on issues of mutually advantageous cooperation;
- Article 8, which expresses the desirability of combining efforts to establish common economic zones and cooperation in environmental issues.

Articles 16 and 18 of the Agreement refer to the Intergovernmental Commission that has been established between the two adjacent countries. An additional protocol regulates the Commission's activities. In particular, Article 2 of this Protocol states that the Commission's functions include: "To review and, if necessary, update the agreements in force regarding water and land use by households in frontier areas and the leasing of land and pastures by individual regions of the Republic of Tajikistan and the Kyrgyz Republic"; and "To coordinate the Parties' efforts to jointly rebuild and maintain the Osh–Khorog road to support production at the enterprises of Gorno Badakhshan Autonomous Oblast of the Republic of Tajikistan and the city of Osh in the Kyrgyz Republic, with a view to ensuring continuous employment for the population of the region".

The Commission continues its activities to the present and ensures cooperation in the following areas: agreements and legislation; industry; energy; transport; sustainable use of water resources; and determination of the status of enterprises of the Republic of Tajikistan that are located on the territory of the Kyrgyz Republic, and enterprises of the Kyrgyz Republic that are located on the territory of the Republic of Tajikistan. Moreover, the Commission deals with issues related to near-boundary collaboration; migration; environment protection and the development of cooperation between the two countries' mountain regions; education; and physical education and sports.

The Intergovernmental Commission, which is regarded as guarantor of the implementation of accepted obligations, can assume significant authority and functions with regard to monitoring the implementation of the PALM Strategy and Action Plan. The LTFs recommend, therefore, that the Commission should play a key role in the process towards achieving the transboundary objectives of the PALM Project.

3 Specific topical needs

3.1. BIODIVERSITY CONSERVATION

In the above-mentioned territories, various anthropogenic activities, including felling of trees on mountainous slopes, have significantly reduced overall forest area and caused losses of water resources and biodiversity. This calls for a comprehensive regional programme on biodiversity conservation, as well as closer monitoring of developments in the frontier areas.

Moreover, there is a need for legislative initiatives promoting the introduction of educational programmes for local communities to raise awareness of the damage caused to the land by its inappropriate use.

3.2. LAW ON PASTURES FOR THE REPUBLIC OF TAJIKISTAN

The Integrated LTF Report recommends that a law on pastures be developed and introduced in the Republic of Tajikistan, based on existing legislation and state and sectoral programmes. When developing the law it will be necessary to:

- Enhance the authority of pasture users and the local executive bodies to control and regulate pasture use;
- Provide additional legislative guarantees to the population for long-term pasture use, taking account of existing requirements for sustainable pasture use;
- Facilitate resolution of disputes at the local level.

3.3. PASTURE USE IN THE EASTERN PAMIRS AND JIRGITOL RAYON OF TAJIKISTAN AND THE ALAI VALLEY OF KYRGYZSTAN

Currently, GBAO is experiencing great difficulty in providing sufficient productive summer pastures for small and large livestock. Moreover, providing livestock with winter forage, particularly hay, poses an acute challenge. Due to natural and geographic conditions of the region, the most productive pastures are owned by Kyrgyzstan, including in the areas bordering Tajikistan. The Alai Valley contains rich pastures and hayfields for livestock breeding. In light of this fact, the Integrated LTF Report recommends developing a mutually beneficial agreement between the two countries to provide Tajik people with rented pasture plots in the Alai Valley of Kyrgyzstan.

Issues of pasture use in the border areas and particularly near the enclaves require special regulations. Land resources are the livelihood base for the Kyrgyz people, and land allocation to, as well as use of these resources by, international legal and physical entities are issues of high economic and political importance. Article 13 of the Pasture Law of the Kyrgyz Republic (No. 30, dated 26 January 2009) states that pastures may be allocated to foreign legal and physical entities, provided that pastures not in use are made available and in accordance with interstate and inter-government agreements ratified by the parliament (Jogorku Kenesh) of the Kyrgyz Republic.

In 2008 the Administration of the President of the Kyrgyz Republic developed an Action Plan to implement the arrangements agreed at a high-level meeting in Khojent (16 May 2008). This Action Plan proposed the signing of a draft agreement between the Government of the Kyrgyz Republic and the Government of Republic of Tajikistan on the use of pastures in Kyrgyzstan. This draft agreement has gone through the necessary approval procedures in accordance with the legislation of the Kyrgyz Republic and the Republic of Tajikistan.

As no concrete mechanism has yet been agreed upon for the use of Kyrgyz pastures, Tajik citizens frequently use these pastures illegally, without observing corresponding regulations and rules, thus giving rise to conflicts. This situation calls for a constructive dialogue to identify the mutual interests of each party; this will make it possible to deal with contested issues at the economic level, facilitating mutual integration among pasture users in the transboundary region and satisfying their needs while meeting current conditions of interstate cooperation and ensuring a mutually beneficial partnership.

