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Environmental Degradation, Migration, Internal Displacement, and Rural Vulnerabilities in Tajikistan

May 2012

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ACKNOWLEDGEMENTS

The authors of this report express their deepest gratitude to Zeynal Hajiyeu, Chief of IOM Mission in Tajikistan and the employees of the IOM country office, especially Moyonsho Mahmadbekov, Patrik Shirak and Zohir Navjavonov for their invaluable advice on improving the structure and content of this report.

Special gratitude goes to Alihon Latifi, Executive Director of Bars Consulting Ltd., Haidar Dzhumankulov, Academician of the Tajik Academy of Agricultural Sciences and also Hikmatullo Akhmadov, President of the Tajik Academy of Agricultural Sciences for the information, comments, advice and recommendations.

Deep appreciation is expressed to Solihodzha Boltuev, Head of the Farming Enterprise in Isfara district and Suhrob Hasanov, Deputy Head of the Department of Labour and Social Protection in Panjakent district of Sughd Province.

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LIST OF ACRONYMS

ADB	Asian Development Bank	PO	Public Organization
CIS	Commonwealth of Independent States	POP	Public Opinion Poll
FGD	Focus Group Discussion	RF	Russian Federation
GBAO	Gorno-Badakhshan Autonomous Oblast	RRS	Regions of Republican Subordination
IDP	Internally Displaced Persons	RT	Republic of Tajikistan
IOM	International Organizations for Migration	UN	United Nations
NGO	Nongovernmental Organization		

GENERAL PROVISIONS

This research aimed at exploring the link between the degradation of the environment, migration, internal displacement, and the vulnerability of the rural population in the Republic of Tajikistan. It was based on a public opinion poll representing the country's population and quantitative and qualitative surveys in 4 districts with different types of environmental degradation and migration patterns: environmental migrants who resettled in a new location in 2005 following the floods (Sarazm and Khurmi, Panjakent district of Sughd Province), environmental migrants who resettled to a new location after floods in 2005 (Faizobod, Kodara and Andzhiron villages of Hamadoni District, Khatlon Province), environmental migrants who returned to their previous place of residence following resettlement (Chorsada, Nurobod District, RRS), and labour migrants from Jamoat Kulkand and severely affected by degradation (Isfara District, Sughd Province).

This report provides qualitative data with regard to the environmental situation in Tajikistan and quantitative data on the perception of the environment by the country's population as well as an assessment of the causes of migration, quantitative and qualitative data on the types of migration, and its association with environmental changes. Focus Group Discussions (FGD) and interviews with key persons in 4 selected districts enabled us to find to what extent environmental factors affect the development of temporary internal and external migration as well as resettlement to permanent places of residence both within the Republic of Tajikistan and beyond.

KEY FINDINGS

In recent years, the population of Tajikistan has been experiencing negative consequences from environmental degradation for numerous reasons: rapid population growth, widespread violation of the environment. The increasing climate change will lead to the intensification of environment degradation, and the acceleration of natural disasters.

The population of Tajikistan considers droughts, the shortage of potable and irrigation water, the per capita shortage of agricultural lands, land degradation (including crop-lands and pastures) climate change, and particularly the abnormal fluctuations in precipitation and temperature increases as their major problems.

Climate change, together with the local negative impact of environmental degradation, significantly affects the living habits of local communities, sometimes compelling them

to resettle involuntarily. The rural population of Tajikistan is the most vulnerable (74% of the country's total population). Due to salinization, erosion, and the loss of fertile land, its productivity declines. Warm winters lead to the spread of agricultural pests and diseases destroy orchards. Inadequate irrigation, the lack of new resources for land cultivation, and modern machinery has decreased agricultural efficiency in the areas affected by degradation. Sughd Province is the most vulnerable area as the survey showed.

Environmental degradation is increasingly impacting the migration patterns of the population of Tajikistan. Despite the fact that the country's population is consistently implementing a migration strategy involving temporary labour migration plus agriculture at home such as subsistence farming with the intensive participation of women and children, environmental factors have become ever so crucial in the decision-making process of migration, especially in choosing the types of migration—temporary external, internal, seasonal, and agricultural labour migration or emigration.

Research has shown that the concept of ecological migration in Tajikistan is understood as a consequence of natural disasters or designated to prevent their adverse effects. In Tajikistan, there is legislation in place, which is regulating migration caused by natural calamities, and institutions have been established to manage migration. The state annually resettles hundreds of households from hazardous zones by providing assistance and support. Also informal methods of assistance are available to the victims, as well as their adaptation to new situations.

In Tajikistan, however, there is a trend toward the growth of self-managed migration, induced by ecological causes, particularly by gradual environmental degradation. Environmental factors pose a direct cause in bolstering migration as well as the contextual factors of the process of the development of migration in Tajikistan.

Environmental degradation aggravates the already vulnerable stance of communities that are losing adaptation resources, and it deprives them of the opportunity to survive, thus driving them out of the affected areas.

The research demonstrated that opting for a form of migration depends on the scope of destruction and the deprivation caused by natural disasters, on probability of relapse, loss of livelihood, the volume of assistance, the poverty level, remittances, and the potential capacities in the places of destination. At times, affected households apply several types of migration and use certain patterns relevant to the circumstances.

In practically every case, efforts to mitigate natural disasters involve labour migration. Male members of households having no insurance or large amount of savings make a trip to places where, within a short time, they can acquire the means to restore their households. In some cases, if attempts to restore the household are unsuccessful and new locations lack sustainable sources of income, labour migration becomes a stable part of the household economy.

Based on the research, districts affected by environmental degradation have the highest level of migration. However, in the event of extreme pauperization, such as due to natural disasters, households cannot fund the initial costs of migration and choose internal migration or random earnings. Hence, villages seriously affected by natural disasters have a lower level of labour migration, while internal migration is higher than in neighbouring villages.

Key success factors for adaptation of population to the effects of unfavourable ecological factors are:

- Economic development of the regions affected by environmental degradation. It is crucial to ensure the development of the agricultural infrastructure, the financial sector, the insurance and labour market, education, and the SME sector.
- Membership in social, religious, professional, and other associations, and the capacity to build communities facing environmental degradation. The most effective institutions are traditional social ones, such as offspring (*avlod*) and the neighbourhood community (*mahalla*). In addition to the state, they assist vulnerable households, including arrangements for migration.

Major recommendations:

The study revealed that the rural population of Tajikistan is heavily vulnerable to environmental degradation. The most common adaptation strategy to the negative changes was both external and internal labour migration.

Environmental degradation is not a powerful push factor by itself. It becomes such because of inadequate management of natural resources and poor administration observed in the agricultural sector as a whole. Therefore, the key tasks are the need to improve sustainable management of natural resources, sustainable agricultural development and promotion of agrarian reform, capacity building, expansion of authority and responsibility of local communities in rural areas, promotion of gender development, capacity building of agencies providing assistance in emergency situations of natural character, improving migration management, as well as counselling and awareness-raising activities.

- The economic development of rural areas and measures taken to decrease their vulnerability are the best tools for risk mitigation, damage minimization, and the acceleration of the rehabilitation of communities affected by environmental degradation.
- It is important to ensure favourable conditions for farm development and the build-up of the agricultural infrastructure and the processing system in rural areas.
- It is crucial to ensure poverty reduction and thereby bolster the diversification of revenues, including labour migration in a civilized form and its institutional structures.
- To this end, it is necessary to promote small enterprises and private businesses and to involve rural communities - primarily women and youth - in entrepreneurial activities.
- Bolster the development of the service sector, primarily tourism and crafts.
- It is crucial to encourage savings through the employment of bank instruments, micro-crediting, and the development of the insurance business.
- International organizations need to provide conditions for the sustainable funding of soil degradation prevention programmes.

It is important to:

- bolster social investments and promote social consolidation, develop community governance and strengthen community's capacity in traditional form and in the form of NGOs;
- rehabilitate irrigation, collection, and drainage systems, as well as pumping facilities;
- utilize modern irrigation techniques: tube, rain, and drip irrigation, etc.;
- take measures for economically feasible development of the employment sector in rural areas;
- restore the traditional knowledge and models for environmental management as well as to implement inexpensive and available innovative technologies in the agricultural industry;
- consult with the victims of natural disasters when selecting a location for their resettlement and ensuring their involvement in decision-making;
- conduct monitoring and follow-up studies on the migration associated with environmental degradation.

BACKGROUND

The impact of ecological factors on migration fluctuations has captured a lot of attention over the recent decade. Environmental changes associated with natural phenomena, anthropogenic impacts, and climate change encourages increased migration trends, modify their destinations and forms of migration relevant to environmental factors.

The environmental degradation caused by various reasons has its greatest impact on the rural population because the deterioration of the environment deprives them of their livelihood, compels them to develop adaptation strategies, and, in the worst case scenario, to migrate in a temporary or permanent fashion. Taking into consideration the fact that rural residents comprise a major part of the population of Tajikistan (74%), it is likely that the problem of environmental migration is extremely up-to-date for Tajikistan, a mountainous terrain with annual avalanches, floods, and mudslides that cause extensive damage to the rural population.

Natural disasters generate fast state and community responses. Sufficiently progressive legislation is in place in the Republic of Tajikistan to regulate migration induced by natural calamities, and institutes are designated to manage it. Every year hundreds of households are being resettled by the state from disaster-prone areas and provided support and assistance. Communities also help people affected by natural disasters.

However, there are gradual changes in the environment that have a greater impact on human life than nonrecurring natural phenomena. Droughts force people to migrate more than mudslides. Together with migration induced by natural changes in the ecosystem, migration grows in association with the adverse consequences of human activity: soil degradation caused by poor irrigation systems, the deterioration of soil and water protection structures; and inadequate water resource management. Climate change exacerbates the situation by causing aridization of the region, affecting glaciers, inducing mudslides, and stimulating desertification. All of these developments lead to aggravated economic hardships, deteriorating social conditions, poverty, and the bolstering of both internal and external migration.

In recent years politicians and scientists have taken a growing interest in the dynamic correlation between migration and environmental changes. It has to be acknowledged that despite a great interest in this topic, there is very limited data on the correlation between the environment and migration. Therefore, projects have been implemented recently for empirical data collection geared towards assessing the impact of environmental changes

on decision-making in relation to migration. Therefore, the European Commission initiated a scaled international project on Environmental Changes and Forced Migration Scenarios (EACH-FOR) involving 23 countries. The section on Tajikistan in this study was implemented by Parviz Hakimov and Moyonsho Mahmadbekov. In substance, the study is the first in the Republic of Tajikistan to survey the migrating population associated with environmental degradation. As shown by the survey results of these authors,¹ despite the different types of environmental degradation in place, communities continue to live in these locations. The key reasons for that settled life are the existence of a labour migrant in the household, reluctance to leave one's ancestor's land, and the lack of sufficient financial resources.² The survey of households that pointed out at various types of environmental degradation showed that nearly 62% of them had labour migrants in Sughd, 44% and 46% in Khatlon and the RRS respectively. The survey results indicated that 14% of migrants were engaged in unpaid household labour.

P. Hakimov and M. Mahmadbekov came to the conclusion that environmental degradation can have not only a direct impact, but also indirect stimulating effect on external and internal labour migration - through the decreasing incomes of the population engaged in agriculture related to the process of environmental degradation.

Notwithstanding the fact that Hakimov/Mahmadbekov's study covered a significant array of issues, most aspects of environmental degradation's impact on migration needs further research. Thus, this is an issue of how environmental changes impact the lives of rural communities in Tajikistan. Hitherto, the impact of deteriorated soil, salinization, desertification and droughts on rural population has not been studied. Despite the fact that, based on UN data, 40 thousand hectares of land in Tajikistan are affected by salinization and 40 thousand hectares by flooding, and that every year 1000 hectares of land are driven out of agricultural rotation due to salinization (UN, 2004), there have not been any studies on the link between environmental degradation and migration in rural communities.

Regularly, researchers involved in exploring the link between environmental degradation and migration processes in different parts of the world are focused on the adverse effects of migration, including on the environment.

There are considerably fewer studies that reflect how migration helps to cope with adverse environmental effects,

1 Hakimov P. Sh., and Mahmadbekov M. Sh. The Economic Dynamics of Labour Migrant Remittances in Tajikistan, IOM Tajikistan, April 2009, www.iom.tj/publication/html.

2 Surveys on climate change in Republic of Tajikistan, 2010 OSCE – "XXI Century Youth", Dushanbe, 2010, p. 25

i.e. how migration becomes a response strategy or how it can control pressure on ecologically hostile regions.

In order to better understand the substance, nature, and dynamic of ecological migration processes in rural areas, IOM initiated this survey on Environmental Degradation, Migration, Internal Displacement, and Rural Vulnerabilities in Tajikistan.

Survey goals

To expand the knowledge base on the association between a deteriorating environment and migration that can be applied to strengthen the government's capacity and that of communities concerned about responding to challenges through the development of adequate policy and programmes.

RESEARCH QUESTIONS & METHODOLOGY

The major questions addressed during this study included:

- How strongly is migration induced (directly or indirectly) by environmental factors?
- Which environmental factors push people to migrate and what is the specific effect of environmental factors on migration in various regions of Tajikistan?
- Is migration (temporary or permanent) a means for responding to environmental degradation?

For the purposes of this research, a combined methodology was used involving descriptive statistics, quantitative and qualitative methods of study, and with the use of secondary data sources. The methodological concept included approaches developed and reflected in the book "Migration, Environment, and Climate Change: Assessing the Evidence." eds. Frank Laczko and Christine Aghazarm.

The first phase included a review of various data sources in order to study environmental assessment in the Republic of Tajikistan, historical models of migration, environmental changes, and migration correlation, as well as the legislation of the RT, studies, and the press. Additionally, data from the Ministry of Labour and Social Protection of Tajikistan, official statistical data, and former studies, as well as, "Climate Change Research in Tajikistan for 2010." OSCE - XXI Century Youth, Dushanbe 2010, page 25; Parviz Hakimov and Moyonsho Mahmadbekov "The Scenario of Environmental Change and Forced Migration in Tajikistan", was used.

The second phase ensured the implementation of a quantitative study comprised of two parts:

PUBLIC OPINION POLL (POP-1)

1050 respondents aged 18 and above were surveyed based on a personal standardized interview method. The sampling represented the population distribution by the regions and types of settlement. The respondents in the households were selected based on the rule of the most recent birthday. The sampling error was under 2.5%.

The goal of the survey was to study population of Tajikistan's perception of the problems of environmental degradation and their association with migration, to determine the key factors of degradation's impact on migration, and to map the terrain of Tajikistan based on these indicators.

To this end, a questionnaire comprised of 21 questions was developed and integrated into the omnibus survey conducted by the Sharq Centre in April 2011. The survey was conducted based on a national representative sampling in 150 clusters located in 104 settlement points across all the provinces of Tajikistan. The survey was based on personal interviews at respondents' homes.

DIAGRAM 1. DISTRIBUTION OF INTERVIEWS BY PROVINCES (POP-1)

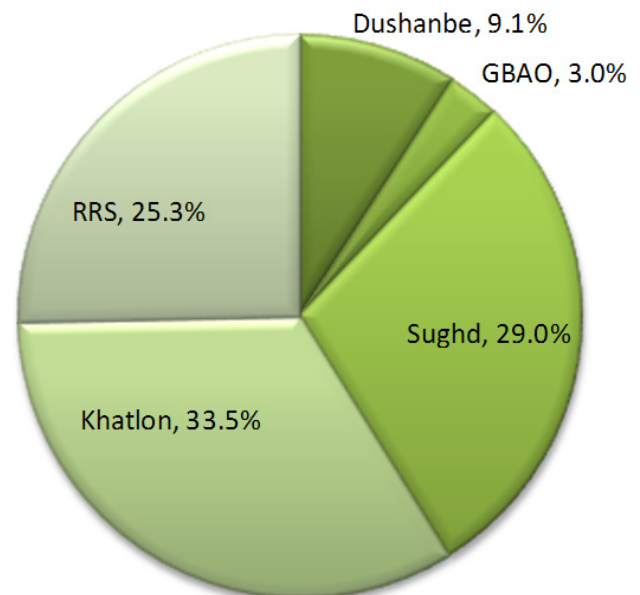


TABLE 1. DISTRIBUTION OF INTERVIEWS BY SURVEYED AREA (POP-2)

No. of heads of environmental migrant households

Districts	Surveys
Nurobod	40
Hamadoni	40
Panjakent	40
Isfara	10
TOTAL	130

SURVEY OF FOUR VULNERABLE DISTRICTS

After conducting a national public opinion poll, four districts with various types of environmental degradation and migration patterns were selected, including the Sarazm and Khurmi communities of Panjakent district, the Kul-kand community of Isfara district (Sughd Province), the Dzhashtigul and Kalinin communities (Faizabad, Kodara and Anjircon villages) of Hamadoni district (Khatlon Province), the Hakimi community (Chorsada village) of Nurobod district (RRS). Semi-structured surveys covering 130 respondents were conducted in these districts. The sampling was carried out aided by the “key informant” and “snowball” methods. Four groups of respondents were surveyed: a) heads of households from disaster areas, b) heads of resettled households, c) heads of households from areas hosting environmental migrants, and d) labour migrants.

