



Enhancing the Education System, Training of Specialists and Raising Public Awareness on the Problem of Climate Change and Its Adverse Consequences

11.1. Introduction

The increase of public awareness and enhancement of knowledge on climate change problems, anthropogenic pressures on the climatic system and its adverse consequences, has great value for increasing the efficiency of NAP implementation and the development of new state policy directions in the area of climate change.

The development and implementation of measures aimed at education and public awareness on climate change problems, improvement of public access to information on climate change, training of scientific, technical and managerial personnel are important national commitments to the UNFCCC (Article 6).

In the long term, it is required to develop an appropriate program based on an in-depth study of the national needs to improve the existing system of ecological education, and raising public awareness on climate change.

11.2. System of education and access to knowledge

The education system of the Republic of Tajikistan has a public character and is carried out by specially authorized state departments.

The education system includes preschool and out of school educational entities, primary, secondary and high schools, lyceums, gymnasia, technical colleges, technical schools, universities, and also institutes and other postgraduate education centers (improvement of professional skills), masters and doctorate studies.

In the republic there is an advanced network of educational entities, however the potential of pedagogical staff, the financing of education and deterioration of the logistical base do not promote adequate knowledge acquisition in some areas of the republic.

With the purpose of enhancing ecological education and raising public awareness, the "State program on ecological education and public awareness in the Republic of Tajikistan to the year 2010" was launched in 1996. This program is based on state policy in the category of ecological education and is aimed at forming public ecological thinking, and the active social position of citizens as environmental defenders (fig. 11.1).

In courses at comprehensive schools, there are educational subjects in which the conditions of climate formation, basic climatic factors and their value for natural resources are considered. In the high school curriculum, a course on ecology and environmental protection is provided, and separate subjects include climate studies, synoptic meteorology, glaciology, hydrology, agricultural meteorology, general hygiene, ecology of transport etc. However, in these subjects the questions related to the problem of anthropogenic pressures on the climate and adverse consequences of climate change are not considered.

11.3. Mass media

Mass media is the major factor in public awareness about the state of the environment and creation of ecological vision among the population.

Press, radio and TV are the basic mass media in the republic. Some 259 printed editions are registered in the republic, including 20 countrywide editions, out of which 85 are published regularly. The separate editions dealing with ecological issues include the ecological bulletin of the Ministry for Nature Protection, the newspaper "Navruzi Vatan", and newsletters by ecological NGOs.

The national broadcasting has three channels; transmissions from the neighboring countries also are received everywhere. On the radio, climate change issues started to be reflected with the beginning of the preparation of the First National Communication and National Action Plan for Climate Change Mitigation. The leading experts and scientists of the republic were interviewed on the radio on emerging subjects.

Public awareness assessment shows that television is the basic source of ecological information. There are TV programs "We and Nature", "Animal World", children's competitions on subjects about nature.

Nevertheless, climate change problems in mass media are propagandized in insufficient volume, and that is a direct consequence of the lack of appropriate information and misunderstanding of the urgency of this problem.

In spite of the fact that environmental protection topics are periodically covered in the mass media, the population of the republic is insufficiently informed on climate change problems. This circumstance breaks the process of public involvement in climate change mitigation and prevents access to reliable information about climate change.

11.4. Internet

Access to the Internet in the republic is rather limited. Internet network users number about 2 thousand in Tajikistan with dial-up and dedicated access.