In order to provide the people of Murghab rayon with energy resources (fuels) and prevent excessive collection of teresken, the Integrated LTF Report recommends that the two countries conclude a long-term agreement for the delivery of coal from the Sary-Tash deposit in the Alai Valley of the Kyrgyz Republic to the population of Murghab rayon in the Republic of Tajikistan. This would offer Kyrgyzstan a new market while enabling Tajikistan to cover its energy needs.

3.4. LAW ON MOUNTAINOUS TERRITORIES FOR THE REPUBLIC OF TAJIKISTAN

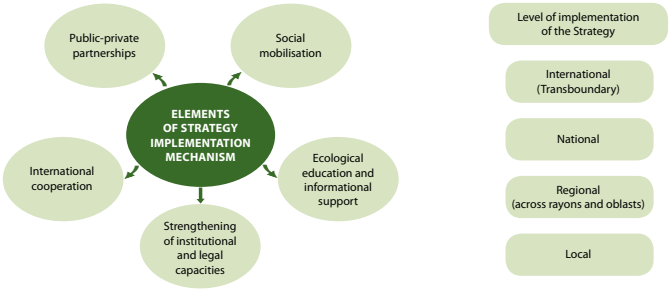
To achieve the objective of SLM in the mountain areas of Tajikistan, the LTFs recommend that Tajikistan introduce a law on mountainous territories regulating the management of low-mountain, mid-mountain, and high-mountain areas, taking account of the specific characteristics of each of these categories.

Over the past few years, the government of the Republic of Tajikistan has made several decisions in support of socio-economic development in mountainous territories. Such development could, to a certain degree, contribute to improving the living conditions during the transitional period of the market economy. However, most of the measures taken have been sectoral, whereas effective management of mountainous territories requires a comprehensive approach, including ecological, economical, and social aspects. Experts consider that the problems of mountainous territories could be solved more efficiently by encouraging local initiatives and social mobilisation among the inhabitants and by giving more authority and independence to local communities.

Other aspects pointed out by the LTFs for consideration when developing the Tajik law on mountainous territories include: a focus on alternative employment opportunities that make better use of the rich natural resources of the mountains; improving market conditions and opportunities by expanding the rights and authority of local administrations and communities and increasing their responsibility for the management of natural resources; and enhancing tourism as one of the most important means of economic development in mountainous rayons.

4 Strategy implementation mechanism

The mechanisms required to implement the Strategy include public-private partnerships linked with social mobilisation, as well as the development of institutional capacity, involving specialists and consultants from international foundations and organisations, providing ecological education, and ensuring informational support. The main mechanism required to successfully implement the Strategy is the assurance of an effective interaction between the state and the private sector, where at present the latter does not participate in environmental activities. Public authorities need to establish a system of incentives and benefits to make the use of environmentally friendly technology more attractive for business organisations and individual entrepreneurs.



With a view to strengthening institutional capacity, and achieving effective regional-level cooperation, it is necessary that a transboundary council be created, consisting of decision-makers from Osh oblast (Kyrgyzstan), GBAO, and Jirgitol rayon (Tajikistan), as well as representatives of international and civil society organisations. Possible tasks of this council could include interaction with the secretariats of the United Nations conventions on biodiversity (UNCBD), climate change (UNFCCC), and desertification (UNCCD) and with programmes of donor organisations working in the High Pamir and Pamir-Alai region (Aga Khan Foundation, ARIS, etc.), including the development and incorporation of specific action plans for each rayon and local community, and providing assistance in fundraising. The council could also perform institutional functions and implement concrete actions at the local, rayon, and inter-oblast levels.

In order to accelerate implementation of the Strategy, especially the transboundary activities considered essential under the Strategy, it is recommended that the agreements to promote cooperation between the governments of Osh oblast (Kyrgyzstan), GBAO, and Jirgitol rayon (Tajikistan) be concluded expeditiously.

The PALM project is foreseen to end by mid 2011, with a possible prolongation of 6 months. For the duration of their activity within the PALM project, the National Executing Agencies (NEA) have confirmed their responsibility for disseminating information about the Strategy and Action Plan, facilitating transboundary meetings (such as the regional government meetings mentioned above), and promoting and coordinating the development of possible follow-up projects. More specifically, this would ideally include the following activities:

For purposes of monitoring and evaluating the implementation of the Strategy it is considered expedient to maintain the national PALM project offices in Kyrgyzstan and Tajikistan. They could also serve as the secretariat to the above council and provide annual reports to the council on the implementation of the Strategy.

Members of the existing National Steering Committees and the Regional Group of Advisers can provide political, institutional, and financial support in implementing the Strategy and Action Plan.