The questionnaire was developed based on EACH-FOR research materials and R. Bilsborrow’s recommendations adjusted along the lines of the research goals and objectives.³ The sampling goal was to attempt to obtain materials enabling the comparison of more or less objective and subjective assessments of the values of various factor groups. The questionnaire included 73 questions and was comprised of several blocks of issues: climate change, soil and water conditions; agricultural productivity, livestock population and pasture conditions; the demographic situation, employment, and migration; the sources and income levels of the population; the role of ecological and some other factors in improving the communities’ wellbeing.

Both samplings were carried out by a team of 47 professional interviewers in many research projects, including 25 women and 22 men who were trained to use the research instruments and were evaluated. All supervisors and interviewers were fluent in Tajik, Russian, and Uzbek and could interview in the respondents’ native language. To ensure the toolkit validity, a pilot interview was conducted upon which the questionnaires were updated.

The monitoring and quality assurance of the sampling was conducted by supervisors involved in assessing the accuracy of filling questionnaires. Assessing the interviewers’ accuracy (twice for each interviewer) was ensured through the random approach and by interviewing respondents who had already been interviewed. In addition to that, 10% of the questionnaires were validated based on the method of telephone interviewing.

The need to further explore vulnerability of rural population to environmental degradation and the related migration made us to reject quantitative research in Isfara district, and use semi-structured interviews and focus group discussions. Changes to the methodology were caused by the fact that there is insignificant ecological migration in Isfara district, but a high degree of environmental degradation, vulnerability of the rural population and migration.

QUALITATIVE METHODS

Aside from the quantitative survey, qualitative methods were also employed. In order to assess the history of environmental change and its impact on migration in the affected areas, the following interventions were carried out:

- Expert interviews including interviews with the staff of the Ministry of Labour and the Social Protection of the Population of the Republic of Tajikistan and NGOs;
- Focused interviews with key informants in each selected area: the staffs of employment centres, the Committee for Emergency Situations, communities (*jamoats*), neighbourhood (*mahalla*) committees, farmers, and migrants;
- 3 FGD with migrants, their family members, representatives of the state institutions, local authorities, and experts in the specified districts.

DATA ANALYSIS

When the survey was finished, all of the questionnaires were encoded and the data was prepared through the use of SPSS.

3 EACH-FOR Field Questionnaire—MIGRANT questionnaire
Richard E. Bilsborrow, Collecting Data on the Migration– Environment Nexus // Migration, Environment and Climate Change: ASSESSING THE EVIDENCE. http://publications.iom.int/bookstore/free/migration_and_environment.pdf



The Rasht Valley is one of the most vulnerable regions to climate change in Tajikistan.

Database was cleared and a follow-up tabulation was introduced. Data development and introduction, and cleaning and tabulation were carried out by two operators and programmers at the Sharq Research Centre.

In the final phase, the received data was evaluated and a report was developed.

TERMS AND DEFINITIONS USED

Forced migration

General term used to describe a migratory movement in which an element of coercion exists, including threats to life and livelihood, whether arising from natural or man-made causes (e.g. movements of refugees and internally displaced persons as well as people displaced by natural or environmental disasters, chemical or nuclear disasters, famine, or development projects).⁴

Environmental degradation

The destruction or significant environmental disorder in nature that ensures substance and energy exchange within nature, and between nature and humans.

4 A Glossary on Migration, ed. Richard Perruchoud (Geneva, 2005), art. 89

Seasonal worker

A migrant worker whose work by its character is dependent on seasonal conditions and is performed only during part of the year (Art. 2(2)(b), International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families, 1990).⁵

Natural disasters

Environmental disaster, an unpremeditated natural catastrophic event making the environment unfit to live in for humans or dramatically deteriorating the environment.

Environmental migrants

Environmental migrants are persons or groups of persons who, predominantly for reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move within their country or abroad.⁶

METHODOLOGICAL PROBLEMS

Over the course of the study an array of methodological problems were defined. Firstly, the definition for “environmental migrant” is used in Tajikistan only with regard to

5 Ibid., art. 89.

6 Ibid., art. 89.

those who resettle based on state organized programmes, normally after having the Committee for Emergency Situations provide an opinion about the environmental threats to their habitat or those affected by natural disasters, or for individuals resettled by the state because of development projects such as power plant construction. The following is a definition for “environmental migrant” formulated in Migration Law: ‘Environmental Migrants’ - individuals forced to leave their homes due to environmental disasters. (Migration Law, art. 1). Internal migration and environmental migration procedures are determined by the Government of Tajikistan (Art. 2). Persons resettling due to environmental degradation are not regarded as environmental migrants.

A ground observation of the study suggests that the population of Tajikistan has a rather obscure and incomprehensible idea about what the ecology and the environment are. The majority of the respondents appreciated an ecological situation and the environment as the environment of an anthropogenic nature by assessing the level of sanitation, water supply, and public utility services available in their settlements. Only one third of the respondents of POP-1 suggested that the environment involves the condition of the earth, water, atmosphere, etc. That compelled us to apply quality methods more intensively - the interviews and the FGD focused on exploring environmental degradation factors, population vulnerability, and its response to environmental risks.

The need to explore the rural population’s vulnerability to environmental degradation and the migration associated with it compelled us to abstain from a quantitative survey in the Isfara district and to apply semi-structural interviews and FGD. These changes were induced by the fact that there was no significant environmental migration in the Isfara district. However, the level of environmental degradation, the rural communities’ vulnerability, and migration were high.

The distinction between forced and voluntary migration caused for environmentally related reasons was yet another methodological challenge. The definition for forced migration was indeed adaptable in the event of natural disasters and calamities. On other occasions the distinction between forced and voluntary migration was vague due to the comprehensiveness of migration associated with environmental factors. The multiple causes for migration associated with environmental degradation, as well as a combination of several types of migration in the life of a single environmental migrant, make it difficult to draw a clear distinction. The difficulties in defining environmental migration make it challenging to estimate the scopes of migration caused by environmental migration.

Over the course of the research we were also confronted with a challenge related to the research methodology. The interviews and quality researches are based on the subjective evaluation of environmental degradation that may be inconsistent with the objective data, such as precipitation level, crop yield, soil mineralization level, etc. The evaluation of migration is also subjective and not always consistent with the objective data. For instance, survey data from the district of Panjakent indicated that villages populated by environmental migrants from Shing have a somewhat lower migration level compared with the other villages of the district. Congruence with the data from the Ministry of Labour and Social Protection suggested that, to the contrary, migration level in these villages is higher than in other societies (*jamoats*). Thus, the reliability of data based on the communities’ representation needs to be verified with the objective data wherever possible. Concerning the assessment of environmental degradation and climate change, the materials and data used were provided by the Soil Institute of the Agricultural Academy of the Republic of Tajikistan, including satellite images. The study demonstrated that surveys and interviews provided enough evidence on migration processes, their causes, strategies, population adaptation to environmental degradation, and process histories. However, the evidence on environmental conditions, environmental degradation, and their causes was very relative.

RESEARCH RESULTS

OVERVIEW OF THE ENVIRONMENTAL SITUATION IN TAJIKISTAN

In recent years the population of Tajikistan has been increasingly affected by the aftermath of environmental degradation by virtue of a whole range of reasons: the rapid growth of the population and the widespread disturbance of the natural environment. The processes of increasing climate change have led to the intensified problems of environmental degradation.

One of the key factors significantly affecting environmental conditions is the demographic situation. During the years of independence, the population of Tajikistan has increased considerably – from 5,108,600 in 1989 to 7,565,000 in 2010. This has increased the stress on the environment. Population growth took place due to the natural birth rate, which, although it has declined over the past 20 years (from 32,3 to 22,5 per thousand), is nonetheless high.

The population of Tajikistan is unevenly spread. Over 85% of it is concentrated in the areas at the altitude of 1500-1800 meters above sea level in two great agglomerations:

the north and the central-south western, which are separated from one another. If the population density of GBAO comprises 3.4 persons per square kilometre,⁷ the population density of the valley areas of northern Tajikistan are considerably higher. In the district of Jabbor Rasulov, for instance, the population density is 385 persons per square kilometre. The densely populated areas experience critical land shortage for habitation and the business activity of communities.

Natural disasters

93% of Tajikistan is mountainous terrain and 80% of the land area is located in a seismically active zone. The combination of mountainous terrain with high altitude ranges from 350 to 7495 meters over sea level, violent swings in temperature with over +40C in summer and -30C in winter, intensive snow and glacier melt from March through August, storms with over 100 mm rain/day stand behind a high rate of disaster threat.

The key disaster threats that occur naturally or have a man-made character, to which Tajikistan is prone, include: floods, mudslides, soil erosion, rock falls and avalanches, earthquakes, droughts, outbreaks of disease, industrial disasters and the subsequent pollution of the environment (problems of tailing in Sughd Province).

Damage is mainly caused by floods and mudslides. Tajikistan has 102 mudslide-prone rivers. The areas with the most mudslide activity include the Zarafshon river basin whence 150 mudslides a year emanate, as well as the Vakhsh and Panj river basins with 70 mudslides on the average. The highest mudslide activity occurs in April (35% of all mudslides) and in May (28% of all mudslides). Man-made mudslides stem from outbursts and runoffs of water from canals and water-storage basins. The break of the Sargazon water-storage basin with a capacity of 2.5 mln. cubic meters in 1987 is a good example.

Sarez Lake with 17 cubic km in capacity and 3,260 m above sea level is also a threat; its affected area includes a territory of 55 thousand square kilometres in Tajikistan, Afghanistan, Uzbekistan, and Turkmenistan.

The intensity and frequency of natural disasters in the form of mudslides, floods, high waters, and avalanches in recent years have been affected by climate change. The widespread temperature increase against the fragmented increase and decrease of humidification mode facilitates climate aridization in Tajikistan.⁸ The abnormal fluctuations in atmospheric precipitation increase the frequency of natural disaster.

7 The Regions of the Republic of Tajikistan, 2010, pp. 20-21.

8 Climate Change Study in Tajikistan, 2010, OSCE – XXI Century Youth, Dushanbe, 2010, p.5.

TABLE 2. THE SCOPE OF NATURALLY INDUCED EMERGENCY SITUATIONS

2003	2004	2005	2006	2007	2008	2009
162	434	284	201	111	117	189

Source: State Statistical Agency, 2010. *Statistical Yearbook, State Statistics Agency of the Republic of Tajikistan*, p. 194.

In the first six months of 2011, Tajikistan had 120 naturally induced emergency situations resulting in the loss of 11 lives. In 2010, 236 natural disasters resulted in the loss of 61 lives and 4425 damaged houses.

Gradual environmental degradation

Natural disasters such as mudslides, floods, and landslides draw a lot of attention and evoke a rapid response from the state and society. However, there are slow changes in the environment that can have a considerably stronger impact on the future movement of population. For instance, over the last 30 years twice as many people were affected globally by droughts rather than storms (1.6 billion compared with nearly 718 million).⁹

The major environmental problems in Tajikistan are the degradation of the land and water, deforestation, and decreased biodiversity. The main problem for the rural population includes soil degradation. Tajikistan is one of the most land-deprived countries in Central Asia. Only 32,2% of its territory comprises agricultural lands, over 80,8% of which is seasonal pastures and just 16 % is cropland. Per capita irrigable land is less than 0,116 hectares, including 0,08 hectares of irrigated cropland. Land suitable for farming comprises 8% of the country's territory. Though farm land areas were increased at the expense of rain-fed pastures by 169,7 thousand hectares (in 1990-2002), cropland area was decreased at the same time by 9%. The per capita decrease of cropland emanates not only from population growth, but also from land acquisition under civil and industrial construction, and because of the land cessation from agricultural rotation. Despite a trend in deurbanization from 1991 through 2002, the land areas occupied by cities increased 38% and by rural settlements 124%.

Total land area of Tajikistan as of 2005 was 14,255,397 hectares (see Table 3).

The major types of soil in Tajikistan include the brown mountain soil and the valley marginal gray soil (1-3% humus) with relatively low humus and high carbonate content. Low natural land productivity requires significant spending on agrotechnical and reclamation operations.

9 Migration, Environment, and Climate Change: ASSESSING THE EVIDENCE. Eds. By Frank Laczko and Christine Aghazarm, p.10.

TABLE 3. THE LAND RESOURCES OF TAJIKISTAN

	Thousand hectares
Lands of agricultural assignment	7784.4 including irrigable land 703.8
State Forest Fund lands	888,4
Lands for human settlement	69,9
Lands under industry, transport, communication, defense, and other designations	177,6
State Water Fund lands	39,1
Lands of environmental, recreational, and historical-cultural designation	2631,5

Types of soil degradation

97.9% of the territory of Tajikistan is exposed to degradation and desertification. 88,7% of that is in the high or medium range. The ratio for the causes of soil degradation is distributed in the following way: cattle overgrazing - 35%, deforestation - 30%, agricultural activities - 27%, excessive exploitation of vegetation - 7%, industrial activity - 1%. Nearly 10,000 hectares of irrigable land is not used due to soil salinization and other reasons.¹⁰

Erosion by water

Rare generous irrigation and losses through filtration from canals to irrigable lands lead to subsidence, landslides, avalanches, and the formation of gullies. Irrigation is regularly superficial (along ridges). With all the benefits of this approach, the cost of water irrigation is high. In the mountainous areas and the foothills with slopes such irrigation results in erosion. The soil exposed to erosion in Tajikistan comprises 58.9%, including marginally washed-off soil - 14.8 %, medium washed-off - 20.1 %, and intensely washed-off - 23.9%.

Soil wash-off on slopes

This is especially prevalent in the foothills and the high mountainous areas. A significant part of the agricultural area (76%) is located at the altitude of 800-2500 meters above sea level; land with a slope ratio 10-200 comprises 14.6% of the total area of the country. Due to the high poverty rate and the lack of employment, the local population

reclaims new areas, mainly rain-fed land or provisionally irrigable land, land under cultivation with wheat and other crops, and ploughed areas with a slope ratio of 15-250. The reclamation of land areas with a slope ratio of 100 facilitates soil erosion.

Wind erosion

Wind erosion is most typical for GBAO (40%), is prevalent in the Vakhsh zone (24%), and is observed in the Shartuz, Jilikul, Beshkent, Jomi, Kumsangir, and Panjakent districts, and Sughd Province (23%), particularly in the Zarafshon Valley districts (Panjakent district).

Landslides

Landslides take place in the mountainous areas of the country, and everywhere where there is a slope with over 10% ratio. Landslides often are developed during farming on mountainous slopes, when river banks and water storage basins are washed off due to the irregular construction of hydro-technical facilities (canals, ditches) and roads, as well as due to gullying. Landslides damage fertile mountainous slopes and turn them into waste areas.

Water saturation and the swamping of soil

This occurs at high-water beds or as a result of human activity due to the increase in ground water level. Permanent or seasonal swamping covers 12 to 15% of irrigable land (Akhmadov, 36). Swamping leads to decreased soil fertility and the preclusion of significant areas from agricultural use.

Salinization

This frequently occurs in inter-mountain valleys such as the Fergana, Surkhandariyo, Kulob, Beshkent, Kofarnihoni Poyon, Vakhsh, Panji Poyon, Yovon, Danghara, and Lohur valleys. Salinization is a major problem for irrigated farming in arid lands that have a poorly developed or no ground water drainage capacity. Irrigation of newly developed areas in foothills leads to the rise of ground water which takes out mineral salts from the bottom of the ground and from ground waters. It facilitates the salinization of previously irrigated areas located below newly reclaimed ones, commonly at the level of the second and third terrace above the floodplain.¹¹

There are secondary salinization problems as well. Water used for irrigation or the wash-out of salinated soil is five and more times more mineralized than regular water. It is diverted through collector and drainage systems and gathered in the rivers and water reservoirs used for irrigation. As a result, the irrigated water mineralization level is increasing year by year and entails the need for increased irrigation norms for land desalinization. This vicious circle further facilitates the rise of ground waters and the

10 Akhmadov Kh.M., *Eroziya pochv v Tadjikistane i rayonirovaniye po metodam bor'by s nei*, Dushanbe, Izdatel'stvo "Sharqi ozod", 2010, p 34.

11 Ibid, p 34-36.

salinization of irrigated areas. Soil salinization comprises 15% of the irrigable area of Tajikistan.

A major part of a previously irrigated area has a rather developed collector and drainage system. However, due to its poor condition, the system doesn't cope with the diversion of infiltrated waters. It induces soil salinization and, in a number of places, gullyng. Since the early 1990s, due to the increase in the cost of energy, the lack of spare parts, ruined and obsolete hydraulic systems, and the high value of new machinery, as well as poor levels of maintenance, the collector and drainage systems have not been rehabilitated. As a result, the efficiency of the present horizontal open drainage facilities is as high as 60-70% while that of the closed ones is only 50%.¹² The vertical drainage systems were notably deteriorated. The serious decline of farming culture has exacerbated the situation. Land salinization entails not only the destruction of the land and agricultural losses, but it has an adverse affect on water and the environment, including the atmosphere, biodiversity, and human health.