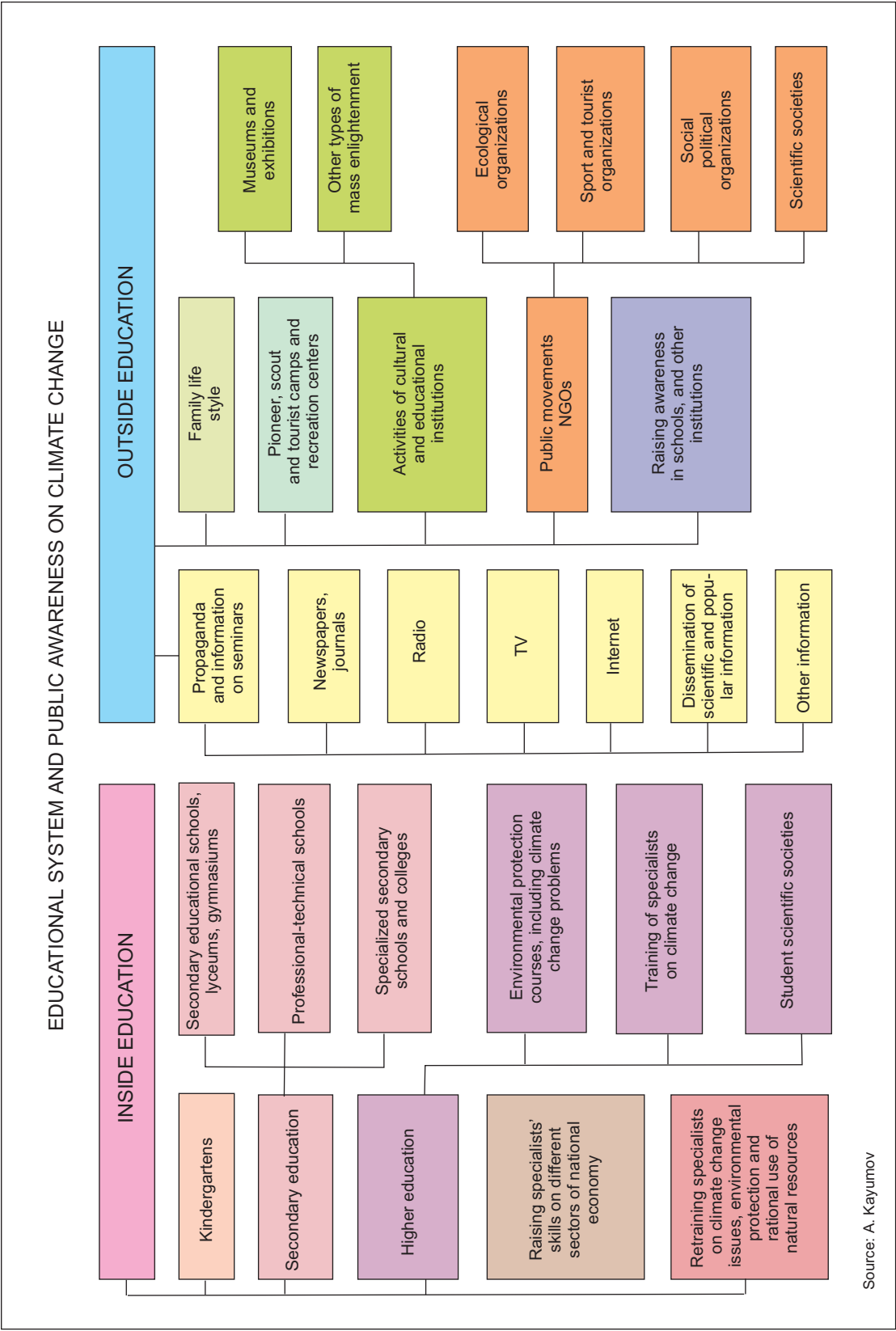
The limited number of users is caused by technical difficulties and high installation and use costs. However, the formation of new Internet companies has promoted the improvement of access to the global network and the decrease of service costs.

The distribution of ecological information, including climate change, using the Internet resources is a major element in providing access for the global community to information about Tajikistan's circumstances and exchange of knowledge.

For the first time, the electronic version of the report about the state of the environment in the Republic of Tajikistan was launched on the Internet in 1998. Cooperation with leading international organizations on environmental protection, including UNEP, allowed the creation of more satisfactory and effective digital information products:

The electronic version of the report "Vital maps and graphics on the environment and climate change in the Republic of Tajikistan" in support of the National Action Plan (<http://www.grida.no/enrin/htmls/tadjik/vitalgraphics/eng/index.htm>)

The electronic version of the report "The state of the environment in the Republic of Tajikistan in 2000" includes information on the state of climate, water and land resources, biodiversity, ozone layer, anthropogenic pressures and response measures (<http://www.grida.no/enrin/htmls/tadjik/soe2/eng/>)



Source: A. Kayumov

Fig. 11.1.

Ecological information about Dushanbe, including climate change, atmospheric air quality (<http://www.ceroi.net/reports/dushanbe/eng/index.htm>).

The Tajik Met Service has developed electronic versions of the reports about climatic anomalies in the Republic of Tajikistan in 2000 and data on long-term meteorological observations on GCOS stations in Tajikistan. The materials of national workshops on climate change were recorded on electronic disks.

11.5. Public ecological movement and organizations

Ecological non-governmental organizations play an important role in the formation of public opinion, and ecological education, and have certain potential in solving ecological problems, mainly at a local level.

At present there are about 40 ecological NGOs in Tajikistan. Some of them are engaged in ecological education and public awareness; other NGOs implement nature protection projects. The efforts of public organizations are targeting the clearing of ecologically vulnerable territories, the improvement of the sanitary urban state, tree planting, and the realization of demonstration projects on renewable energies etc.