Local initiatives are the main means of implementing the Strategy in an effective way. The local communities at the PALM pilot sites have become involved in, and increasingly committed to, assessing, prioritising, planning, and implementing projects for improving natural resource management. Social mobilisation of the population is a powerful tool for promoting development, intensifying the economy, and strengthening mountain settlements in the region. Concrete actions must be implemented by means of pilot projects, for example on soil and water conservation technologies, rehabilitation of irrigation networks, creation of water and pasture users' associations, and establishment of a rural extension network on the protection of land users' rights, as has been done at the PALM pilot sites. All of these projects are to be carried out with participation of the rural communities.

Further important mechanisms to implement the Strategy include the strengthening of international cooperation and exploration of opportunities to include the region in the major international and regional development programmes and projects. For example, such projects could include establishment of transboundary protected areas, transboundary programmes on conservation of endemic plant and animal species (***Fritillaria Eduardii***, snow leopard, etc.), improving the population's access to modern information channels and communication systems in order to overcome informational isolation and address development challenges in the region.

It is evident that all above-mentioned mechanisms to implement the Strategy require will further harmonisation, especially the improvements to the legal framework recommended to enhance the existing environmental legislation, which is fairly well-developed at this point. For example, for the High Pamir and Pamir-Alai region, and for Kyrgyzstan in general, it is considered expedient to adopt laws and regulations that enable the proper consideration of economic benefits from the use of biological resources and the potential economic damage that can result from such activities. A large part of the rent revenue flowing into the state treasury should be returned to the local governments for the improvement of local and regional natural ecosystems.

In addition, it is necessary to thoroughly develop and describe the mechanisms for enforcing the regulatory acts, particularly at the local and rayon levels. The actions recommended in the Strategy should be carried out within the framework of integrated programmes on sustainable development in Kyrgyzstan and Tajikistan. Moreover, the expert group recommends that, based on the proposed Strategy, action plans be developed for each rayon (and jamoat or aiyl okrug) of the High Pamir and Pamir-Alai region. The levels of strategy implementation – from international to local – are specified in detail in the action plan for sustainable land management of Pamir and Pamir-Alai.

PART VII. Action plan

(PHOTO: PATSAP TEAM TAJIKISTAN)

1. Action Plan for Biodiversity and Forest Management in the High Pamir and Pamir-Alai Region

Overall objective: Conservation, restoration, and development of forests and biodiversity in the High Pamir and Pamir-Alai region

Achieving the goals and objectives outlined in the strategy requires the following actions:

Actions	Phases 1	2	3	Expected outputs and outcomes	Level of implementation
Data collection, analysis, and monitoring					
1.1. Identification of key areas for ecosystem research	+			Map showing research sites	National Regional
1.2. Elaboration of plan for scientific research and instructions on conducting monitoring	+			Plan indicating concrete sites, dates and duration, and the persons and institutions responsible for conducting the various studies, for the use of scientists and personnel of specially protected natural areas	National
1.3. Elaboration of an inventory of species composition and biodiversity abundance with the aim of assessing natural resources based on international standards (e.g. IUCN criteria)		+		GIS-based scientific and statistical computer database	National Regional
1.4. Training of personnel and conducting of monitoring and scientific research activities			+	Annual training of young professionals from academic institutions and specialists from government and non-government institutions active in monitoring of flora and fauna	National Regional
1.5. Creation of a centralised, web-based database (GIS) on natural biodiversity resources that is accessible to all stakeholders			+	Database in GIS system that can serve as a basis for monitoring	Regional
1.6. Elaboration of joint strategies and action plans for rare species (snow leopard, bear, teresken)		+		Transboundary strategies for protecting most severely threatened species	International Regional
Improvement of the legal framework					
1.7. Harmonisation of, and lobbying for, laws and regulatory acts concerning protection and sustainable use of biodiversity and forest resources		+		Inconsistencies and contradictions between and within the legislations of the two countries are removed	International
1.8 Intensification of monitoring of compliance with legislation by all population segments and improvement of mechanisms of its implementation; inter-agency coordination		+		Strict compliance with laws as well as their proper and competent application are ensured	International National Regional Local
1.9. Collaboration of local conservation inspectors with local population for timely prevention of poaching	+			Local population is actively involved in protection; contact groups or persons are appointed in places where poaching is likely to occur	Regional Local
1.10. Establishment of mechanisms of collaboration and interaction between environmental protection personnel and border and customs authorities in prevention of poaching and of export of horns, skins, meat, and other parts or derivatives of wild animals, as well as rare and valuable medicinal plants	+			Joint plan of measures to promote cooperation between the relevant institutions and organisations in the two countries is developed	International Local
1.11. Creation of mobile anti-poaching units in Murghab rayon, GBAO, Tajikistan, and in Chon-Alai rayon, Kyrgyzstan		+		Two mobile anti-poaching units in the key areas of Lake Karakul and Altyn-Mazar	Regional Local
Strengthening of natural resource management infrastructure and technological support					
1.12. Identification of key areas and migration corridors of wild animals for long-term protection on the territory of SPNAs and forestry units (leskhozes)	+			Priority areas for protection and migration corridors of ungulates are mapped	Regional
1.13. Zoning of SPNA territories into protection zones, tourism development zones, and economic zones, and elaboration of management plans for each zone		+		Areas under protective regimes as well as possible combinations of protection and sustainable use of biodiversity are identified	National Regional Local
1.14. Strengthening of material and technical equipment of SPNAs and leskhozes through provision of technical equipment, uniforms, field gear, and tutorial literature		+		Effectiveness of operation is increased as a result of improved material and technical equipment	National
1.15. Training and provision of qualified personnel for SPNAs and leskhozes in rayons and oblasts, along with augmentation of the number of permanent employees in these institutions			+	Professional personnel capacity is created	National Regional
1.16. Discontinuation of livestock grazing in core zone of Tajik National Park, in Zorkul Nature Reserve (zapovednik) and in core zones of new SPNA in Chon-Alai rayon	+			Disturbance factor is eliminated, feeding conditions are improved, and compliance with legislation is ensured	Regional Local
1.17. Establishment of a network of public and private SPNAs of different ranks and with different protection regimes (areas of limited use)			+ +	Local population is involved in solving problems of biodiversity conservation	Regional Local
1.18. Restoration of teresken communities (Ceratoides) in the Eastern Pamirs (Murghab rayon) as most important feeding resource for wild ungulates		+		Protective and feeding conditions in wild ungulate habitats are improved	Local
1.19. Establishment of system of supply of local population with energy carriers (coal, electricity) at reduced prices; development of industrial forestry		+		Natural forests and teresken are no longer used as heating fuel	National Regional Local
1.20. Establishment of research nurseries for growing planting stock for forest, fruit, and berry cultures: dog rose, sea-buckthorn, barberry, apricot, apple, pear, and mulberry			+	Planting stock for reforestation is grown in nurseries	Local
1.21. Rehabilitation (restoration) of degraded forests and establishment of forest belts for erosion control		+		Qualitative and quantitative condition of forest ecosystem is improved and slope erosion is stopped	Local