Soil dehumidification

In the last decade, soil fertility has noticeably declined. This is due to the decreased content of humus in the soil as a result of improper soil treatment, the shortage of fertilizer, and irregular crop rotation. Overall, the soil in Tajikistan, particularly in the mountains, is unlikely to be fertile. Consequently, dehumidification leads to decreased agricultural productivity, erosion, and soil deflation. The reduced application of organic and mineral fertilizer by more than three times results in poor soil fertility and a downturn in agricultural productivity.

Degradation of pasture areas

Pastures comprise 3,648 thousand hectares. Practically all of the pastures are located on steep hills where risks of erosion are high. In recent years pastures have been overused, exacerbating erosion and leading to the desertification of summer (90%) and winter (92,5) pastures. In overgrazed areas, particularly on bluegrass and sedge pastures, the culture content in plants is progressively changing. With that, pasture productivity is declining by 5-10 times.

Deforestation

In recent years, due to energy deficiency in places, there was a widespread cutting of forests that took on a dangerous quality. The areas of conradi, walnut, birch, and pistachio forests decreased by 20 to 25%. The cutting of forests affected the air temperature, increased the range of temperature fluctuation and land loss (by 29 times) during rainfalls. Cattle overgrazing in deforested areas aggravates soil degradation to the point of its being eliminated in certain areas. In the Shartuz district, several hectares of soil

THE IRRIGATION SYSTEM OF TAJIKISTAN

Irrigation farming is located in the inter-mountain hollows and valleys where the surface slopes are considerable (from 0,001 to 0,05). It requires the creation of a modern water management scheme comprised of sophisticated and unique hydro-technical constructions. Nearly 48% of the irrigable land of the Republic depends on a pumping system to supply water to the areas at an altitude of from 10 to over 200 meters. In the Republic of Tajikistan there are currently 17 irrigation systems using 445 pumping stations and 1,845 pumps that correspond with a set of varied technical constructions and water intake facilities to supply water to the farms, thus decreasing ground water level, diverting the excess and underground water, preventing erosion, and protecting the land and commercial facilities from the damaging effect of floods, mudslides, etc. Deterioration of the technical condition of irrigational and collector-drainage systems led to the systematic under-flooding of 142 and seasonal under-flooding of 490 residential settlements. In Tajikistan, from 15 to 22 thousand hectares of irrigable land a year becomes unusable due to soil-reclamation reasons.

reinforcing the haloxylon desert were removed. That led to the formation of sand-drifts and dunes up to 4 meters high.

The poor protective qualities of forests has a significant impact on the erosion processes in the mountains and the increase of areas affected by various levels of degradation, firstly those designated as agricultural. As a result of such processes, the scope of various natural disasters such as mudslides, landslides, and avalanches increases.

Increase of wastes, including industrial pollution

The size of industrial wastes, including toxic wastes, comprises 200 million tons; secondary wastes treatment is not available. Municipal wastes are discarded in the waste fields, special fuel storages and treatment facilities are not available. Unauthorized waste fields occupy tens of hectares of land every year.

Climate change

Climate change affects the intensity and frequency of natural disasters, including mudslides, floods, and avalanches. Research results and interviews with ecologists and soil scientists showed that ground air temperature in most geographic areas and the high altitude zones of Tajikistan is increasing. It is established that the annual temperature increase in Tajikistan is 0,01°C on average. The general

¹² Ibid., p. 31.

trend of increase in air temperature accounts for the significant atmospheric winter-spring temperatures. On the one hand, the level of fluctuation in atmospheric precipitation is variable due to the great geographic and climatic diversity of the area. Consequently, the widespread increase of temperature, as opposed to the fragmentary increase and decrease in the moisture regime, facilitates climate aridization in Tajikistan. On the other hand, abnormal fluctuations in atmospheric precipitations affect the intensity and frequency of the occurrence of natural disasters, including mudslides, flood, and avalanches.¹³

Impact of these changes will indirectly affect various forms of human activity, from economic development to public health. These impacts exacerbate economic challenges, cause a deterioration in social conditions and poverty, and, in turn, encourage both internal and external migration. Moreover, climate changes, together with the local adverse effect of environmental degradation, have a significant impact on the lifestyle of local communities, and in a number of cases leads to the forced resettlement of their population. Given the scarcity of resources and the attempts to retain existing and oftentimes ecologically unstable means of environmental management, this will lead to the increase of the anthropogenic burden on new places of settlement and a decline in living standards.¹⁴ The mostly rural population of Tajikistan comprises the major part of the country's population (74%) and is in a difficult situation.

The disruptions of the initial years after independence and the civil war and its consequences resulted in mass internal migration. Thus, the mountainous areas of the RRS, Sughd Province and GBAO received a considerable number of internally displaced persons (IDP) from Khatlon Province and central Tajikistan. The mass development of mountainous and foothill areas with their fragile ecosystems got underway, thus aggravating the process of environmental degradation ever more. These processes were also affected by altered types of farming: the proportion of cattle overland farming was drastically decreased. Simultaneously, the livestock population on private farms increased. Consequently, livestock was kept in small herds near its owner's dwellings. That resulted in the year-round exploitation of the majority of seasonal pastures. Pasture overgrazing leads to degradation. Other pastures in forested areas were ploughed up. All these activities led to the rapid development of soil erosion in the foothills and mountainous areas.

The notable negative impact is carried forward by the reclamation of extremely steep and erosion-prone forest slopes previously underdeveloped. The productivity of such

THE IMPACT OF MIGRATION ON LAND USE

With mastering of new valleys and irrigation lands in the 1930s, 40s, 50s, and 60s, the residents of mountainous districts were resettled to valleys. The mountainous territory was used mainly for summer pasture. As a result, man-made pressure on the mountainous ecosystem decreased several fold. Many of the natural ecosystems were restored during this period. However, after the adoption of the Government Resolution in 1990 for the rehabilitation of mountain villages, many of the residents of valleys returned to their old locales and began using land, water, forest and other natural resources intensively while breaking ecosystem balance. Currently we observe intensive degradation of lands and depletion of bio resources.

areas enables them to yield harvests for 2-3 years more, thus transforming those areas into wastelands and forcing farmers to reclaim new areas on ever steeper slopes.

Population growth, food security problems, energy deficiency, and low incomes compel communities both in the mountains and the valleys to overuse natural resources, disrupting them even more.

At the same time there is no incentive for investment in productive long-term land use, which prevents the development of agriculture and environmental preservation.

GOVERNMENT POLICIES TO FIGHT AGAINST SOIL DEGRADATION

The Government has adopted a concept of the adequate use and safeguarding of the water resources of Tajikistan, including the following programmes, which are in place: the Tajikistan Clean Water and Sanitation Programme, World Bank and ADB funded irrigation and collector-drainage rehabilitation system, the rural infrastructure programme and land reclamation programme of the Danghara valley, funded by the Islamic Bank.

The Parliament of the Republic of Tajikistan approved the Poverty Reduction Strategy Paper (2002) where much emphasis is placed on water in the overall fight against poverty. Public investment and technical assistance programme for 2001-2003, in which the fight against soil degradation holds a major place, was approved based on the Presidential Decree of 11 February 2002.

Soil degradation continues to be an urgent problem of development in Tajikistan despite certain steps taken by the government and implementation of pilot projects supported by the World Bank and Asian Development Bank. The

¹³ Climate Change Study in the Republic of Tajikistan 2010, OSCE – XXI Century Youth (Dushanbe, 2010), p.5

¹⁴ Ibid.

main reason for this is the inadequate management and lack of incentives for investment in enhancing long-term land productivity.

RURAL POPULATION'S VULNERABILITY TO ENVIRONMENTAL DEGRADATION

Agriculture is one of the priority sectors of Tajikistan's economy. Over 76% of country's population resides in rural areas, and more than half of the economically active population is occupied in agriculture.

Despite tentative positive trends in the agricultural sector reform and some growth in productivity, there are few constraints on land degradation and inadequate water resource management. Areas prone to erosion, swamping and salinization due to run-off from reclamation, hydro-technical, anti-erosion, and anti-salinization structures are increasing.

The poor land and water resource management in agriculture tends to exacerbate the impact on the condition of the country's land and water resources, consequently leading to low agricultural productivity.

The expiration of existing irrigation facilities, poor technical infrastructure of farms, and ineffective economic incentives hamper transition to progressive methods of irrigation and land management and result in the further expansion of irrigable areas prone to swamping and salinization. The decreased import of mineral fertilizers led to deteriorated crop and livestock production, exacerbated the problem of food security and poverty, especially among the rural population. It affected the employment, income level, and living standards of the population. The increasingly aggravated condition of land and water resources and the failure to take adequate or sufficient measures resulted in significant crop decreases and unreasonable costs for the rehabilitation of environmental facilities.¹⁵

The intensity of the salinization affecting crop productivity can be estimated by the way the yield rate drops 20% under slight salinization, 40% under moderate salinization, and 70% under grave salinization, while under extremely grave salinization (when the soil turns to saline marsh) the crops are doomed.¹⁶

Fruit productivity compared to 1990 decreased 30-35%; for vegetables 10% and grapes 57%. Decline in agricultural productivity is related to inadequate forms of economic management and economic incentives, the application of

TABLE 4. THE SHARE OF AGRICULTURE IN GDP (IN %)

1996	2000	2003	2009
36	27	25.2	18.5

Information source: State Statistical Agency, RT (2010), p.204.

traditional farming and irrigation techniques, insufficient use of organic and mineral fertilizers, and the poor performance of the material infrastructure of the agricultural sector.¹⁷ Despite some improvement in crop productivity in 2008-2009, it remains rather low. In addition, over recent years farming standards have declined and the traditional relations and standards of ecosystem exploitation have been distorted.

VIEW OF THE POPULATION OF TAJIKISTAN ON THE ENVIRONMENT AND MIGRATION

Environmental assessment

POP-1 data enabled us to realize the extent to which the environmental situation and ecological threats are perceived by the population of Tajikistan, as well as the most prevalent strategies of adaptation applicable to current conditions.

Firstly, the survey helped to determine what is perceived of the ecological situation and the environment. The respondents' perception of the environment include: a) the environment of an anthropogenic nature – settlements, the atmosphere, and the nearest croplands; b) the ecological conditions of the district, gorge, valley, and region in general.

Based on the survey data, 22.7% of urban and 26.8% of the rural population indicated that the ecological conditions of their areas improved while 42% of the urban and 43.2% of the rural residents indicated that conditions had deteriorated, 32.2% of the urban and 28.1% of the rural residents suggested that they didn't change. The majority of the respondents indicated that the environment improved referred to the near sphere. 61.1% of those who believed ecological conditions improved suggested that they had better hygiene conditions in their districts, better access to clean water, and better handling of trash, while 32% indicated an increase in garden areas, improved soil fertility, the reclamation of new areas, and stable rainfall distribution.

Although the gap between cities and rural areas in terms of the dynamics of the environmental situation is not very large, the causes of improved/deteriorated ecological situation distinguish. If the urban people pointed out those

¹⁵ Integrated environmental assessment, Republic of Tajikistan, UNDP 2006, p.78.

¹⁶ Kh. M. Akhmedov. Soil Erosion in Tajikistan and Zoning according to fighting against it. Dushanbe 2010, p.166

¹⁷ Ibid.



Largely deserted resettlement village of Beshkent in Khatlon province.

municipal utility services improved, the rural population more often indicated an improvement in water supply and sanitation as a result of their own collective efforts. Both urban and rural populations pointed out that the improved environment was due to the elevation of skills in self-organization: they (neighbours, apartment block residents, streets, communities, and villages) grasped the idea of organizing their ecological well-being independently from the state and conducting *hashars*, or voluntary Saturday cleanup, to provide amenities and better environmental well-being for local settlements. The majority of rural residents reported that they had laid water pipes to their households, created a pond or ensured access to potable water, improved the areas for trash disposal, and cleaned out the irrigation ditches.

In our neighbourhood (mahalla) we learned to keep it clean and garbage was not thrown onto the roads anymore. They take care of the water ponds from where they drink water. Before, they used to dump the trash in the ditches. (Shugnon district, GBAO)

People realized the importance of keeping things clean jointly, and that filth is harmful, not just for themselves, but also for the children. Thus, they do their best to maintain cleanliness (Bokhtar district, Khatlon).

The roads are fixed, and the trash is not scattered everywhere. People acknowledged that a lot depends on them. Thus, they concentrated on the development of the area and landscape gardening. We arrange for volunteer work on the Saturday before every holiday (Kulob district, Khatlon).

Access to drinking water improved. All flowing water canals were cleaned. Areas for the disposal of trash were cleaned and moved out of the village (Jabbor Rasulov district, Sughd).

Compared to the post-conflict period, life became better, people dug pools to collect water and kept them clean, because water is first of all for drinking (Jomi district, Khatlon).

There were many fewer people who indicated improved environmental conditions, implying that the surrounding territory - one third of the respondents. 12% of respondents pointed out that areas in cotton were now occupied by gardens that new approaches in tillage and new crop varieties brought about improved crop productivity.

Compared to previous years, the weather became cooler, and fruits and vegetables ripened every year (Hamadoni district, Khatlon).

Fruit trees are being planted, better tillage skills are being acquired, leading to a higher yield capacity for plots of land, and

adequate water supply is available. Areas previously dead or planted in cotton are now planted with fruit trees. They are clean, and the ditches are cleaned up. (Temurmali district, Khatlon).

Perception of the environmental and ecological situation at the regional cross-section

Based on the results of the cross-regional study, the majority of respondents in Sughd Province indicated an obviously deteriorated environment – 52.3% of respondents. In GBAO, in contrast, only 18.8% of respondents believed that the environmental situation had deteriorated in recent years.

ENVIRONMENTAL DEGRADATION: CAUSES AND FACTORS

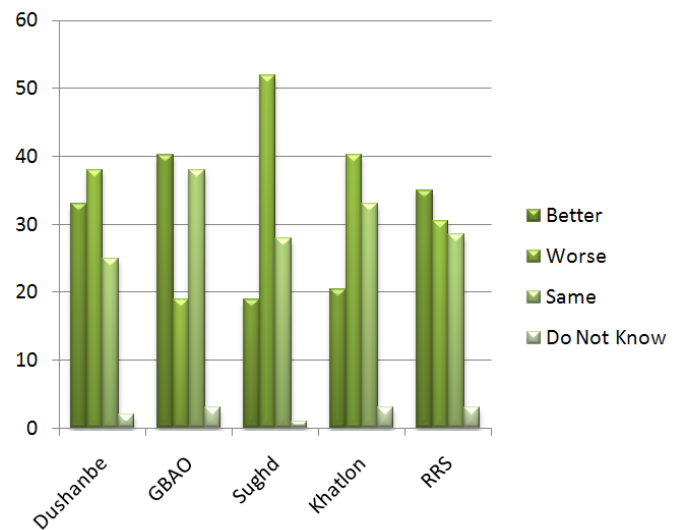
The disaggregated data of POP-1 based on geographic location (rural/urban) enabled us to outline the environmental degradation factors that rural communities were most concerned of:

- Drought, potable and irrigation water shortage: 37,8% of rural residents
- Lack of waste collection places, wastes are not treated, not moved out polluting environment: 19,9%
- Lack of mudslide canals cleaning measures: 8,3%
- The spread of plant diseases, agricultural pests, and rodents: 6,5%
- Transferring pastures to private ownership causing the cattle to graze in the wrong places and to pollute the environment: 5,3%
- Water pollution from industrial waste and household trash: 5,2%
- Air deterioration due to industrial pollution (cement plant, aluminium smelter) and exhaust gases: 4,3 %
- Cutting down of trees: 4,0%
- Increased rate of natural disasters: 1,5%
- The deterioration of sanitary conditions (wastes, bad water) affecting infectious disease morbidity rate: 1,5%
- Acute shortage of land due to population growth: 1,2%
- Land salinization: 0,6 %
- Pollution caused by tailing pits: 0,6%

Below we discuss the data obtained in more detail.

The biggest group of rural respondents that indicated a deteriorating environment (37%) recorded a decrease in the precipitation rate, frequent droughts, the drying-up of water sources, and the shortage of potable and irrigation water.

DIAGRAM 2. ENVIRONMENTAL SITUATION AT THE REGIONAL CROSS-SECTION



In recent years the natural sources have tend to dry up. There is no other water source for drinking and irrigation. We are not sure what to do if the source dries-up. (Panjakent district, Sughd).

Drought became the key factor for environmental degradation in Sughd Province. In addition, the survey and interviews revealed that the crucial factors of environmental degradation include natural disasters, soil salinization and degradation, the most susceptible areas being upstream of the Zarafshon River. Rising temperatures and precipitation levels along with intensive deglaciation and snow melt in the Zarafshon valley carry the risk of frequent natural disasters (mudslides, floods, avalanches) for Northern Tajikistan. It also has a pronounced man-made factor - the cutting down of trees and overgrazing by cattle that exacerbates the impact of climate change even more. In the long run, serious droughts are most likely to happen that already take effect during extreme fluctuations of temperature and precipitation. The most vulnerable sectors of this region are the land resources, agriculture, water management, natural ecosystems, and tourism.