The acceptance by the republic of the Aarhus Convention on access to environmental information opens new prospects for the dialogue between governmental structures and public organizations. However, the problem of climate change has not received due attention in NGO activities. This requires non-governmental organizations to be more active in this environmental field.

11.6. Scientific research and publications on climate change

Scientific research on climate change is not only the basis for the formation of knowledge, but also for policy-making and public opinion.

The activity of research organizations has promoted in-depth study of nature-climatic conditions of Tajikistan and edition of a number of fundamental publications.

In the period of 1960-1980, the climate directory of Tajikistan, the atlas of Tajikistan, with maps and graphics of climatic conditions, monographies and collections of scientific research were issued.

The publications on ecological problems provide:

- The scientific bases, in which the new scientific achievements and results are stated;
- Monitoring data, including information about the state of the environment and related trends;
- Data about negative impacts on the environment, technologies for the reduction of harmful emissions into the atmosphere;
- Reports of scientific conferences and workshops

The analysis of publications by types has shown that the greatest number of publications (60%) are devoted to scientific researches on ecological problems, 25% of publications include monitoring data.

Some publications reflect the regularities of climatic conditions formation and hydrometeorological phenomena over the territory of the republic and Central Asian region; other publications characterize the dynamics of water resources, glaciation and

their linkages with climatic factors. The publications about harmful substance emissions are connected with the analysis of their impacts on natural resources and public health.

However the climate change problem, in its contemporary understanding, is not considered in almost all publications. Modifications in the climate directories, methodical manuals, cartographical production is required. There are new opportunities for the study of the climate change problem, using computer-aided models, and international methodologies issued by IPCC and UNEP.

The growth of the number of publications in 2000-2002 was a direct result of conducting scientific researches on the climate change problem, arranging workshops, conferences etc.

Since the beginning of the preparation of the First National Communication and National Action Plan on Climate Change, it was possible to carry out purposeful scientific research and analysis of anthropogenic impacts on the climate change. Within this framework, national experts and scientists have prepared an inventory of GHG emissions and conducted the vulnerability assessment to climate change; a summary and collection of the reports about climate change, the monography "Climate change and its impacts on human health" have been published. More than 150 maps and graphics on various aspects of climate change in Tajikistan have been prepared.

11.7. Public awareness on climate change

In the course of the National Action Plan preparation, workshops with participation of government, scientists, and representatives from regions, mass media and NGOs have been dedicated to various aspects of the climate change problem. The workshops have promoted the creation of uniform opinion on the importance of the climate change problem and its adverse consequences for the republic and world community.

At governmental level a better understanding of the climate change problem has allowed the creation of preconditions for the integration of this problem into policy planning, and at public level this has promoted the creation of a good basis for the realization of accepted measures.

A series of public awareness assessments were conducted in the period from October 2000 till March 2002. The representatives of republican regions, people of various ages and occupations took part in interviews.

The analysis of assessment results shows that the population is insufficiently informed on climate change problems. First of all, it concerns the anthropogenic pressures on the climate system, climate change trends and its adverse consequences.

Such a situation is conditioned by several factors:

- Information on climate change is covered insufficiently in the mass-media and public organizations in view of the novelty of this problem for Tajikistan;
- There are no subjects about climate change and anthropogenic pressures on the climate system in the school and high school curriculum;
- The middle management (heads of local governments, enterprises) is insufficiently informed on the climate change problem;
- Popular brochures and books on the subject are not being published, and the Internet is still inaccessible to the majority of the population.

11.8. Enhancement of the education system, training of specialists and raising public awareness on climate change and its adverse consequences

The basis for effective implementation of the National Action Plan is the support and understanding of climate change by decision-making officials, scientists and the general public. In this area, training of personnel and public awareness on climate change are paramount. Such measures can be implemented on the basis of the existing education system and mass-media, and also through the creation of new structures.

11.8.1. Legal issues

In 1996, the government of Tajikistan developed the "State program of ecological education and public awareness in the Republic of Tajikistan to the year 2010".

However, in this document the raising of public awareness on climate change is not stipulated. In the mass media and the educational system, the climate change problem is not sufficiently covered.

For the creation of a basis for effective implementation of measures, it is necessary to accept the legislative acts for propagation and improvement of public awareness on climate change, reduction of GHG emissions and adaptation to climate change through the Ministry of Education, the mass-media, local governments and enterprises.

11.8.2. Institutional frameworks and interdepartmental cooperation

For gathering, analysis and distribution of the climate change information on national and international levels, and effective implementation of the National Action Plan, the establishment of an Information Center on Climate Change and the designation of a national focal point for the implementation of Article 6 UNFCCC are necessary.