Actions	Phases[1] 1	2	3	Expected outputs and outcomes	Level of implementation
Strengthening of economic potential					
1.22. Management and sustainable use of forest and hunting resources based on local communities, through provision of local people with forest plots to rent, nurseries, and establishment of community hunting operations		+		New jobs are created, social living conditions of local inhabitants are improved, a sense of ownership and responsibility for natural resources is shown	Regional Local
1.23. Production of souvenir and handicraft products based on microcredits	+			Problem of augmenting employment among the population and providing alternatives to poaching is solved to some extent	Local
1.24. Creation of favourable conditions for tourism development with participation of local population, training of professionals in ecotourism, improvement of infrastructure and tourism marketing		+		Favourable conditions for ecotourism development are created, mechanism of tourist activities is established based on participation of local communities	Regional Local
1.25. Construction of mini production units for processing of forest products and medicinal plants, such as production units for canning fruits and berries	+			Transition from low-price raw produce to economically profitable processed products, solving social problems and providing the market with processed goods; jobs are created	Local
1.26. Establishment of plantations of poplars, willows, and other fast-growing trees for obtaining industrial wood and firewood		+		Demand of population for industrial wood and firewood is partially satisfied	Local
1.27. Modification of distribution scheme for foreign-currency revenue from tourist trophy hunting to increase share of local communities		+		Local inhabitants' interest in conservation and long-term sustainable use of natural resources is increased	National Local
1.28. Establishment of fund for creating material incentives for conservation inspectors and local people to combat poaching		+		Opportunity for material incentives for biodiversity conservation is created	Regional Local
Strengthening of informational and educational potential					
1.29. Awareness raising among local population regarding issues of biodiversity and forest conservation by organising workshops, issuing popular scientific materials, and placing publications and speeches of specialists in the media		+		Public awareness of problems of biodiversity conservation is increased	National Local
1.30. Production and dissemination of popular scientific brochures, booklets, calendars, and postage stamps in collaboration with national and local environmental NGOs			+	Public awareness of problems of biodiversity conservation is increased	National Local
1.31. Organisation of round table discussions with stakeholders, production of radio and TV broadcasts	+			Public awareness is increased	National Local
1.32. Awareness raising among border troops and custom officers of biodiversity conservation and fight against poaching and illegal export of wild fauna and flora	+			Work on preventing poaching and illegal export of trophies is improved	Regional Local
1.33. Organisation of clubs of young ecologists, of elders (aksakals), and others to revive traditions of respect for nature		+		Different age segments of local population are involved in biodiversity protection	Local
1.34. Use of national folklore dealing with environmental topics (proverbs, folk songs, legends) in promotion of biodiversity conservation	+			Local traditional potential for environmental conservation is tapped	Local
1.35. Creation of eco-education centres based on protected areas and national parks	+			Public awareness is increased	Regional Local
1.36. Publication of affordable and accessible lists (brochures, newsletters) of rare and endangered species in the region		+		Information on endangered plant and animal species in the region is available to schools, universities, and natural resource users	International National
International and transboundary cooperation					
1.37. Signing of intergovernmental agreement between RT and KR on protection, monitoring, and research of key, rare, and valuable species of plants and wild animals		+		Agreements are signed at the level of state institutions for nature conservation	International
1.38. Conclusion of agreements on joint cooperation in implementing activities to stop poaching of wild animals (snow leopard, Marco Polo Sheep, Siberian Ibex, and others) and non-organised tourism in the key transboundary areas of Altyn-Mazar and Kyzyl-Art	+ +			Process of illegal hunting of rare, valuable, and most vulnerable wildlife species and non-organised tourism in key areas for fauna and flora are stopped	International
1.39. Development and implementation of joint intergovernmental environmental projects		+		Conservation of, and research on, mountain ecosystems are enhanced by joint efforts	International
1.40. Organisation of international and regional workshops and conferences for discussing issues of biodiversity conservation and restoration	+			Next steps for sustainable use and effective protection of biological resources are determined	International Regional
1.41. Improvement of legal acts and their effective use in transboundary relations		+		Legal instruments for nature conservation are harmonised at the regional level	International Regional
1.42. Coordination of activities of tourism enterprises in the two countries and development of transboundary tourist routes for enhancing the attractiveness of local tourism products on the tourism market	+			Mechanisms for cooperation among tourism enterprises are established, number of foreign tourists is increased, new jobs are created, sale of local products and souvenirs is increased	International Regional