In the foothills and valleys of Sughd Province man-made factors are mostly apparent: salinization, underflooding and degradation of previously cultivated lands, and soil erosion. Notable climate change was recorded by the local population that involved increased temperature and its extreme fluctuations. Thus, in the Isfara district temperature fluctuations determined the lack of apricot production in the last 4 years and led to the collapse of a traditional industry – the production of dry fruits.

Our lands are running dry and we can't get a good harvest. Even fruit trees do not yield. Children don't get fruits in the summer due to the shortage of both potable and irrigation water. (Isfara district, Sughd)

Due to the lack of water, our lands can be sowed only with winter wheat, nothing else. (Panjakent district, Sughd)

Due to the lack of irrigation water we cannot plant fruit trees. We can't grow anything other than wheat on the rain-fed lands. (Konibodom district, Sughd)

Our land is unproductive due to the shortage of water. As a matter of fact, there is no potable water. When it rains, we collect and store rainwater in barrels. (Qabodiyon district, Khatlon)

Previously, the water supply system in our village used to be much better. Currently, the situation is harsh and becomes worse day by day. Without water, life is terrible. (Konibodom district, Sughd)

There is no potable water in our village, nor is there water for watering the garden. We have water delivered to us, so we buy it. Water is discharged from the cistern by the house. Potable water is delivered from a distance. It is of a poor quality and salty. When it rains, we fill the cistern. If there is no rain, we'll have a hard time. (Konibodom district, Sughd)

The respondents described the effect of droughts:

We have outbreaks of disease both among the people and the livestock due to droughts in our village. (Asht district, Sughd)

The majority of answers provide direct evidence of aridization induced by climate change and associated environmental degradation.

The climate is changing year after year. It affects our lives. Winter this year was abnormal. The level of precipitation was low. The water in the river was drying up. Consequently, glaciers do not thaw. The water level in the rivers is decreasing. Due to low level of water in the water storage facilities, restrictions on the power supply are introduced in the cities. In rural areas power was short for over a month. Gas was totally unavailable, and food was cooked on wood fires. (Bokhtar district, Khatlon)

The respondents also pointed to the population growth, which decreases access to land and water resources, and the high rate of natural disasters.

In recent years, the rate of natural disasters increased, including floods, earthquakes, landslides, and droughts. We have

landslides and mudslides occurring more frequently. (Panjakent district, Sughd)

An insignificant number of respondents - nearly 3% - associated the frequency of landslides and mudslides with deforestation and the cutting down of trees. They also assumed that cutting down of trees and planting greenery in residential areas aggravated the environmental situation. They noted that due to the population's inability to buy fuel for household needs, as well as the shortage of power in the winter, trees are cut down everywhere, thus increasing the risk of mudslides, avalanches, floods, landslides, and, consequently, soil erosion.

Previously there were lots of trees here. In recent years, trees get cut down. They are almost completely gone. There is filth all around. Trash is everywhere, and it is rarely disposed of.

The lack of power and, the cutting down of trees for firewood damages ecology of the environment. (Ayni district, Sughd)

The responses also included the effect of man-made factors on the environment.

When the aluminium smelter operates, besides toxic gases, it emits dust, which settles on the plants, subsequently withering them. (Tursunzoda district, RRS)

There is a cement plant not far from our place. There is no escape from the dust. People get sick more frequently, and the toxic cement dust greatly affects human health. (Varzob district, RRS.)

Due to the proximity of the tailing pits of the city of Chkalovsk's industrial enterprise, more and more land becomes unfit, and the sickness rate increases. (Gafurov district, Sughd)

The respondents' feedback testify that the preventive measures for natural disasters and environmental degradation are insufficient.

The discharge canals for mudslides never get cleaned. If it floods, it collapses wattle and daub houses because the canals are clogged. (Isfara district, Sughd)

Trees are not treated for pests. Most trees are infested and don't yield fruit. (Rasht district, RRS)

SOIL DEGRADATION

Neither of the qualitative surveys - the POP-1 and the POP-2 - reveal the communities' concerns about soil degradation. However, one qualitative survey - the interviews and the FGD materials - showed that behind most of the complaints there was the problem of soil degradation. A comparison of the analyses of the objective data (materials

TABLE 5. DID VERY MANY RESIDENTS LEAVE YOUR VILLAGE DURING THE LAST YEAR?
(VIEW OF THE POPULATION, DISTRIBUTION BY THE PLACE OF RESIDENCE– CITY/VILLAGE)

	Dushanbe	GBAO		Sughd		Khatlon		RRS	
	City	City	Village	City	Village	City	Village	City	Village
Yes	72,9%	100,0%	79,2%	48,8%	54,9%	83,9%	93,2%	79,2%	91,7%
No	27,1%	-	20,8%	30,0%	45,1%	16,1%	6,4%	20,8%	8,3%

provided by the Soil Institute) and the survey data enabled us to determine how much the population was affected by land shortages and erosion, as well as the adverse effect of applying traditional farming methods.

*When new lands above old gardens are reclaimed, the ground water with salt rises up and the land becomes unfit for use.
(Isfara district, Sughd)*

MIGRATION AND ITS ASSOCIATION WITH ENVIRONMENTAL CHANGES

Brief overview of migration in the Republic of Tajikistan

Tajikistan is known to have a high level of labour migration. In 2007, every third household had at least one family member in labour migration abroad.¹⁸ The size of labour migration from Tajikistan in 2009 was estimated at 800,000, comprising nearly 10% of country's population.

According to R. Brown, S. Olimova, and M. Boboev (2008), the majority of labour migrants from Tajikistan are young men - (93%); 66,7% of all migrants are 16-34 years of age, and 76% are from rural areas. The education level of migrants is above country's average: 22,3% of migrants have higher education and 76,2% have a high school education. They migrate to different countries. However, the prevailing majority (93%) go to Russia. They are engaged in such sectors as construction (74,1%), trade (10,8%), agriculture (5,4%), industry (4,8%), and transport and public utility services (4,8 %). The share of seasonal migration is significantly high - 73,1% of migrants are employed abroad on a seasonal basis.¹⁹

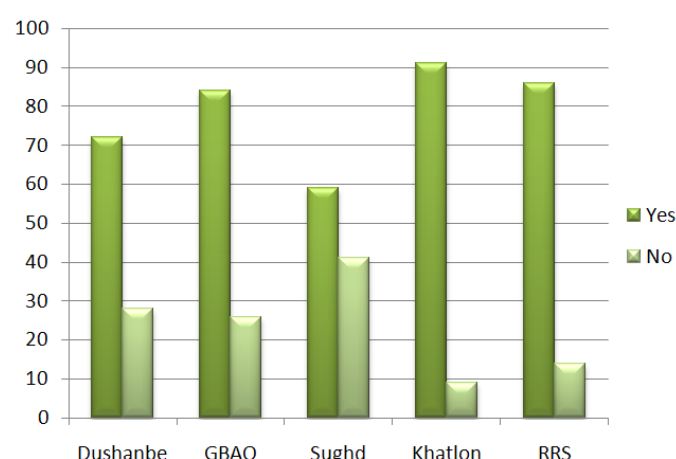
Tajik migrants make a large contribution to the economy of their native country as well as their destination country.

18 Brown, R., S. Olimova, and M. Boboev. (2008). "Country Report on the Remittances of International Migrants in Tajikistan," in, Study on International Migrants' Remittances in Central Asia and the South Caucasus. Asian Development Bank, Manila. Accessed through: <http://www.adb.org/Documents/Reports/Consultant/40038-REG/40038-04-REG-TACR.pdf>;

19 Ibid.

DIAGRAM 3. THE FEATURES OF (OUTFLOW) MOBILITY IN THE REGIONAL CROSS-SECTION

Did many of your community's residents leave in the last year?



The share of remittances transferred back home in 2011 according to the National Bank of Tajikistan constituted 2.96 billion US dollars, which comprises 45% of Tajikistan's GDP.

Other types of migration flows - internal, net migration, push-pull migration, and migration in pursuit of studies – are substantially smaller by proportion when compared to labour migration.

View of the population of Tajikistan about the migration situation

We determined the overall perception of migration by our respondents. Based on the results, the POP-1 recorded a high level of mobility for the Tajikistan population. In the cross-regional study, the highest mobility was recorded in Khatlon Province, and the RRS - 91,8% and 85,7% respectively - reported that the majority of residents left their settlement over the course of last year. The lowest level of mobility in the public opinion poll was reported in Sughd Province as only 58,2% of those interviewed reported that

the majority of residents of their community moved out over the course of last year.

While exploring migration features, it was revealed that the absolutely dominate trend was that of labour migration beyond Tajikistan, mainly to the Russia. In Sughd Province, the trend comprised internal labour migration (*mardikori*). There was internal migration in Khatlon Province. There was a net outflow migration beyond Tajikistan with the highest level in Sughd Province and the GBAO.

Migration potential of Tajikistan's population

When analyzing migration intentions we discovered that the population of Tajikistan continues to implement a migration strategy involving temporary labour migration plus an agricultural economy at home, along with subsistence farming with the high level of women and children participation. According to the Gallup Poll, only 9% of the respondents would like to leave the Republic of Tajikistan permanently. At the same time, 28% of respondents (national representative sample) would like to go abroad for temporary employment.²⁰

The residents of GBAO and the Sughd Province are prepared for future migration. Intentions to migrate are less evident among the residents of Dushanbe, Khatlon Province, and the Regions of Republican Subordination (RRS) where the populations is less mobile.

MIGRATION ASSOCIATED WITH ENVIRONMENTAL DEGRADATION

In our survey we focused on the following types of migration linked with environmental degradation:

- Forced migration caused by natural disasters and organized by the state (case-study of Panjakent and Hamadoni).
- Forced voluntary migration due to climate change and long-term environmental deterioration (case-study of the Isfara and Hamadoni districts).
- Planned resettlement of the population from the flood zone (case-study of Nurobod district)
- Labour migration as an adaptation strategy in environmentally unfriendly areas.

Forced migration caused by natural disasters (Case-studies of the Panjakent and Hamadoni districts)

During the survey, two categories of environmental migrants were identified that were resettled under government programmes. The difference is determined by the urgency of the resettlements:

- Planned migrants as a result of natural disasters.

- Planned migrants from dangerous zones.

Planned migrants as a result of natural disasters

Pursuant to the legislation of the Republic of Tajikistan, in the event of natural disasters (earthquake, mudslide, high water, flood, avalanche, etc.) an emergency evacuation of the population will be conducted. The Committee for Emergency Situations of the Government of the Republic of Tajikistan is in charge of implementing such an evacuation involving authorized agencies.

The Committee for Emergency Situations makes decisions. People trust the Committee; they rely on the decisions of the Committee. Last year they resettled 16 households, provided them with all necessities, houses, furniture, and lump sum allowances. According to our norms, we destroy a house, and retain one room. We are not allowed to retain a house. We help them for 2-3 months.

Insurance companies provide support. However, they have their own norms. Based on our actions, they pay insurance to those who timely insured their property and houses. The majority of the affected population was not insured. However, some insured their assets and lives, and received insurance payments. (Employee of the Committee of Emergency Situations, Panjakent District)

The Committee arranges search, support, and transportation for the population affected by a natural disaster; the Ministry of Health provides medical support; the Ministry of Transport provides transportation, etc. The population affected by natural disasters is resettled to tent camps provided jointly by the Committee of Emergency Situations and the Red Crescent, as well as other organizations.

Within 24 hours after the natural disaster, and based on the applications from the population, the local authorities, the Committee of Emergency Situations, and Tajikgeology provide their opinion, and representatives from Tajikgeology provide their expertise. The environmental migrants receive support and tents, if required, and primary necessities. Then, we provide clarification to the population and make a list of the affected households, which will have to move to new places. (Employment Centre, Panjakent District)

Different procedures apply when people are resettled from places that became uninhabitable. The legislation of the Republic of Tajikistan envisages planned resettlements of the population from dangerous exogenous areas, for which the State Agency of Social Protection, Population Employment, and Migration of the Ministry of Labour and Social Protection are responsible.

²⁰ Ozodi, August 5, 2010.

Resettlement procedures for environmental migrants

Current legislation envisages the following procedures and rules for defining the environmentally dangerous zones of the country:

The Geology Committee of the Republic of Tajikistan, based on the surveys of areas in the districts, identifies environmentally dangerous zones and provides opinions on the status of the location of areas subject to exogenous processes. Dangerous zones are revealed through aerial methods, the decryption of satellite images and aerial photographs, continued satellite sensing of the earth's surface, and interviews with the local population. A plan to resettle the population from exogenous zones was developed based on the research. According to the long-term migration planning for households prone to exogenous factors, 7,664 households were resettled during 2000-2004, and 7,200 households were resettled during 2005-2010. (see Table 6)

Often the resettlement of the population from extra-hazardous zones is proposed after natural and technogenic disasters. More often, the territories of settlements prone to the threat of avalanches and floods are considered potentially hazardous. Dry washes, rivers, and streams flowing down slopes are potentially dangerous. The intensive ploughing of such slopes, unregulated cattle grazing, the failure to follow safety rules for construction, excessive irrigation, and heavy precipitation may cause more intense avalanches. For instance, heavy rains cause avalanches that transform to mudslides, which, in turn, may block riverbeds and cause floods. (see Insertion on the village of Fayzobod village, Hamadoni district)

Decisions on the population's resettlement and the means for moving from the hazardous zones is made by the executive authorities of the regions, districts, and cities based on the application of citizens, farms prone to disasters, and the expert opinions of geologists, in coordination with other authorized bodies.

Government agencies are responsible for the selection of resettlement areas. The State Land Use Committee and its district offices allocate land plots for the resettlement of the population from environmentally hazardous zones, and local authorities make decisions on the allocation of plots of land. In this way, the key linkages in decision-making about resettlement are the State Land Use Committee of the Republic of Tajikistan and the district authorities. An interagency commission plays an important role in district authorities.

TABLE 6. THE RESETTLEMENT OF ENVIRONMENTAL
MIGRANTS (2000–2010)

Year	Number of Households
2000	158
2001	559
2002	738
2003	338
2004	877
2005	625
2006	125
2007	934
2008	543
2009	860
2010	836
Total	6643

Source: The Agency for Social Protection, Population Employment, and Migration of the Ministry of Labour and the Social Protection of the Population of the Republic of Tajikistan

Funds allocated from the budget for the resettlement of each household

Each family receives a concessional loan of 3,000 somonis (approximately €545.5) and 300 somonis (approximately €54.5) as a lump sum for financial support. Each household receives a plot of land of 0.08 – 0.10 hectares for building a house.

Ministries, departments, and local authorities shall implement the following measures to provide social and legal protection to environmental migrants:

- pay transportation costs;
- transportation services during the resettlement of migrants from hazardous to safe areas;
- the construction of transport roads, and restoration and upgrading on-farm roads in the new place of residence;
- construction of health facilities and the provision of specialists in this sector;

THE VILLAGE OF FAYZOBOD, HAMADONI DISTRICT, KHATLON PROVINCE

The residents of the villages of Fayzobod, Tagnob, Dashtigullo, Kirov, and Turdiyev were resettled to safer areas after the flood of 2005. All residents received assistance and land plots, and they built houses. However, they do not feel safe. The annual spring floods of the Siyohob River, the threat of floods along the Panj River, and, above all, a possible break in the Sarez Lake cause the people to consider further resettlement.

People were resettled from affected areas to safer places in the same village. For example, in Fayzobod the affected households were moved higher up in the same village, and they were allocated plots of land and built houses.

Environmental migrants faced multiple problems in the new places, and the major problem was the lack of both clean water and water for irrigation. They suffered from the lack of land because pastures are in private hands and inaccessible to the village residents. The climate changed significantly, with no rain, but drought.

One part of the affected households was allocated new places for living in the higher areas in the same village, where they have access to water. One group of the environmental migrants, who lost everything, was moved to the new territory, where new houses were built for them in the village of Kondara. In this village, there is no clean water for drinking, no water for irrigation, and no pastures. Hence, it is impossible to live in this area no matter how much one would like to. Currently, in terms of livelihood, the majority of the environmental migrants depend on their plots of land, remittances from labour migrants, and employment in the civil service. The majority plan to migrate. Their dream is to leave this village forever. They state that the population is growing rapidly, and there will not be enough land or pastures. Part of them plans to return to their traditional land – the Shuroobod District--whence their predecessors were moved in the 1930s. Others want to move to Qurghonteppa, Danghara, Sarband, Dushanbe cities or their surroundings. Some, who have funds, already purchased houses or apartments in Dushanbe.

- establishment of preschool and general education institutions in the new places of residence for the environmental migrants;
- ensure security for the chain of environmental migrants during transference to the new place of residence;
- arrange for functioning water supply lines to provide drinking water, as well as irrigation water to household plots in the environmental migrants' new places of residence;
- arrange for agricultural infrastructure.²¹

At present, in connection with the plans of the Government of Tajikistan to divert the Vakhsh River for the ongoing construction of the Roghun Hydro-Power Dam, the resettlement of more than thirty thousand residents from the adjacent settlements to other towns and districts in the Republic are planned. A water reservoir will be created in the evacuated areas in the future.