[1] Key: 1 = Short-term phase (up to 2 years); 2 = Mid-term phase (up to 5 years); 3 = Long-term phase (up to 10 years)

2. Action Plan for Increasing the Efficiency of Farming in the High Pamir and Pamir-Alai Region

Overall objective: Sustainable use of land resources and increase in the profitability of agriculture in the High Pamir and Pamir-Alai region

Achieving the goals and objectives outlined in the strategy requires the following actions:

Actions	Phases[1]			Expected outputs and outcomes	Level of implementation
	1	2	3		
Data collection, analysis, and monitoring					
2.1. Preparation of soil maps for each district based on assessment of agrochemical and agrophysical soil properties	+			Soil map indicating soil fertility and soil degradation, to be used as a basis for developing a crop rotation scheme	National
2.2. Investigation of possible areas for cultivation of medicinal plants (camomile, calendula, etc.), fodder (Astragalus, Silphium), and industrial crops (flax, tobacco, etc.) and identification of plants and crops		+		The most promising crops and medicinal plants and possible zones and areas for their cultivation are identified	Regional Local
2.3. Analysis of demand for agricultural and horticultural products on near and distant foreign as well as domestic markets	+	+		Areas and countries with high demand for agricultural and horticultural products from the High Pamir and Pamir-Alai region are identified	International Local
Improvement of the legal framework					
2.4. Development of legal framework for supporting cooperation among small-scale land users to introduce modern and soil-friendly crop production technologies		+		Legal framework for supporting cooperation among small-scale land users to introduce modern and soil-friendly crop production technologies is developed	National
2.5. Provision of legal advice and information material on land use issues for local people	+			Informedness of local population in legal matters related to land use is increased	Local
Strengthening of natural resource management infrastructure and technological support					
2.6. Creation of water users' associations for sustainable and equitable use of water resources	+			Water losses are reduced and social tension is decreased	Local
2.7. Introduction of innovative irrigation technologies (drip and sprinkler irrigation, drainage and root irrigation, hydraulic rams)		+		Additional land is irrigated and water use is optimised by means of water-saving technologies	National
2.8. Creation of material and technical framework (tractors, aggregate machinery, small-scale technical equipment, repair parts, etc.) for farms and agricultural enterprises, based on cooperation		+	+	Sustainable technical equipment framework for farms is created	Local
2.9. Organisation of centralised supply of mineral and organic fertilisers and pesticides for disease and pest control		+		Productivity of crop cultures is increased and their sanitary condition is improved	Regional Local
2.10. Management and sustainable use of resources through development of sustainable forms of farming and land use (rent, long-term use, etc.)		+		New jobs are created, social living conditions are improved, advanced methods are applied	National Local
2.11. Construction and repair of irrigation systems, fortification of embankments, and protection measures against mudflows	+			Area of irrigated land is increased, the condition of irrigated land is improved, and its productivity is increased	National
2.12. Organisation of research seed farms and nurseries - in Alai rayon - in Jirgitol rayon - in Alai rayon for Hissar-Alai and Tenir-Too - in the Western Pamirs		+		Framework for research on, and production of, seed and planting stock is established and ensures supply of high-quality seed and planting stock	Regional Local
2.13. Introduction of technologies for polycropping (combination of several crops on one plot) with a view to increasing productivity of horticulture, vegetable, and fodder production			+	Yields of orchards, vegetable cultures, and hay meadows are increased through intercropping	National
2.14. Dissemination of traditional methods of production and processing of horticultural products	+			Market is provided with quality horticultural products	Local
2.15. Renewal of old orchards (5-10% annually)		+		Area of productive orchards and fruit yield are increased	Local
2.16. Establishment and support of biological laboratories for plant protection: - in Alai rayon for Hissar-Alai and Tenir-Too - in the Western Pamirs		+		An inventory of the most dangerous pests is available and measures for plant protection against pests are developed	National
2.17. Introduction of intensive crop rotation	+			Productivity of arable land is increased	Local

Actions	Phases[1]			Expected outputs and outcomes	Level of implementation
	1	2	3		
Strengthening of economic potential					
2.18. Development and implementation of management plan for introduction of seed and planting stocks tested and approved for specific agro-ecological zones using a variety of financial mechanisms		+		Yield levels and the economic well-being of the population is increased by means of improved stock of crop and seed varieties	Local
2.19. Establishment of storage facilities and small production units for processing agricultural and horticultural produce, based on co-financing		+		Quality storage facilities are available, processed products are produced, jobs are created, and the competitiveness of local products is increased	Local
2.20. Establishment of outlets for selling agricultural, vegetable, and horticultural produce (dried apricots, etc.) and medicinal plants in major commercial and industrial centres of both republics and abroad	+			Additional revenue is generated through increased sales of local products	International Regional
2.21. Establishment of border trade zones (markets, trade fairs)	+			Economic relations are developed, sales of excess agricultural produce are improved, population is provided with essential goods and products	International Regional Local
2.22. Establishment of intermediary enterprises for purchase and further sale of products	+			Produce is marketed rapidly and profitably through intermediary enterprises who purchase from individual producers	Regional
2.23. Assistance in attracting microcredits at favourable conditions for establishment of greenhouse and hothouse farms, including farms using hydrothermal sources		+		Employment and income of local population is increased through development of greenhouse and hothouse vegetable production	Regional
Strengthening of informational and educational potential					
2.24. Development of courses and curriculums on the use of modern agrotechnical practices (school and secondary professional education, short-term courses)	+			Professionally oriented youth groups are created and apply modern agrotechnical practices	National
2.25. Development of instructions, manuals, and booklets on crop production, vegetable-growing, and horticulture; organisation of trainings and workshops, regular extension services for farms and educational institutions on cultivation, storage and processing of agricultural products	+			Level of knowledge and opportunities for product sales is increased	National Regional
2.26. Creation of information database on availability of seeds and planting material, market situation, availability of technical and agrochemical means		+		Timely access to information on options for crop selection, purchase and rent of equipment and agrochemicals, and sales of products is ensured	National
2.27. Training and strengthening of qualified specialists in agricultural production (agronomists, agrochemists, soil scientists, irrigation specialists, experts in processing technologies for agricultural products) through: - introduction of specialised training in institutions of higher education in the High Pamir and Pamir-Alai region; - further training of specialists in Osh and Khorog - development of relief schemes and fostering mechanisms for young professionals with required profiles by state and local governments	+			Branches of the institutions of higher education are provided with highly qualified specialists in agriculture from among the local population	National Regional
International and transboundary cooperation					
2.28. Use of twinning agreements for exchange of information, more comprehensive and mutually beneficial use of material farming resources (agricultural machinery, agrochemicals, seed and planting stock)	+			Mutually beneficial cooperation enhances sustainable land management throughout the region	International Local
2.29. Creation of transboundary structures for interaction and exchange of information, technology, seed, and planting stock		+		A foundation is laid for sustainable use of good practices, modern technologies, and quality seed and planting stock	International Local

[1] Key: 1 = Short-term phase (up to 2 years); 2 = Mid-term phase (up to 5 years); 3 = Long-term phase (up to 10 years)

3. Action Plan for Use of Mountain Pastures and Increasing the Productivity of Livestock Farming in the High Pamir and Pamir-Alai Region

Overall objective: Sustainable pasture management and increase in the productivity of livestock farming in the High Pamir and Pamir-Alai region

Achieving the goals and objectives outlined in the strategy requires the following actions:

Actions	Phases[1]			Expected outputs and outcomes	Level of implementation
	1	2	3		
Data collection, analysis, and monitoring					
3.1. Elaboration of a plan for research on, and monitoring of, the condition of pastures and hay meadows	+			Research plan is available and provides a basis for development of actions for sustainable use and restoration of pastures	National
3.2. Study of productivity of different types of pastures and determination of their capacity		+		Basis for mapping of pasture capacities is created	National Regional
3.3. Mapping of grazing capacity and redistribution of pasturelands under consideration of their capacities		+		Adequate stocking densities are implemented on concrete pasturelands based on grazing capacity maps	Regional
3.4. Identification of highly productive fodder plants that are resistant to climate change		+		High-yield fodder plants previously not cultivated in the region are identified and introduced into production	National Regional
3.5. Increase in personnel and enhancement of professional capacity of relevant departments of ministries of agriculture of both republics as well as related organisations with a view to conducting a comprehensive scientific survey of pastures (geobotanical characteristics, soil properties, water regime, stocking density)			+	The level of knowledge about sustainable management and improvement of pastures among mid- and top-rank agricultural specialists is raised, providing a basis for development of long-term sustainable use and restoration of severely eroded pastures	National Regional
3.6. Development and provision of investment projects for study of pasturelands		+		Study of pasturelands and restoration of degraded pastures is accelerated based on investments, thereby improving access to pasture resources and increasing sustainability of pasture use	National Regional Local
Improvement of the legal framework					
3.7. Extension of area affected by Art. 2 of the Kyrgyz Law "On Pastures", which promotes sustainable pasture use by providing the option of additional income-generating activities (ecological and scientific tourism, beekeeping, etc.)	+			The condition of pastures is improved, additional income is generated, prosperity is enhanced	National Regional Local
3.8. Lobbying in support of a Tajik law on pastures	+			Tajik law on pastures is adopted and enables farmers to know their rights regarding use and management of pastures, thus promoting sustainable pasture use	National Regional Local
3.9. Monitoring and assessment of impacts of introduction of Kyrgyz Law On Pastures			+	Groups of highly qualified legal experts develop a law on pastures for Tajikistan based on the results of the impact assessment and monitoring of the Kyrgyz law, sustainable use of pasture resources is enhanced	National Regional
Strengthening of natural resource management infrastructure and technological support					
3.10. Inventory of pasturelands, definition of plot boundaries, and allocation of plots to specific users based on appropriate certification		+		Control and responsibility for, sustainable pasture use are ensured	Regional
3.11. Development of mechanism for gradual restoration of pastures near villages by introducing seasonal use restrictions		+		Strict system of rotational grazing is established and winter pastures are restored	National Local
3.12. Melioration of pasturelands (first of all pastures near villages), conservation of valuable natural fodder species, and prevention of weed encroachment through regulation of pasture rotation and compliance with grazing quota		+		The condition of pastures in Tajikistan and Kyrgyzstan is improved	Local
3.13. Transfer of part of pastures near villages to hay meadow category through enclosure with natural vegetation, irrigation, and reseeding with perennial fodder grasses			+	The process of degradation of pastures near villages is stopped, fodder supply is improved, and a more productive ecosystem is forming	Local
3.14. Development of investment projects to improve condition of pastures		+		Economic basis for addressing issues of sustainable pasture use and fodder supply is ensured	Regional Local
3.15. Prevention of teresken extraction in the Eastern Pamirs by solving problems of energy supply for population (use of alternative sources of energy)			+	Degradation of teresken shrubs is reduced, fodder base of pasturelands is improved, and desertification is reduced	Regional Local
3.16. Preparation of seed and subsequent sowing of, and reseeding with, more productive fodder crops (including Elymus L., teresken, etc.) in order to promote meadow formation on pastures		+		Natural and cultivated pastures are restored, fodder resources and productivity of pasturelands are increased	Local
3.17. Repair and construction of transhumance routes and bridges		+		Access to remote pasture is ensured and stocking rate on pastures near villages is reduced	Local
3.18. Establishment of breeding farms for breeding pedigree livestock adapted to high-altitude conditions (yaks, cows, sheep, horses, etc.)			+	Breed composition is improved, traditional breeds adapted to local conditions are restored	Regional Local
3.19. Establishment of specialised yak-breeding farms in Murghab rayon of GBAO, Tajikistan, and Chon-Alai rayon, Kyrgyzstan		+		Improvement of breed composition and increase in productivity in yak farming are ensured	Regional Local
3.20. Processing of livestock products (creation of mini production units, training in modern processing technologies, etc.)			+	Revenues from sales of processed livestock products is increased	Local