Pursuant to a Government resolution, 4,726 families from the Roghun and Nurobod districts must be resettled by 2015. This means more than 30 thousand people who reside in the settlements of Sicharogh, Hakimi, Mujikharf, Komosomolobod, and Samsolik will eventually be relocated.

Who selects the locations for resettlement?

There is a whole range of problems related to resettlement arranged by the state from environmentally unfriendly districts and as a result of natural disasters. Territories for resettlement are chosen by the central authorities at the instruction of district authorities without the involvement of future environmental migrants. No environmental migrants in the Panjakent or Nurobod districts participated in the selection of places for resettlement. In Hamadoni, 88.5% did not participate in the discussions, whereas 11.5% chose places of residence themselves. Given the lack of sufficient land area and the high share of environmentally unfriendly territories in the Republic of Tajikistan, there is a threat that environmental migrants may be resettled to places that are just as hazardous or to areas with no sources of income or living conditions. The frequency of such situations causes reverse migration or further migration of various types, which will be discussed in the following sections. (see Table 7)

It is evident that planned resettlement under government programmes implemented without involving the people subject to resettlement causes different reactions. Those differences are defined by many factors: the conditions and reasons for resettlement, taking into account the opinion

21 Climate Change Survey, p. 25-26.

TABLE 7. THE SELECTION OF A RESETTLEMENT PLACE (WHO CHOOSES THE LOCATIONS FOR RESETTLEMENT?)

	Nurobod	Hamadoni	Panjakent
Themselves	0,0%	11,5%	0,0%
Authorities	100,0%	88,5%	100,0%

TABLE 9. POPULATION OUTFLOW FROM THE DEGRADATION AFFECTED ZONES (DID MANY RESIDENTS LEAVE YOUR VILLAGE DURING THE LAST YEAR?)

	Total	Nurobod	Hamadoni	Panjakent	Isfara
Yes	78,6%	76,9 %	100 %	100%	100%
No	21,3%	23,1,%	0,0%	0,0%	0,0%

TABLE 8. THE RATE OF SATISFACTION WITH THE MEASURES DEPLOYED BY OFFICIALS (IN THE REGIONAL CROSS-SECTION)

Do you think the Government does everything to improve the situation caused by environmental degradation or the conflicts over natural resources?

	Dushanbe	GBAO	Sughd	Khatlon	RRS	Total
Yes	54,2%	46,9%	38,2%	36,6%	40,2%	39,9%
No	39,6%	25,0%	41,1%	33,5%	33,5%	36,0%
Do not know	6,3%	28,1%	20,7%	29,8%	26,3%	24,1%

of environmental migrants, and their financial standing. (Table 8)

The survey showed that the most positive perception of resettlement was observed in the district of Panjakent. The resettlement was carried out within one district (case-study of Panjakent). The district authorities, who joined with the land authorities, participated in the decision-making about land allocation to environmental migrants, is closely linked with the communities and took into account the interests of the parties.

The strongest opposition to resettlement was expressed by migrants from the village of Chorsada in the Nurobod district, who were moved to Sargazon from the area that will be flooded during the construction of the Roghun Hydro-Power Plant. In this case, 44.8% of respondents said they had resisted. At the same time, all respondents attempted to negotiate resettlement conditions with the representatives of the authorities. 80% said that in the future they will move independently without looking for any support. As far as the intentions for migration are concerned, 27.5% of the village residents plan to move, 42.5% decided to stay and protest against flooding or resettle within the same area above the level of flooding, and 29% have not yet decided.

VOLUNTARY MIGRATION RELATED TO ENVIRONMENTAL DEGRADATION

Migration following natural disasters

Resettlement to new places with government support often does not prevent mobility of the population affected by the natural disasters. The survey showed that migration is a wide spread strategy of survival for the people affected by natural disasters and restoring their households after moving to safer places. This is confirmed by collected data showing the subjective evaluation of the migration level in areas prone to natural disasters and with a degrading environment much lower than the average evaluation in the country. Chorsada village in the Nurobod district, where the subjective evaluation of the migration level is significantly lower than the country average, is an exception. (see Table 9)

In the villages affected by natural disasters, external migration is very high. 90% of the young men migrated to Russia for work. In the villages not affected by natural disasters, 45-50% of households have migrants. 65% of the resettled environmental migrants in villages have already migrated to Russia for work. The resettled population does not have access to water or plots of land. They only have houses. This is why they leave for Russia to work. (Fergana Valley, Panjakent District, Khurmi Community)

Population's response to resettlement:**Adaptation strategy**

The resettlement of environmental migrants to safe areas is often successful. 87,5% of respondents in Panjakent said they are satisfied with the safety level in the new place. Even where resettlement went without conflicts and the resettled population was satisfied with the support of the authorities, the environmental migrants face common problems: climate change, human activities causing environmental degradation, agrarian overpopulation, poverty, and the lack of resources for coping with the situation.

In order to find out how resettled environmental migrants adapt to the new situation and the strategies they develop, it is important to study the economics and income of environmental migrants' households after resettlement.

Employment

The survey primarily shows the low portion of workers in all of the surveyed territories. In Nurobod, 22,5% of respondents do not work; in Hamadoni, 42,5% do not work; and 50% do not work in the district of Panjakent. However, the correlation of unemployed and economically inactive in the surveyed villages varies. If in Panjakent 22,5% are unemployed, in Nurobod and Hamadoni the unemployment level is nearly 10 times lower – 2,5 and 5% respectively. At the same time, the share of the economically inactive population is the highest in Hamadoni – 37,5% and the lowest in Nurobod – 20%.

Employment spheres

As far as employment spheres are concerned, the majority of those employed in Nurobod and Panjakent are involved in agriculture: 55% of the heads of households of the environmental migrants from Nurobod, 42,5% of those from Panjakent, and 17,5% from Hamadoni. Contrary to other districts, the second important employment sphere in Hamadoni is the civil service – 15% (compared to 10% in Nurobod and 2,5% in Panjakent). The share of self-employed is quite high – 10% in Nurobod and 15% in Hamadoni. There are no self-employed in Panjakent. (see Table 10)

Income and sources of income

The POP-2 shows that the majority of surveyed households in all the districts involved are poor. 100% of the respondents in Panjakent, 85% in Hamadoni, and 54% in Nurobod consider themselves low-income households. A civil service salary is considered the main income source by 67,5% of the surveyed households in Hamadoni, 10% in Panjakent, and 5% in Nurobod. Agriculture is the main source of income for 87% of the surveyed households in Nurobod, 31% of households in Panjakent, and 7,5% of households in Hamadoni. At the same time, labour migration is the main source of income for 51,3% of Panjakent residents

TABLE 10. EMPLOYMENT OF ENVIRONMENTAL MIGRANTS

	Nurobod	Hamadoni	Panjakent
Agriculture	55,0%	17,5%	42,5%
Service sector	0,0%	7,5%	2,5%
Civil servants	10,0%	15,0%	2,5%
Entrepreneurs	2,5%	2,5%	2,5%
Self-employed	10,0%	15,0%	0,0%
Do not work (students, housewives, pensioners)	20,0%	37,5%	27,5%
Unemployed	2,5%	5,0%	22,5%

TABLE 11. INCOME SOURCES: HOUSEHOLDS

	Nurobod	Hamadoni	Panjakent
Salaried work in this country.	5,1%	67,5%	10,3%
Income from farm activities (gardening and other farming activities) in this country.	87,2%	7,5%	30,8%
Business/entrepreneurship not related to agriculture in this country.	0,0%	2,5%	2,6%
Self-employment other than farming activities and business in this country.	2,6%	5,0%	2,6%
Income from trading abroad.	0,0%	0,0%	2,6%
Remittances (apart from income of migrants and shuttle traders, but including funds delivered by other migrants).	0,0%	17,5%	51,3%
Leasing of land, premises, or equipment.	5,1%	0,0%	0,0%
Total	100,0%	100,0%	100,0%

and 17,5% migrants in Hamadoni. None of the households in Nurobod recognized that remittances play an important role in the households' income, as remittances are a supplementary and irregular income source. (see Table 11)

Economy in the households of environmental migrants: The case of Panjakent

One may assume that the dramatically varying indicators of employment, unemployment, and the economically active population are linked to the types of economy existing in the surveyed districts. One may also suppose that the types of economy developed not only historically, but also as a response to environmental degradation. In Panjakent, income from migration and agriculture is the economic basis. The resettled population received 10 acres of land per farm. Earlier, these were irrigated lands, but the pumps are in disrepair, the environmental migrants cannot afford to buy new pumps or repair old ones, as spare parts are very expensive. As a result, irrigation is complicated, and yields are low due to drought and land degradation. As there is no industry in the district, employment is restricted to a small plant in the district centre where 30 environmental migrants work. Small business is not developed, as migrants do not have savings or access to credit resources. No environmental migrants are employed in the services sphere.

Therefore, survival strategies include the following: a) developing household plots where food products are produced for household consumption; b) livestock breeding (dairy cows, goats, and sheep) for household consumption (milk) and as savings tool; c) using old hazardous places of residence for the management of livestock. There are no pastures in Sarazm. Hence, environmental migrants leave one or two members of their households in Shing, in the hazardous area, where they manage the livestock; c) internal labour migration; d) external labour migration.

We asked individuals about their sources of income? Here are a few of the answers received:

1. *Income from using land is not satisfactory. We grow grain and vegetables. We cannot grow tobacco because of the lack of water for irrigation. Since 2005, when we moved, we were not able to use the land. There was drought and no water. Last year and this year everything dried up. Yields went down, and we don't have fertilizers. One pack of nitrate fertilizer costs 70 Somonis in the market. We can buy it only once to fertilize the land, instead of three times. Sometimes we use fertilizers, but there is no water, and it gets dry anyway. We incur losses. We don't have machinery. We have to hire a driver with a tractor. Diesel oil is expensive. This year, our community hired a tractor driver to work on 12 hectares of land. Now we cannot pay him. The tractor driver comes to the community council.*

THE VILLAGE OF SARAZM, PANJAKENT DISTRICT, SUGH D PROVINCE

From 8-11 June 2005, mudslides hit Shing and Rudaki, the two largest communities in Panjakent district. These resulted in the loss of 5 lives, including 3 children and 2 adults, as well as 392 destroyed houses in Shing and 152 in the village of Vagashton, causing significant damage to the local economy. A total of 12,000 people lost their properties and belongings.

Once the victims of the natural disaster were resettled to tent camps, the authorities allocated 50 hectares of land to build new houses for these environmental migrants in Sarazm, which lies close to the Samarkand-Panjakent highway. Sarazm has become a shelter for migrants from the villages of Shing, Vagashton and Badgah. However, some resettled families were unable to adapt to the new conditions. Before they resided in mountainous areas of 1300 meters above sea level with plenty of water and pastures. Now, however, the problems they face relate to land which is subject to soil and wind erosion, limited access to potable water, unemployment and poverty. The majority of male heads of families and their older sons have migrated to Russia. Half of the households have sent their young children back to the mountains to graze cattle there. At present, there are 1500 people residing in Shing.

What can I do? The harvest is lost, and we have no funds to pay. Nobody wants to work on our land. The expenses are too high. We don't earn any income and only incur losses.

2. *Livestock breeding. People may have a maximum of one cow or 2-3 goats to provide milk for the children. Some have livestock for a rainy day. In a difficult situation, they take a cow or a calf to the market to sell. Otherwise, there is no benefit from livestock. Fodder is expensive in the market. There are no pastures in Sarazm.*

3. *Migration. People live from hand to mouth and rely only on remittances from Russia.*

4. *Mardikori. Young men who go to the markets in Panjakent and wait for odd jobs. Some even go to Khujand.*

5. *Working in the plant in Panjakent. 30 persons from our community work in this plant.*

6. *Some people stayed in Shing and work there. They may manage livestock. There are pastures, and it is much easier, although more dangerous. (Community Council Chairman, Sarazm Village, Panjakent District)*

TABLE 12. MIGRATION CAUSES (POP-1)

	Many	Some	Nobody
Due to the conflict	5,0	12,7	82,3
Low social status	47,8	27,4	24,8
Violence	5,0	13,2	81,8
Persecution on religious grounds	5,2	9,9	84,9
Persecution on national grounds	7,6	10,4	82,0
Conflict over natural resources (access to land, water, and pastures)	9,3	16,2	74,5
Unemployment	68,4	24,3	7,3
Low income	64,9	29,0	6,2
No livelihood	40,0	37,7	22,3
No access to land	21,7	40,8	37,5
No land for agricultural farming	10,9	37,3	51,8
Impossibility to earn due to the degrading environment	7,6	33,8	58,6
No water/drought	7,6	40,1	52,3
Poor soil	6,3	38,2	55,5
Unstable harvests	5,6	41,0	53,4
Poor water quality	9,0	33,6	57,3
Diseases caused by the environment	5,3	27,9	66,8
Slowly degrading environment	5,4	28,5	66,1
Natural disasters (avalanches, termites, floods, earthquakes, etc.)	7,4	23,7	68,9
Technogenic catastrophes (chemical poisoning, the breaking-up of tailing ponds, etc.)	4,6	17,9	77,5
Development plans (construction of dams, town development, etc.)	3,8	19,5	76,7

TABLE 13. UNEMPLOYMENT AS A CAUSE FOR MIGRATION

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many	89,6%	68,8%	57,6%	62,2%	81,2%
Some	8,3%	31,3%	26,3%	36,1%	11,3%
Nobody	2,1%	0,0%	16,1%	1,7%	7,5%

TABLE 14. LACK OF WATER/DROUGHT

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many	1,0%	0,0%	12,8%	6,5%	6,4%
Some	30,2%	0,0%	41,8%	43,5%	42,1%
Nobody	68,8%	100,0%	45,4%	50,0%	51,5%

TABLE 15. POOR SOIL (SOIL DEGRADATION)

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many	1,0%	0,0%	11,2%	7,1%	2,3%
Some	31,3%	0,0%	37,2%	38,4%	46,2%
Nobody	67,7%	100,0%	51,6%	54,5%	51,5%

TABLE 16. CONFLICT OVER NATURAL RESOURCES
(ACCESS TO LAND, WATER, AND PASTURES)

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many	6,3%	3,1%	11,5%	9,4%	8,6%
Some	16,7%	9,4%	17,1%	21,6%	8,6%
Nobody	77,1%	87,5%	71,4%	69,0%	82,7%

TABLE 17. UNSTABLE HARVESTS

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many			11,5%	4,8%	2,6%
Some	28,1%	12,5%	43,1%	38,6%	49,6%
Nobody	71,9%	87,5%	45,4%	56,5%	47,7%

TABLE 18. BAD WATER QUALITY

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many	0,0%	0,0%	16,8%	10,5%	2,6%
Some	33,3%	3,1%	26,6%	38,6%	38,7%
Nobody	66,7%	96,9%	56,6%	50,9%	58,6%

TABLE 19. NATURAL DISASTERS (LANDSLIDES, TERMITES, FLOODS, EARTHQUAKES, ETC.)

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many	4,2%	0,0%	4,3%	16,8%	0,8%
Some	29,2%	21,9%	26,3%	19,9%	24,1%
Nobody	66,7%	78,1%	69,4%	63,4%	75,2%

TABLE 20. MAN-MADE DISASTERS (CHEMICAL POISONING, THE WASHING OUT OF TAILING PONDS, ETC.)

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many	4,2%	0,0%	4,3%	8,0%	1,1%
Some	26,0%	0,0%	15,5%	15,9%	22,6%
Nobody	69,8%	100,0%	80,3%	76,1%	76,3%

Income from agriculture is critical to 100% of the environmental migrants in Panjakent. Declining yield and the loss of cattle, with a very small income, leave the residents of Panjakent on a level of extreme poverty. In such cases, remittances remain the most important source of income, and labour migration is the main survival strategy after re-settlement caused by environmental factors.

Migration causes: Which of the factors for environmental degradation bolster migration most of all?

When and what environmental problems (environmental pollution, soil degradation, natural disasters, etc.) have a key impact on people's decision to move, or leave temporarily or forever? Do environmental reasons have a key impact on the decision of whether to migrate, or do they only aggravate the problems? In order to find out and to identify the share of environmental factors among other push factors, we included questions about migration

causes both in the POP-1 and the POP-2. The table summarizing the opinion of the Tajikistan population shows that in 2011 environmental degradation became an important push factor for a significant and growing number of people. Environmental factors causing migration are most important for the population residing in the Sughd Province. (see Table 12)

Data from the national representative survey POP-1 shows that environmental causes (drought, worsened water supply, and declining soil fertility) are the third top reason pushing the population of Tajikistan from their homes, after unemployment, low income, and lack of access to agricultural land.

Based on the responses broken down by regions, we concluded that there is a big difference between the sets of push factors in the regions of the Republic of Tajikistan.

The main push factor for the populations of Dushanbe and the RRS is unemployment. (see Table 13)

Environmental reasons are more significant for decision-making concerning migration for the residents of the Sughd Province than for the populations of other regions in Tajikistan. More than half of the respondents (54,6%) from the Sughd Province stated that people migrate due to drought. The same factor was mentioned by 50% of the respondents in the Khatlon Province. (see Table 14)

Soil degradation was mentioned as a push factor by 48,5% of respondents from the RRS, 48,4% of the respondents from the Sughd Province, and 45,5% of the respondents from the Khatlon Province. With that, 11,2% of the respondents from the Sughd Province indicated that soil degradation is a push factor for many migrants, whereas respondents from other regions indicated that this factor is the main one for some migrants. Conflict over natural resources, unstable harvests, and bad water quality are also important issues for the population in the Sughd Province. (see Tables 15, 16, 17 and 18)

At the same time, natural disasters as push factor are more important for the population of the Khatlon Province: 16,8% of the respondents from the Khatlon Province indicated that they left the settlement because of natural disasters.

This position was supported by only 4,3% of the Sughd and Dushanbe residents, and 0,8% of the RRS residents. No respondents from the GBAO said that natural disasters are the primary reason for migration from their region. (see Table 19)



Newly constructed health centre in a resettlement village in Djirgatol district.

Man-made disasters are the main push factor from the viewpoint of 8% of the residents in Khatlon, 4,3% of the residents in Sughd, 4,2% of the residents in Dushanbe, and 1,1% of the residents in the RRS. In the GBAO, there is no such a problem. (see Table 20)

MIGRATION PATTERNS ASSOCIATED WITH NATURAL DISASTERS AND ENVIRONMENTAL DEGRADATION

A comparison of the POP-1 and POP-2 surveys' data shows a significantly higher level of migration in districts affected by natural disasters and a degrading environment compared to the country's average level of migration. However, migration patterns and models caused by environmental reasons were assessed only on the basis of the POP-2 materials, interviews, and the FGD. A quality assessment in four selected districts shows that the forms and scale of environmental migration differ in their peculiarities and vary widely – from resettlement to short-term cyclical labour migration. Moreover, migration becomes complex when the types of migration interweave and coexist in the life of a single person or household.

We used to grow cotton. After 2005, when we were resettled because of the flood, only women and children are engaged in the growing of cotton, and salaries are very low. Most of the residents, particularly the youth, leave for good. Some leave for Russia, Dushanbe, and Qurghonteppa. Others leave for seasonal migration from 7 to 10 months of work. (Anjirkon Village, Hamadoni District).

Interviews and surveys showed that the following types of migration are spread in an organized way in villages with a population that resettled after natural disasters:

- external labour migration
- internal labour migration
- return migration
- voluntary internal migration
- rural-urban migration
- emigration

External labour migration

96% of households participate in external labour migration in the Hamadoni district, and 82,5% of households in the Panjakent district. Often, two-thirds of migrants with families work abroad seasonally from 3 to 10 months. They

spend the winter months at home with families. One-third of the migrants are not married and stay abroad for a longer period of time. Most of the seasonal workers from the surveyed districts affected by natural disasters are engaged in low-skilled manual labour in construction, mining, industry, and agriculture.

In Russia, our people do the hardest jobs. They mainly work in Novosibirsk and in the Moscow Oblast as construction labourers. I have not heard for nine years from a guy from Khurmi who sells goods in the market or acts as a job foreman or an intermediary. They cannot even be intermediaries. Intermediaries are from other communities. (FGD, Panjakent District, the community of Khurmi)

Only men from our area leave for Russia to work. Women stay home. Men migrate without their wives. Half of them work seasonally. The other half works for 5-6 years. Young, unmarried people work 5-6 years. Married men work seasonally and return home in the winter. My eldest son has not come home in 5 years. He left when he was 18 years old. He works in the Moscow area in a bread baking facility. He is not married. He calls me and sends money every month. We depend on his money. (FGD, Panjakent District, Jamoat Sarazm)

The major problems of migrants in these districts: an increased number of undocumented workers, low qualifications, and hence, low salaries, reliance on intermediaries, vulnerability to human trafficking, deception, exploitation by employers, persecution by Russian law enforcement agencies, and increased rate of injury and diseases at work.

Our main problems: we are not able to legalize our status. It is difficult to find a job. We are cheated by intermediaries and employers. The police bother us. We are robbed and have no registration. All of these problems are due to the lack of money and time to take a view of the situation and to assess it. We are driven into a corner, and our families are in despair. We must find a job to send money to our families. (A migrant from Sarazm, Panjakent District)

Internal labour migration

12% of the households in the surveyed villages of the Panjakent district have internal labour migrants in the cities of Panjakent, Khujand, and Dushanbe.

People resettled from Shing go to the market in Panjakent and sit and wait for casual work. (FGD, Panjakent District, Sarazm community)

Often, households prefer internal migration in two cases: a) due to family circumstances; b) due to poverty. Extreme poverty does not allow households to find the initial capital for migration, including for travel, initial accommodation,

and obtaining the documents for official status in the Russian Federation.

Not all are able to find money to migrate to Russia for work. One family can hardly collect money for one migrant. Those, who cannot find money become “working men” (mardikor) in Panjakent, and more seldom in Khujand. (FGD, Sarazm, Panjakent District)

Leasing land in other districts should also be considered as one more option for internal migration. Such an insignificant trend was revealed in the Panjakent district. It is more developed in the Isfara district where those who lost hope in their apricot yields, lease apricot gardens in the other districts of the Sughd Province. There is also a trend of internal migration from the villages of Isfara seriously affected by environmental degradation. Those migrants are engaged in the drying of fruits in other regions of Tajikistan, particularly in the GBAO.

Return migration

About half of surveyed households in the Panjakent district have relatives residing temporarily or permanently in old settlements.²²

A total of 340 households and 20 farms moved from Shing. Some internal migrants sent young people to Shing to pasture livestock. Those who remained in or returned to Shing, live there. However, frequent floods pose a serious threat. (Sarazm, Panjakent District)

Rural-urban migration

This is an insignificant trend apparent only in the Khatlon Province. According to respondents, a part of the rural environmental migrants in Hamadoni do not see any opportunities for farming. At the same time, they have resources to move and settle their households in the city.

Recently the climate had been changing significantly. No rains for a long time, and drought. It is very hard to survive. Due to the lack of irrigated land and the lack of pastures, farmers can no longer rely on land for living. Many people from our village have already left and purchased houses or apartments in Dushanbe and Qurghonteppa. (FGD, Anjircon, Hamadoni District)

Migration within the country

This is another insignificant trend discovered only in the Khatlon Province. Environmental migrants resettled from the villages of Fayzobod, Tagnob, Dashtigullo, Kyrov, and Turdiyev are not sure if they are safe. They are concerned about a break in the Sarez Lake and would like to move to

²² Return migration is described in the Section “Return Ecological Migration”.

TABLE 21. ARE YOU PLANNING TO CHANGE
YOUR PLACE OF RESIDENCE?

	Nurobod	Hamadoni	Panjakent
Yes	27,5%	52,5%	5,0%
No	42,5%	20,0%	95,0%
Do not know	27,5%	27,5%	0,0%

WHO MOVES, THE RICH OR THE POOR?

A comparison of the surveyed villages and their respondents according to their level of well-being showed that the poorest households are migrants from Panjakent. Only 5% of those migrants plan to change their place of residence. An unwillingness to move was explained by the lack of resources and opportunities.

The survey showed that sending households and the households of relatives and friends play an important role in the financing of migration. The process of searching for jobs abroad requires initial expenses to prepare for the trip, traveling, accommodations, and employment abroad.

Despite multiple migration, financial sources and family savings are the main sources according to 64% of the household heads. With that, it is often difficult to define what is meant by family savings, whether those include the savings of a given household or a group of related households representing an extended family. It is more probably the latter, as money from brothers is not taken as debt, whereas money brought by brothers-in-law is considered debt, which the migrants try to return as soon as possible.

The majority of Panjakent environmental migrants responded negatively when asked if they would move to other territories provided financial resources. They explained that in their district they were part of invisible solidarity and support schemes. In addition, Panjakent residents think they have enough incentives neither in Tajikistan regions, nor in Russia, where the majority of labour migrants work.

their fathers' land, or to villages in the Shurobod district. (see Insertion - Who Moves, The Rich or the Poor?)

We have lived all our lives in this village. I don't know the opinions of the children, however, I don't want to move. But if they want to move, I don't mind. Smart people moved to Dushanbe right after the war, when dwellings were inexpensive. Some moved to Kulob, Kurghonteppa, Sarband, Kolkhozobod, Qumsangir, and Beshkent after the flood. Better-off people purchased houses in Dushanbe. (Anjircon, Hamadoni)

Among the better-off environmental migrants from Hamadoni, only 20% do not want to move, 80% plan to resettle or to consider such an opportunity. The reason for refusing to move is a lack of funds. As far as the residents of the village of Chorsada in Nurobod district are concerned. About half of the respondents - 42,5% - do not want to move. Others represent two equal groups of 27.5% each who would like to move or have not yet decided. Obviously, an unsuccessful experience in moving to Sargazon led to diminishing optimism about moving to a new place. (see Insertion - Return Migration in the Village of Chorsada in the Nurobod District)

Return migration: The return of migrants after natural disasters or planned resettlement

The experience of resettlement and return migration from the village of Chorsada in Nurobod district showed that return migration is caused by economic factors and insufficient participation of people in deciding on the resettlement locations.

Note: In connection with the plans to construct the Roghun Hydro-Electric Power Plant, the resettlement of more than thirty thousand residents from the adjacent settlements to other towns and districts is planned. Pursuant to a Government resolution, 4,726 families residing in the settlements of Sicharogh, Hakimi, Mujikharf, Komsomolobod, and Samsolik of the Roghun and Nurobod districts should be relocated by 2015. However, the population refuses to leave their villages. They demand to reassess the value of their houses for the government's proposed compensation is insufficient for settling in a new place. Since the beginning of Roghun's construction local authorities managed to resettle only 1,150 people.

Environmental migrants resettled to the Danghara district because of the flooding of the area of Roghun Hydro-Electric Power Plant, but they later left their new houses and returned to their villages of origin. The interviews and results of the survey showed that the decision to return, which led to a conflict with local authorities, was based on economic factors: 1) the deficit or lack of opportunities to earn income in the area proposed for resettlement (lack of workplaces); 2) the need to completely change the way

of family economy, which is not covered by the benefits of such changes (women could not handle the plots of land due to a lack of water, thereby producing poor harvests); 3) the rather high level of well-being of the resettled people allowed them to return and settle, and to plan to resettle in other parts of the gorge when the Roghun water reservoir is filled.

MIGRATION ASSOCIATED WITH GRADUAL ENVIRONMENTAL DEGRADATION

The survey data shows that in the event of slow environmental degradation, the link between migration and the economic situation of households is the most important. The experience of the village of Kulkand in Isfara district, which is most prone to salinization, water logging, and the destruction of soil, as well as the dispersion of agricultural pests, shows that environmental changes have an indirect economic impact on the population's mobility. Drought and soil degradation gradually deprived the farmers and horticulturists of Kulkand of their livelihoods. In response to those challenges, temporary labour migration began. Comparison of migration from different communities in the Isfara district shows that the community of Kulkand is mostly affected by salinization and soil degradation and has the highest level of labour migration and net migration in Tajikistan.

GRADUAL ENVIRONMENTAL DEGRADATION IN THE COMMUNITY OF KULKAND IN ISFARA DISTRICT²³

Horticulture is the main agricultural activity in Isfara. There are 16 thousand hectares of land allocated for gardens and 4,5 thousand hectares for cropland in Isfara. 99% of gardens comprise apricot orchards. Note: The total area of the community is 3,128 hectares including 2,301 hectares (73% of the total area) of arable land, 1,600 hectares (51,5%) of orchards, 220,65 hectares (approximately 7%) of pastures, 327,32 hectares of housing and public as well as social utilities, 279 hectares under channels and roads.

Kulkand, in total, has 1,947 hectares of land, of which 777 hectares are for crops and the remaining are for gardens. The Lakkon valley begins with Navgilem and ends with Lakkon. In this area, the groundwater level is high. In the 1970s, the Tortokul reservoir was constructed. It is on higher elevation and the water gets filtered greatly raising the level of subsoil water in our valley.

Flooding is the major problem of our population. We have agrogenic soil. New lands development and irrigation raises the level of groundwater in our valley, thus leading to salinization and degradation. In some places, one can dig half a meter and find water. In some areas the ground is

RETURN MIGRATION IN THE VILLAGE OF CHORSADA IN THE NUROBOD DISTRICT

The village of Chorsada is located in the flood area of the Roghun HPP. In 1999, residents of this area were told that they have to move. They received land plots in the village of Sargazon in the Danghara District and were promised that all conditions will be provided. The people received 500 somonis per family and transportation.

The people were given 8-10 acres per household. Dry land has become infertile after the mudslide. They built their houses on their own, and they received cement and concrete. They brought wood and timber from the village, and walls were made from raw clay (pokhsa). After the construction of the houses, the men moved their families to Sargazon, where they lived for 3-6 months. Resentment began when women arrived in the area. The women planted trees, but nothing grew, even in the household plots.

There is no water. One container of water costs 50 somonis. There is no transport, and no health services are provided. There is no opportunity for work. Some people who have vehicles go to Danghara. Others have nothing to do in Sargazon. They approached the government 2-3 times requesting an improvement in the situation, but nothing was done. They are not satisfied and have decided to return home.

They destroyed the houses, took wood, the doors, and other wooden parts, loaded them into their cars, and left. The government warned them that the area would be flooded for the construction of the dam, and that they would not receive any compensation because they are registered in Sargazon. The residents of Chorsada decided that when they begin erecting the dam, they will go to the other side of the gorge and build houses there.

They are currently engaged in agriculture, and the basis of their well-being is livestock and remittances. The farm was rehabilitated after returning using remittances. 90% of the sons left for Russia to work. The residents of Chorsada work in construction in Novokuznetsk, Kemerovo, and Irkutsk. Several families opened a canteen with migration income for long-distance truck drivers and a tea house, and they sell gasoline. In Sargazon residents of Chorsada fell on hard times. They are gradually restoring their living conditions. After return their life improved two times, nevertheless, they are still poorer than residents of other villages in the districts.

23 Interview with the head of a farm in Kulkand, Isfara district

white, all covered by salt. Nothing grows over there and the land is withdrawn from circulation. We do not know what to crop.

Therefore, we do washing irrigation and clean collection network. These procedures should be applied every two years and we clean in 5-10 years period because of the large extent of the collector-drainage system. There is a need for equipment and money for these purposes. Unfortunately, in these areas we have to use the recycled water remaining after the washing irrigation, which causes repeated salinization. The population is growing, therefore new lands are being cultivated and higher terraces are irrigated. From there the water is filtered in the lowlands, here in Kulkand. This again brings degradation and salinization, which result in the fall of crop yields, incomes and level of profitability of agricultural production.

The climate has changed. Since 1999, we have observed a rise in temperatures and disasters caused as a result of extreme temperatures, such as the spreading of agricultural pests as the cold winter does not kill them. Last year, there were so many pests that we did not manage to process. Our main source of wealth—the apricots—were lost.

Before, there was not such a heat as there is now. And I do not recall such extreme temperatures. There were frosts in 2005, 2007 and 2011. In four of the last five years, the apricot harvest was destroyed. Temperature fluctuations destroy vegetables. Last year, all tomatoes were lost because of the extreme temperatures, which led to a blight of vegetables. In such cases, fungicides are useless. You can save nothing when there are such temperature changes.

In 1994-1996, the level of profitability in our economy reached 80-90%. Gradually, the level of profitability has decreased to a minimum, and not just because of salinization and soil degradation. In many ways, the problems lie in poor management and administration of the agricultural sector. Cost disparity plays a major role for an agricultural producer. In 1994, we exchanged 1 kg of dried apricots for 10 liters of diesel fuel. At present, the cost of fuel, spare parts, fertilizers went up including taxes and charges for water. Prices for our products have remained the same, or perhaps they have increased by 10-15%.

The lack of human resources is another problem. Decline in yields and lack of income urges people to migrate abroad. Before, we had 2,500 employees and more than 2,000 applications for admission. Everyone wanted to work in our household. There was no need to seek out tractor operators and mechanics. Now, the profitability amounts to 10-13% with no incomes and interest expressed by people.

90% of workers in our household are women. If the wife is working in the farm she receives payment in kind, which is food. But that's not sufficient and therefore there is an outflow of men to Russia. It is impossible to find a good mechanic. The men from Kulkand work in Russia for 2-3 years basically involved in the construction sector. This was before when they traded dried apricots. At present, you can hardly find 1-1,5% of apricot sellers among the residents of Kulkand. The rest are either construction workers or day labourers. Some get married in Russia and stay there forever.

Why do they go? Well, because of the living conditions and lack of income. In flooded *mahallas*, migration rates are much higher due to the damages cause to their houses. Houses used to need renovation once every 50 years, but now we need to do it every 10 years. That is why people leave to Russia with their families.

CORRELATION BETWEEN LABOUR MIGRATION AND MICROECONOMICS OF ENVIRONMENTAL MIGRANTS' HOUSEHOLDS

Let us discuss the economy of migrants' households in all 4 districts in more detail to assess the link between the dispersion of poverty due to environmental degradation and labour migration. There are environmental migrants living in 3 villages: Faizobod (Hamadoni district), Kulkand (Isfara district), and Sarazm (Panjakent district). There is no clear environmental degradation observed in Chorsada village.