Actions	Phases[1]			Expected outputs and outcomes	Level of implementation
	1	2	3		
Strengthening of natural resource management infrastructure and technological support					
3.21. Establishment of cooperative animal husbandry and veterinary centres and centres for artificial insemination (one in each rayon of Kyrgyzstan and Tajikistan)			+	Veterinary services are improved and productivity of livestock farming is increased through improvement of genetic structure of livestock	Regional Local
3.22. Establishment of mobile centres for emergency veterinary care		+		Veterinary services for livestock breeders on remote pastures are improved, epidemics are prevented	Local
3.23. Establishment of fish and bee-keeping farms			+	Sale of fish and honey generates new jobs and additional income	Local
Strengthening of economic potential					
3.24. Development of project proposals for improving local road and transport infrastructure (roads, bridges) and summer quarters		+		Grant mechanism including cash or in-kind contribution by local communities for priority investments contributes to reducing technical obstacles to use of summer pastures.	Regional Local
3.25. Development of incentives for farmers to participate in programmes of examination and vaccination, including provision of free vaccines (brucellosis) and payment of adequate compensation for slaughter of sick animals.		+		Epidemics and mass diseases of livestock are prevented	Regional Local
3.26. Coordination, accumulation of funding, and monitoring of state programmes for development of livestock farming, including yak farming			+	Stable development of livestock sector is ensured, risks of livestock losses are reduced, and food security in the region is maintained	National Regional
3.27. Development and provision of investment projects on livestock farming	+			Investors are attracted for specific projects on developing livestock farming, including yak farming	Regional Local
Strengthening of informational and educational potential					
3.28. Training and enhancement of qualifications of specialists of local authorities and pasture committees in issues of pasture management (planning, use, assessment, and restoration)		+		Competent management of pasture resources is achieved	National
3.29. Training of specialists of local authorities and pasture committees as well as pasture users in rapid appraisal of pasture condition based on assessment of projective cover and plant abundance		+		Grazing regime and quota are estimated based on rapid appraisals	National
3.30. Development of courses and training programmes on rights and responsibilities of pasture users and details of pasture use, taking account of specific local conditions (for schools, secondary professional education, short-term courses for farmers)		+		A basis for sustainable pasture use by concrete pasture users is created	National
3.31. Development of instructions, manuals, and booklets for pasture users		+		Knowledge about sustainable pasture management is available to pasture users	National
3.32. Training and strengthening of qualified specialists in agricultural production (agronomists, veterinarians, specialists in livestock husbandry, land melioration, and processing technologies for agricultural products) through: - introduction of specialised training in institutions of higher education in the High Pamir and Pamir-Alai region; - further training of specialists in Osh and Khorog - development of relief schemes and fostering mechanisms for young professionals with required profiles by state and local governments			+	A basis for use of the latest advances in agrotechnics, livestock husbandry, veterinary science, and other areas of agricultural production is created	National Regional Local
International and transboundary cooperation					
3.33. Development of a framework for transboundary cooperation (contracts on pasture renting, exchange of pedigree livestock)		+		Breed composition of livestock is improved, and pastures in the Kyrgyz Republic are rented for the period of restoration of pastures near villages	International Local
3.34. Drafting and adoption of agreement on mutual providing of pastures	+			Agreement provides a basis for removing pressure on most degraded pastures	International Local
3.35. Organisation of exchange of experiences between farmers and specialists from neighbouring countries		+		Increase in productivity of all types of land use is ensured	International Local

[1] Key: 1 = Short-term phase (up to 2 years); 2 = Mid-term phase (up to 5 years); 3 = Long-term phase (up to 10 years)

4. Action Plan for Reducing Risks of, and Vulnerability to, Natural Hazards in the High Pamir and Pamir-Alai Region

Overall objective: Reduction of existing dangers and risks of natural disasters and reduction of the vulnerability of land resources and the population in the High Pamir and Pamir-Alai region

Achieving the goals and objectives outlined in the strategy requires the following actions:

Actions	Phases			Expected outputs and outcomes	Level of implementation
	1	2	3		
Data collection, analysis, and monitoring					
4.1. Selection of priority sites and areas for preventive measures to increase safety of population and land from natural hazards	+			List of sites and settlements ranked by levels of risk and exposure to natural hazards, along with plan for engineering measures to protect them	National Regional Local
4.2. Improvement of monitoring system, including satellite remote-sensing, for particularly dangerous sources of disaster risk (glacial lake outbreaks, landslides, avalanches above roads), as well as for weather data and parameters of main watercourses		+	+	Interpretation and analysis of high-resolution satellite images is carried out regularly once or twice every year in order to detect changes in the Earth's surface in the High Pamir and Pamir-Alai mountains, and a GIS database of the monitored parameters is established as a basis for assessment of situations and operational decision-making	International National
Improvement of the legal framework					
4.3. Development of regulatory acts for implementation and required enforcement of the Kyrgyz Law "On Civil Protection"		+	+	Regulatory acts under the Kyrgyz Law "On Civil Protection" are elaborated in the following areas: - empowerment of local state administrations, local self-governance bodies and organisations, and the population - international cooperation - funding for civil protection activities	National Regional
Strengthening of informational and educational potential					
4.4. Conducting of seminars for the authorities and the population in order to inform them of potential natural hazards in their areas of residence and of recommended response and protection measures in cases of emergency	+	+		Seminars are conducted annually in local communities	International National Regional
4.5. Preparation and publication of various information material on potential natural hazards	+	+		Material is published with sufficient print run for dissemination	International National Regional
4.6. Development of mechanism to ensure continuous informedness of local population about potential natural hazards	+	+		Persons responsible for dissemination of information material in communities are determined (teachers, presidents of local governments, elders)	International National Regional Local
Международное и трансграничное сотрудничество					
4.7. Development of a programme of protective measures against natural hazards		+	+	Programmes of measures for protecting land resources and the population against specific types of natural hazards are ready to be presented to donors and foreign governments	International National Regional