What contributes to the growth of poverty among environmental migrants affected by environmental degradation?

First of all, there is limited access to and a general lack of land and water. In Faizobod (Hamadoni) and Sarazm (Panjakent) respondents have only household plots. They also experience an acute shortage of water.

In Chorsada (Nurobod), 80% of the respondents have their own plots of land in addition to household plots, and more access to pastures and water.

Another negative aspect is that agricultural products produced by environmental migrants in the households of Panjakent and Hamadoni are not highly marketable.

In Sarazm, 100% of the respondents grow agricultural crops for their own consumption. They do not sell anything. (see Table 22)

In Faizobod (Hamadoni district), half of the respondents grow agricultural crops for sale (46.2%) and half for their own consumption (53.8%). Meanwhile in Chorsada

(Nurobod), 20% of the respondents grow agricultural crops for their own consumption, and 80% of the respondents sell their harvest in the market.

Thus, the respondents from Chorsada have larger household plots than others. Over the past few years, they have increased the productivity of cultivated crops by improving agricultural techniques and the introduction of new sorts. 87.5% of the respondents in Chorsada reported improved yields in recent years. (see Table 24) All this allows them to successfully engage in agricultural business, manage commercial farming, and have a solid income. The current structure of the economy includes remittances from migrant workers, but they are not the main or an important source of household income. The people from Chorsada attempted to change their place of residence within the framework of the resettlement programme in connection with the construction of Roghun, but after facing enormous difficulties and loss of households, they decided to return to their native village.

As for the resettled residents of Faizobod (Hamadoni district), the economy of their households includes income from labour migration (almost 100% of the environmental migrants households in Faizobod and Kodara send one or more of their family members to work abroad) as well as food production in a household plot. Contrary to all other respondents, the salary paid to them by the public service plays an important role in their income structure.

As far as the residents of the community of Sarazm in Panjakent district are concerned, they have found themselves in the worst situation. The deficit of water and slow environmental degradation in the new place of residence, lack of jobs, and shortage of access to markets do not allow environmental migrants restore their households and adapt to new conditions. As a result, subsistence farming in household plots and income from labour migration have become the basis of their economy. The POP-2 revealed a high level of dependency among the poorest environmental migrants from subsistence farming. The main problem is that environmental migrants affected by natural disasters lose their assets and savings and move to areas prone to degradation. 100% of Panjakent residents reported that the yield of agricultural crops declined in the past several years. 95% of Hamadoni and 5% of Nurobod respondents stated the same. (see Table 24)

The microeconomics of the households, which is based on subsistence farming, is very vulnerable to environmental degradation. It leads to the decline of yield and impoverishment of the rural population. Table 25 shows that the main cause of yield reduction is land degradation (deterioration of soil). Additionally, the destruction of farming (unavailability or expensiveness of fertilizers, quality of

TABLE 22. DO YOU GROW AGRICULTURAL CROPS MAINLY FOR YOUR FAMILY CONSUMPTION OR FOR SALE?

	Nurobod	Hamadoni	Panjakent
Most of the crops are grown for our consumption	20,0%	53,8%	100,0%
Most of the crops are grown for sale, and some for our own consumption	80,0%	46,2%	0,0%

TABLE 23. IF YOU ARE UNABLE TO GROW SUFFICIENT CROPS, IS IT A PROBLEM FOR YOU?

	Nurobod	Hamadoni	Panjakent
Yes	0,0%	92,3%	100,0%
No	100,0%	7,7%	0,0%

TABLE 24. HAS THE PRODUCTIVITY OF YOUR PLOT OF LAND INCREASED OVER RECENT YEARS, DECLINED, OR REMAINED SAME AS BEFORE?

	Nurobod	Hamadoni	Panjakent
Declined	5,0%	95,0%	100,0%
Increased	87,5%	0,0%	0,0%
Remained the same	7,5%	5,0%	0,0%

TABLE 25. IF IT HAS DECLINED, WHAT ARE THE CAUSES OF YIELD REDUCTION?

	Nurobod	Hamadoni	Panjakent
Soil degradation	0,0%	2,6%	100,0%
Lack, insufficiency, or inaccessibility of fertilizers	0,0%	100,0%	100,0%
Lack proper seeds	0,0%	100,0%	100,0%
Seeds are too expensive	0,0%	97,3%	100,0%
Not enough irrigation water	0,0%	2,7%	95,0%
Too much water, water logging, or floods	0,0%	2,6%	5,0%
Water is too expensive	0,0%	2,6%	95,0%
Erosion	0,0%	97,4%	0,0%
Pests, crop diseases	0,0%	94,7%	0,0%
Conflicts in the region	0,0%	0,0%	0,0%
Harvest plundered from fields	0,0%	2,6%	0,0%
Lack of qualified staff	0,0%	44,7%	0,0%
Climate and temperature changes (too hot, too cold, too rainy, or too dry)	0,0%	100,0%	0,0%

TABLE 26. REMITTANCES: DOES A MIGRATED FAMILY MEMBER SUPPORT YOUR HOUSEHOLD?

	Hamadoni	Panjakent
Yes, regularly.	77,8%	100,0%
Yes, sometimes.	22,2%	0,0%

seeds, shortage and high cost of irrigation water) caused by poverty has a negative effect. (see Table 25)

The dependency of the environmental migrants from slow environmental degradation can be seen in Table 23. The loss of the current harvest is a catastrophe for 100% of Panjakent's residents and 92.3% of the migrants from Hamadoni. But it will not be a problem for the residents of the environmentally safe village of Chorsada. (see Table 23)

MIGRATION AS AN ADAPTIVE STRATEGY: OPTING FOR VARIOUS FORMS OF MIGRATION

The survey showed that the selection of the form of migration depends on the scale of destruction and the losses caused by natural disasters, the probability of relapse, the loss of livelihoods, the size of support, poverty level, remittances, and the opportunities in destination places. Sometimes the affected households use several types of migration, applying one or another pattern depending on the circumstances.

Often, the choice of external or internal labour migration depends on the level of well-being. External migration requires more financial resources, preparation, planning, and wider contacts with migrant networks.

Migration data presented by the Employment Centre of the Panjakent district show that the external migration level is much higher in villages affected earlier by slow degradation, as compared to other villages affected by natural disasters. It can be stated that environmentally induced labour migration develops slowly, but comprises a large number of people. There is a trend of developing areas and networks as more people choose labour migration as their main adaptation strategy. Villages that survived natural disasters lost their property in one hour and were not able to engage in external labour migration.

We have fewer migrants in Russia compared to other villages. Why? There are different reasons. Men cannot leave when their parents are old. They have to stay with their parents. However, the main reason is a lack of money. Transportation, documents, and winter clothes are expensive. Households can hardly send one person. Where do they get the money? Borrowing from a bank is not the best option. Interest rates are too high, and income is not guaranteed. They may or may not find a job. They may be deported. Still, there is risk. So those who cannot leave for Russia head to Panjakent to the market. (FGD, Panjakent District)

Despite the lower level of migration in villages affected by natural disasters, the frequency of and reliance on remittances is higher in these villages than in villages affected by slow environmental degradation. (see Table 26)

TABLE 27. DO YOU HAVE RELATIVES OR FRIENDS WHO MOVED OR WERE RESETTLED?

	Nurobod	Hamadoni	Panjakent
Yes	85,0%	100,0%	100,0%
No	15,0%	0,0%	0,0%

TABLE 28. WERE ENVIRONMENTAL PROBLEMS EVEN PARTLY THE REASON FOR YOUR RELATIVES OR FRIENDS TO MOVE OR RESETTLE?

	Nurobod	Hamadoni	Panjakent
Yes	81,1%	100,0%	100,0%
No	18,9%	0,0%	0,0%

TABLE 29. MEMBERSHIP IN SOCIAL, PROFESSIONAL, TERRITORIAL, RELIGIOUS AND OTHER ASSOCIATIONS

	Nurobod	Hamadoni	Panjakent
Religious community, mosque	0,0%	0,0%	5,0%
Farmers' association	0,0%	0,0%	15,0%
Fraternity	0,0%	0,0%	67,5%
Trade unions	0,0%	100,0%	0,0%
Clan	0,0%	0,0%	12,5%
None	100,0%	0,0%	0,0%

Migration's role in the rehabilitation of districts affected by natural disasters

Based on the collected materials, one can conclude that migration, whether permanent or temporary, is a typical survival strategy used in the event of natural disasters or forced resettlement while implementing development plans. Shocks motivate the migration of people to avoid the negative consequences of disasters. At the same time, labour migration, whether external or internal, becomes one of the main tools in adapting to a new environment, as well as the main instrument in the reconstruction of farms in the event of resettlement or the rehabilitation of farms as a result of a natural disaster. However, natural disaster is only a push towards migration. For its formation as a pattern of adaptation strategy, social and economic perspectives, access to money, networks, and contacts are important.

Overall, the surveyed villages (Khurmi and Sarazm in Panjakent district, the village of Anjirkon in Hamadoni district) demonstrated how a natural disaster caused forced migration. But for government programmes such migration could have been short-term. This is what happened to one group of migrants who returned to their villages. Nevertheless, the level of labour migration (internal plus external) in these villages is much higher compared to successful neighbouring villages. These villages show the trend of shifting forced migration to voluntary migration, which is, by nature, something of an adaptation strategy.

ROLE OF ENVIRONMENTAL FACTORS IN BOLSTERING MIGRATION FROM RURAL AREAS

This survey demonstrated a relatively new phenomenon – a greater role for environmental reasons in the group of push factors. Degradation of the environment was an aggravating background for the development of mass labour migration. In early 2000, it gradually became one of the main factors stimulating migration. The following data confirms these facts: 100% of the respondents from Hamadoni and Panjakent, and 85% of the respondents from Nurobod have relatives and friends who are migrants. (see Table 27)

Environmental factors were included as push factors for 100% of these friends and relatives. (see Table 28)

KEY SUCCESS FACTORS FOR RESETTLEMENT: WHO IS SUPPORTING ENVIRONMENTAL MIGRANTS?

The POP-2 demonstrated that the greatest assistance to environmental migrants, in addition to state support, is provided by traditional social institutions (avlod and fraternity). This raises a question of social organization in Tajikistan and the possibilities of mobilizing its institutions in the process of adaptation to environmental degradation. In the course of the study, we were able to collect materials only about social institutions in Panjakent district. In all other surveyed villages, the respondents refused to answer the questions.

The survey demonstrated that fraternal, clannish and communal ties are fairly strong in Sarazm and Khurmi villages of Panjakent district. An important role is played

TABLE 30. THE HOPE FOR FUTURE SUPPORT
FROM FOLLOWING GROUPS

	Hamadoni	Panjakent
Farmers associations	0,0%	2,5%
Fraternities	0,0%	32,5%
Traditional gatherings (<i>gap</i> , <i>gashtak</i>)	3,0%	0,0%
NGOs	72,7%	0,0%
Clans (<i>avlod</i>)	24,2%	65,0%
None	0,0%	0,0%

TABLE 31. INSTITUTES THAT ALREADY PROVIDED SUPPORT:

	Hamadoni	Panjakent
NGO	57,5%	0,0%
Trade unions	2,5%	0,0%
Clan (<i>avlod</i>)	40,0%	100,0%

TABLE 32. WHAT KIND OF ASSISTANCE
WAS PROVIDED EXACTLY?

	Hamadoni	Panjakent
Food products	56,7%	0,0%
Money	16,7%	0,0%
Clothes	3,3%	0,0%
Food and money	20,0%	100,0%
Funds and household utilities	3,3%	0,0%

TABLE 33. THE CAUSE OF MIGRATION: DISEASES
DUE TO ENVIRONMENTAL DEGRADATION

	Dushanbe	GBAO	Sughd	Khatlon	RRS
Many	6,3%	0,0%	6,9%	6,8%	1,9%
Some	28,1%	3,1%	22,7%	37,8%	23,7%
Nobody	65,6%	96,9%	70,4%	55,4%	74,4%

by farmers' associations and mosques. Thus, 12.5% of respondents in Panjakent district recognized themselves as members of *avlod*-clan, 67.5% as members of a fraternity, 15.0% members of farmers' association, and 5.0% are active members of religious community under a local mosque. (see Table 29)

Strong traditional social institutions in Panjakent define the effectiveness of strategies used by the environmental migrants of Panjakent. In addition to 100% support from the authorities, 65% of the Panjakent migrants rely on support from relatives (*avlod*), and 100% already receive such support. Other structures have not provided any support. It is the fear of losing relationships and support of family and countrymen that keeps environmental migrants in Panjakent villages from moving to other parts of Tajikistan, and forcing them to choose external labour migration as an adaptive strategy.

There is a different situation in Hamadoni district. The POP-2 data shows that in Hamadoni there is a much wider range of institutions that have provided assistance and at the same time clannish relations are weaker there than in Panjakent. NGOs have an important role in supporting environmental migrants. Thus, apart from government's assistance, in Hamadoni 72.7% rely on support from NGOs and 57.5% already received it. 24.2% hope to be assisted by relatives (*avlod*) and 40% already received it, 3% rely on traditional male unions (*gashtak*). At the same time, in Hamadoni 2.5% received assistance from trade unions. Also, the type of assistance provided in Hamadoni is more diverse than in Panjakent. 56.7% received food, 20.0% received food and money, 16.7% money only, 3.3% clothes, and 3.0% household items and other goods.

As for the returned environmental migrants from the village of Chorsada in Nurobod district, they refused to answer these questions. (see Tables 30-32)

Overall, the survey showed that in the most severe and unfavourable conditions, the key success factor is the capacity of the community, which develops the most effective strategies for coping with the consequences of natural disasters.

ENVIRONMENTAL MIGRATION'S IMPACT ON HEALTH

It is known that climate change has potential risks for the population's health. With the increasing temperature, the risk of malaria, enteric diseases, thermal stresses, high blood pressure, and respiratory diseases incidence grows. With that, the elderly, children of preschool and school age, and the poor and homeless population are the most vulnerable groups.

The warming of the climate, fragmented atmospheric precipitation, and the diminishing flow of rivers (as well as stagnant water) has increased the risk of intestinal infection such as typhoid fever, salmonellosis, flux, amoebiasis, lamblia, helminthoses, etc. with typical spring-summer, summer, and summer-fall seasonality. These infectious diseases, with fecal-oral transmission, are disseminated through vectors in food products and water. Natural disasters related to water increase the risk of the spread of these infectious diseases. All of this is reflected in the materials of the survey. One third of the respondents on the national level, and many more in Khatlon Province, think that the residents of Tajikistan migrate due to the spread of diseases in the event of a degrading environment.

Nevertheless, it should be taken into account, that respondents quite often consider degradation as deterioration of sanitary conditions of the settlements, accumulation of garbage, lack of clean drinking water, etc. Therefore, data on environmental degradation as a push factor may reflect migration from contaminated settlements in which it is difficult to live because of the paralysis of utilities.

WHICH OF THE ENVIRONMENTAL DEGRADATION FACTORS AFFECT PEOPLE MOST OF ALL WITH REGARD TO MIGRATION AND IN WHAT AREAS?

Data received during this survey were compared with the earlier surveys. Materials on the assessment of households conducted under the ADB survey of poverty level and remittances in 2007 showed that the migration level (external labour, internal labour, and net emigration) is much higher in the districts with an unfavourable environment and a high frequency of natural disasters.

Rural residents are more vulnerable to environmental degradation. They are more dependent on natural resources than people in urban areas. The loss of livelihoods due to climatic stress, drought, more limited access to water and energy resources, and the loss of biodiversity are among the main causes for deteriorating living standards in rural areas.

The risk of increased soil salinization, along with the climate warming, poses the threat of the withdrawal of already scarce agricultural lands from circulation. Currently, the total area of saline soils and saline lands in the country makes up 100-120 thousand hectares or 15% of the total area of agricultural lands.

For the most part, concerns are focused on the climatic warming causing the outbreaks of diseases and pests in the agricultural sector, which may have a serious impact and incur significant damage to economic development. For instance, during 2003-2005, in the southern districts

of Tajikistan (Qumsangir, Farkhor, and Hamadoni), the outbreak of the cotton budworm in areas more than 36 hectares led to the reduction of the cotton crop by 50%. On the other hand, there is an increasing locust outbreak. In Tajikistan, in 2000-2007, the areas affected by the Moroccan locust (*D. Maroccanus*) increased five times, from 16 thousand hectares to 85 thousand hectares.

A vivid example of this comes from the survey conducted in the villages of Isfara. Salinization and soil degradation, drought, and the dispersion of agricultural pests caused huge problems to the farmers and undermined the economy of the Isfara district, which lost its traditional sector – the production of dry fruits. The loss of traditional industry stimulated external migration – labour migration, resettlement, and internal migration (the leasing of orchards and the migration of experts in drying fruits). Based on our data, one can assume that environmental deterioration will push out more people from environmentally degraded districts of Sughd Province. Given the same scale of labour migration, the net migration flows will grow.

The materials of this survey showed that the weight of environmental causes within the group of push factors is growing, which is a new phenomenon in Tajikistan.

Migration due to environmental degradation is mostly stimulated by drought, declining humidity, and the lack of clean and irrigation water, as well as soil degradation. Declining agricultural productivity due to the decreased content of humus in the soil as a result of soil degradation and salinization, as well as high vulnerability of crop species to drought on arable lands, makes small households unprofitable. The impact of land degradation on the rural population is an increase in their vulnerability, which compels them in turn to intensify the use of already disturbed land in order to seek short-term gains. At the same time, it contributes to the expansion of labour migration. According to the materials of the Climate Change Survey 2010, a precipitation deficit will be observed in the longer term. However, the current unequal precipitation in certain territories of the country will continue. According to climate models, by 2030 we will observe increased precipitation in high mountainous areas, and, contrary to that, reduced precipitation in valleys. Therefore, we may assume that the largest scale of migration caused by a degrading environment will be observed in the Sughd Province.

CAN MIGRATION OF VARIOUS TYPES BE AN ADAPTIVE STRATEGY TO ENVIRONMENTAL DEGRADATION?

Also, informal methods of assistance are available to the victims, as well as their adaptation to new situations.

The survey, in general, showed that environmental factors are both the direct cause stimulating migration and a contextual factor for migration development in Tajikistan. According to Shurke (1993), in the scholarly literature on environmental migration, two wide categories dominate: (1) the “minimalists,” who assume that the environment is only a contextual factor in decision-making, and (2) the “maximalists,” who state that the environment is what forces people to leave their houses. Based on the data received, one can assume that the issue is about the extent of the impact of environmental factors on the capacity to adapt to the changing environment. Deterioration of the environment as well as struggling with consequences of natural disaster makes people to seek income outside of their districts. Male members of households having no insurance or large amount of savings make a trip to places where, within a short time, they can acquire the means to restore their households. In some cases, if attempts to restore the household are unsuccessful and new locations lack sustainable sources of income, labour migration becomes a stable part of the household economy.

All four districts that were surveyed in this project had a high rate of labour migration reaching as high as 98% of the households in Anjircon (Hamadoni).

The current migration pattern (a variation of seasonal migration) is one where there is a combination of men participating in labour migration while a major role is played by women and children in agricultural works at home. Based on the survey results, in all villages under consideration, except for Chorsada (Nurobod), notwithstanding the fact that remittances are the main source of income in major families and are insufficient. Therefore, the remaining members of families - mainly women and children - work in the household farming and look for paying jobs. The survey showed that 60% of the interviewed migrants' wives are engaged in paid labour outside their households. 37.5% of the wives of migrants interviewed reported that they had to work because the remittances and other income were insufficient. Oftentimes, women work on farms - 45% of the working wives of migrants. Work on farms does not provide enough in earnings to ensure numerous benefits for the households - this work regulates the relationship with local bosses, access to land plots, water for irrigation, and use of other “public resources.” Based on the household survey, cash earnings from working on a private farm, land, or orchard from the production

of fruits, vegetables, meat, eggs, honey, and the collection and sale of wild plants for migrant households, comprise 23.3%, nearly a quarter of the total family income. Savings made from remittances enable households to overcome two main obstacles they face: the lack of access to credit, which is crucial for family farming, and the lack of insurance that could protect households in emergencies, including environmental disasters.

Investments in agricultural assets, including land, machinery, and equipment, are relatively small with the exception of cattle, which are considered by migrant households as a means for savings and reserve stock. Increasing environmental degradation enforces the diversification of income sources in the affected areas. Declining incomes and deteriorating well-being trigger labour migration. However, absolute poverty and destitution hinder external migration and generate internal migration.

Labour migration performs its role as a survival strategy in the areas affected by environmental degradation in the case where a successfully functioning transnational economy of migrants' households comprised of two parts is in place: foreign employment of migrants generating income (remittances) and providing food, savings, and retaining insurance amounts in the form of cattle, that are applied by the remaining members of households at home. In case of slow environmental degradation, labour migration, whether external or internal, stands as an adaptive strategy along with other strategies such as the extension of crops, planting, leasing, etc., thus improving the productivity of family farms.

Migration can be considered one of the numerous adaptation strategies in response to a changing environment. Adaptation can be implemented in various forms, including different institutional levels. The important role is played by technological development, local community development, and education and training initiatives. Remittances are crucial for the development and rehabilitation needed to facilitate successful adaptation.

However, when environmental degradation reaches the threshold whereby agriculture is no longer profitable, labour migration alone is not able to provide the income for the livelihoods of families. In cases such as this, families strive to resettle entirely. In the case of Tajikistan, resettlement capacity will be constrained by the lack of pull factors in countries receiving the migrants from Tajikistan.

One may also assume that climate change, the type of precipitation, and further degradation of the soil will change the patterns of migration, and they will significantly differ both from the traditional labour migration patterns of the

past 15 years and from resettlement. Such an assumption may be justified by the following.

Earlier research (Hakimov and Mahmadbekov) has shown that push factors are complex. Environmental factors are closely linked with labour market problems, the exclusion of certain population groups, the low level of incomes, etc. However, with climate aridization and soil degradation, environmental factors will continue to affect the lives of the people, which is already happening. People are no longer interested in land cultivation, as a land plot brings losses rather than profits. This changes migration pattern caused by environmental changes, such as aridization, and the increasing irregularity of precipitation restricts the opportunities for seasonal work. The economy of labour migration in Tajikistan as it developed is no longer effective, because it does not act as the second part of the economy – the agricultural economy in the home country.

Hence, the conclusion is that labour migration is an adaptation strategy in the areas affected by environmental degradation. Land degradation, including soil degradation, affect the sustainability of rural production systems and deprive villagers of livelihoods, causing the outflow of rural population as soon as the threshold or breaking point is reached. In contrast to unexpected natural disasters that induce temporary migration, gradual environmental deterioration is likely to cause population outflow from rural areas to other countries, most probably Russia and other countries.

CONCLUSION & FINDINGS

Rural residents of Tajikistan are vulnerable to sudden natural disasters such as mudslides, floods, landslides, and earthquakes. However, they suffer the most from gradual environmental degradation in the form of aridization, land and water degradation, desertification, deforestation and decreased biodiversity. Based on the survey data, 37.8% of respondents mentioned drought to be the main factor of their concern regarding environmental degradation while only 1.5% cited the increased rate of natural disasters.

The populations residing in mountainous areas, foothills and river valleys are hit the hardest by sudden natural disasters. The residents most concerned about natural disasters are found in Khatlon Province. The residents of the valley areas in northern Tajikistan are the most vulnerable to gradual environmental degradation such as drought, salinization, soil erosion, swamping of soil and deforestation.

Climate change has increased the frequency and intensity of natural disasters. Rising and fluctuations of

temperature, combined with increased precipitation levels, have a variety of impacts on human activity ranging from the spheres of economic development to public health. The overall rise in the temperature has increased the spread of agricultural diseases and pests, while the fluctuations in precipitation and extreme temperature place have placed high demands on farming developments, which have required the introduction of new agricultural practices and plant protection products as well as sustainable agricultural management.

Environmental degradation is often caused by anthropogenic factors including demographic pressure and agricultural activity. Rapid population growth, problems associated with food supply, fuel shortages, electricity shortages, low incomes and particularly poor management of agriculture and natural resources have made people in both mountainous areas and valleys over-exploit the natural environment, thereby destroying it. All of this has created further economic difficulties, worsened social conditions, and led to increased poverty which has in turn stimulated both internal and external migration.

Despite this situation of a rapidly deteriorating environment, the population of Tajikistan still has a vague and imprecise idea of what the environment is, the causes and factors behind its degradation, how human influence has impacted the environment including its destruction, and how further damage to the environment and the population's vulnerability may be reduced.

The Government of Tajikistan has taken certain measures to improve the situation, but there remains much to be done in order to attain tangible progress in the field of environmental protection, sustainable resource management and agricultural development.

At the same time, over the recent decade, environmental migration has become more conspicuous. Data from this study shows that environmental causes (drought, worsened water, and declining soil fertility) are the third highest reason pushing the Tajikistan's residents from their homes, only behind unemployment and low incomes. Environmental factors are both the direct cause stimulating migration and a contextual factor for migration development in Tajikistan. This survey demonstrated a relatively new phenomenon – a greater role for environmental reasons in the group of push factors.

Legislation in the Republic of Tajikistan notes the concept of ecological migration, but it includes only migration caused by natural disasters or made to prevent their negative consequences. With that, environmental migrants are those who are resettled as part of government programmes. At the same time, the legislation has no

provision regarding migrants resettling independently because of environmental degradation or other forms of migration induced by environmental reasons.

Despite this, policies and institutional structures exist for the management of environmental migration in Tajikistan. Agencies dealing with natural disaster consequences through prevention and assistance to victims maintain coordination of their activities. There are also informal methods of assistance in place. However, there are numerous unresolved issues such as identifying places for resettlement of environmental migrants, ensuring the provision of basic needs in water, land, jobs and opportunities to farm, which is especially important as the vast majority of such migrants are engaged in agriculture and forestry. As a rule, environmental migrants rarely participate in a selection of the place for resettlement. Territories for resettlement are chosen by the central authorities at the instruction of district authorities without the involvement of the migrating families. Given the lack of sufficient land area and the high share of environmentally unfriendly territories, there is a threat that environmental migrants may be resettled to places that are just as hazardous or to areas with no sources of income or living conditions.

This research has found that in the case that environmental migrants are unable to find sources of income and create favorable living conditions for their families, they start to develop adaptation strategies. The most popular strategies have included external and internal labour migration which allows households to survive in a new place of residence. Migration strategies involve temporary labour migration, with the subsistence farming at home handled with the intensive participation of women and children.

Return migration is another strategy for a household or its members returning to their original place of residence. Despite the risk of recurring disaster, they continue farming the land. Income generated from agricultural production in hazardous zones goes to all members of the household, who live both in the ruined and new areas of residence. As a result of return migration, the native population in some areas has rebounded, only raising the concern for resettlement once again.

A similar situation arises from the implementation of development projects such as construction of hydroelectric plants. The need to resettle people from flood zones of future hydroelectric power plants results in many problems, particularly the selection of resettlement sites for the migrants. Unfavourable areas with limited access to potable and irrigation water, salinized soil, or lack of pastures are unacceptable for migrants, resulting in either their refusal to move to new places, or an increased likelihood of their return to their original places of residence.

The scarcity of land suitable for agriculture is not the only problem facing resettling migrants, as there is also the problem of high unemployment and the difficulty of producing profits from the underdevelopment agricultural sector in the new areas.

The levels of unemployment in all the surveyed villages were found to be higher than the surrounding areas. Likewise, the poverty rate among environmental migrants is much higher than the surveyed territories' average level of poverty.

Limited access to markets, or lack thereof, results in higher levels of unemployment and poverty. Considering this lack of access, environmental migrant households mostly produce food only for their own consumption.

Poverty also prevents migrants from using advanced farming techniques and purchasing equipment, fertilizers, seeds of new varieties and plant protection. This leads to crop decreases and destruction of pastures.

The population's response to resettlement has included several adaptation strategies, and various forms of migration have been among them. The selection of the form of migration (temporary external or internal labour migration, long-term or seasonal) has depended on the scale of destruction and the losses caused by natural disasters, the probability of relapse, the loss of livelihoods, the size of social support, poverty levels, remittances, and the employment opportunities in the place of relocation. Sometimes affected households utilize several types of migration, applying one or another pattern depending on the circumstances. Very often, migration becomes complex when the types of migration interweave and coexist in the life of a single person or household.

Labour migration is the most widespread pattern in affected areas, and as such is the most important means of adaptation to environmental degradation. Male members of households, lacking insurance or large amount of savings, travel to places with the hope that, within a short time, they can acquire the means to restore their households. In some cases, if the attempts to restore the household are unsuccessful and new locations lack sustainable sources of income, labour migration becomes a stable part of the household economy. Based on the research, districts affected by gradual environmental degradation have a higher level of migration than those affected by natural disasters.

It can be stated that labour migration induced by gradual environmental degradation develops slowly, but comprises a large number of people. There is a trend of developing

areas and networks as more people choose labour migration as their main adaptation strategy.

Villages that survived natural disasters but lost their property in an instant were often not able to engage in external labour migration, and instead very often selected internal migration. These households are unable without external support to fund the initial costs of migration and have no access to migrant networks. Therefore, they are urged to borrow money and migrate to Russia where they get engaged in the most difficult, dirtiest and low-paid jobs. The major problems of migrants abroad include an increased number of undocumented workers, low qualifications, and hence, low salaries, reliance on intermediaries, vulnerability to human trafficking, deception, exploitation by employers, persecution by Russian law enforcement agencies, and increased rate of injury and diseases at work.

Despite the lower level of migration in villages affected by natural disasters, the frequency of remittances is higher in these villages than in villages affected by slow environmental degradation. As such, villages hit by natural disasters are more reliant on remittances.

In the case of gradual degradation, environmental changes have an indirect economic impact on the population's mobility. Drought and soil degradation gradually deprive the rural population of their livelihoods. Temporary labour migration or resettlement in the worst scenario is the adaptation measure they prefer to undertake.

Thus, migration in all its forms is one of the most important adaptation strategies for the rural population in Tajikistan in response to the changing environment. Adaptation can be implemented in various forms and at various institutional levels. In this process, an important role is played by technological development, local community development, education and training. Remittances are crucial for the development and rehabilitation of vulnerable territories, as they facilitate the successful adaptation of the rural population to deteriorating environments.

Overall, the survey showed that in the most severe and unfavourable conditions, the key success factors of adaptation, including migration of various forms, are: a) the active role of the state; b) the economic development of vulnerable regions; and, c) the capacity of the local community which develops the most effective strategies for coping with the consequences of natural disasters.

RECOMMENDATIONS

LEGISLATION

- It is necessary to establish links between migration, security, humanitarian activity, development, disaster management and environmental protection within the framework of the legislation and regulatory documents.
- It is important to develop and expand the definition of environmental migration and migrants in the legislation of Tajikistan with the inclusion of persons forced to change their place of residence in connection with environmental degradation beyond government's programs.

POLICY

- It is important to take preventive measures aimed at decreasing the vulnerability of rural population of Tajikistan to environmental degradation and reducing migration related to environmental situation.
- It is essential to create a balance between policies aimed at reducing the vulnerability of rural population and stimulating the population to adapt to the changed environment, while at the same time, policy measures aimed at improving labour migration management and protection the rights of migrant workers and their families.
- It is necessary to develop policy measures aimed at establishing more effective links between human rights, environmental protection, resource management, and migration.

DEVELOPMENT

Economic development of agricultural regions and attempts to reduce their vulnerability are the best means for risk reduction, damage minimization, and the facilitation of household rehabilitation processes affected by environmental degradation.

- It is critical to create favourable conditions for the farms' development in order to improve agricultural and processing infrastructure.
- It is important to decrease poverty, and, to that end, we encourage the diversification of incomes, including labour migration in a civilized form and its institutional structures.
- To this end, it is necessary to develop small and private businesses, and to engage the rural

populations, primarily women and youth, in entrepreneurial activities.

- Encourage the development of services, primarily tourism and handicrafts.
- It is crucial to encourage savings through banking instruments, microlending, and insurance.
- It is important to create incentives aimed at sustainable development of agriculture.
- International organizations should assist in creating the conditions for sustainable funding programmes to prevent soil degradation;
- It is necessary to undertake measures towards establishing an economically feasible employment sector in rural areas;
- It is necessary to restore traditional skills and models of environmental management, as well as to introduce cost-effective and affordable innovative technologies in agricultural production.

aspects, agricultural activities, environmental degradation and migration, which deserves a thorough study and development of policies aimed at mitigating the vulnerability of rural women to environmental degradation and related to it migration.

AWARENESS RAISING

Anthropogenic impact on the environment exacerbates existing environmental, economic and social vulnerability of the rural population of Tajikistan. Therefore, in addition to creating incentives for better management of natural resources at all levels and the development of agriculture, it is necessary to raise awareness among rural population about environmental degradation and its hazardous consequences, measures to reduce vulnerability and migration.

SUPPORT AND DEVELOPMENT OF SOCIAL COHESION

To support migration as an adaptation strategy in conjunction with other adaptive measures, it is necessary to stimulate social investment and support social cohesiveness in local communities, develop community self-governance and capacity building of communities and NGOs. Local communities should assess their needs and tasks, on their own, with regard to environmentally induced migration, forced and/or voluntary.

At the same time it is necessary to develop social partnerships and increase cooperation between the state and its agencies with local communities in the affected areas.

GENDER

Environmental degradation and labour migration as a subsequently taken adaptive measure increases inequality between women and men. Such a pattern can be seen when men go abroad in search of a job while their families engage with agriculture. This is one of the reasons why women prevail in agriculture and more vulnerable to environmental degradation. At the same time, the limitations in earnings, the need for housekeeping and care for family members limit women mobility and intensify their vulnerability to sudden natural disasters. The drought, temperature extremes make them work even harder. Girls leave schools to help their mothers with these tasks. This leads to hardships, poverty and inequality thus undermining social capital needed to effectively confront environmental degradation.

Given that women are largely involved in food production, this raises a question about close interrelation of gender

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IOM International Organization for Migration
СБМ Созмони Байналмилалии Мухочират
МОМ Международная Организация по Миграции