The basic tasks of such a center would include:

- The gathering and analysis of the best available national and international data on climate change, consequences of these changes, and measures for the prevention of the adverse effects of climate change and providing adequate adaptation;
- The development of a directory of organizations and persons engaged in the implementation of Article 6 UNFCCC, and strengthening partnerships;
- Informing the state authorities and public about the latest results of scientific research on climate change issues;
- Methodical support of activities by ministries, departments and mass-media on the development of educational programs, publication of educational and information materials on climate change;
- Assistance in preparation of scientific personnel through graduate and postgraduate studies on climate change;
- Conducting training and workshops for educational institutions, mass media and heads of local governments and industries on climate change problems, including measures on GHG emission reduction and adaptation;

It is expedient to disseminate knowledge in the area of climate change on the basis of the existing educational system, the mass-media, local governments and industries. The sources of knowledge are the information center, the Main Administration on Hydrometeorology of the Ministry for Nature Protection, the Academy of Sciences, high

schools, research institutes, etc. The Ministry of Education prepares the educational curriculum, and the educational institutions introduce them in the process of training; mass-media issues publications and popular radio and television programmes. The local governments and enterprises carry out thematic workshops on climate change.

11.8.3. Enhancement of the education system and training

The key factor in the improvement of climate change coverage in the education system is the preparation and retraining of school and high schools teachers, and inclusion in the appropriate educational curriculum aspects of climate change, i.e. anthropogenic impacts on the climatic system and their consequences for natural resources, the economy and the population.

The basic measures on the improvement of the education system and the training of personnel in the areas related to climate change, include:

- Development of educational materials, retraining of professional staff, and conducting of workshops for teaching staff at universities and colleges on the climate change problem;
- Development of the curriculum for schools and high schools with the purpose of the introduction of climate change issues in educational plans;
- Inclusion of a brief description of processes resulting in climatic changes and their consequences into secondary school and high school courses on ecology, physics, chemistry, geography, biology, hygiene;
- Inclusion of the description of the economic consequences of climate change, assessment of economic damage from natural disasters and the analysis of cost-efficiency of the projects and measures on GHG emission reduction and adaptation into the courses on economy at universities;
- Introduction at the meteorological faculty of special courses focusing on the study of natural and anthropogenic processes influencing the climatic system, indicators of climate change and methods of climate projection using computer models and instrumental research;
- Development and publishing of study materials on climate change problems at physics-technical, geographical, medical, agricultural and economic faculties of universities;
- Development of visual educational materials, posters and slide presentations aimed at the popular explanation of the climatic system and greenhouse effect, natural and anthropogenic impacts on the climate, and the consequences of climatic changes;
- Preparation and distribution of study materials on climate change for voluntary follow-up study at schools and universities;

11.8.4. Informing communities and the mass-media

Reliable information on climate change covered in the mass-media is aimed at the improvement of public understanding in view of the urgency of the climate change problem, so as to support the implementation of measures on reduction of GHG emissions and adaptation.

The measures targeting the propagation of climate change problem in mass-media and public awareness include:

- Conducting workshops for the mass-media on methods of popularization of scientific knowledge and effective forms of dissemination of information on climate change;

- Development of radio and television programmes about the reasons for global climate change, observed and expected consequences of climate changes, sources of anthropogenic pressures on the climatic system and measures on GHG emission reduction and adaptation;
- Cooperation with international organizations and assistance in preparation of the information for the Internet, enabling public access to the World Wide Web;
- Popular publications on climate change in republican and local newspapers;
- Popular lectures and workshops at industrial enterprises about the reasons and consequences of climatic changes, the role of industry in the deterioration of the ecology and climate and mitigation measures;
- Arranging workshops and round tables for the heads of local governments (khukumats, jamoats) and other local authorities on climate change and concrete measures, which are specified in the National Action Plan and can be successfully implemented in local conditions for climate change mitigation, including the use of renewable energies, vehicle emissions reduction, prevention of forest cuttings and promotion to rational use of natural resources;
- Publication and distribution of brochures covering aspects of climate change problems and measures for climate change mitigation, including the translation of international information to local languages;
- Conducting activities on public awareness in the regions, attracting the meteorological stations staff and local governments for popular explanation of climate change problem, and measures promoting the reduction of anthropogenic pressure on the climate in local conditions, with the emphasis on the application of renewable energies, the reduction of emissions, and the conservation of forests etc;
- Regular assessment of public awareness on climate change aimed at an evaluation of the efficiency of undertaken measures on public awareness and the development of additional measures.

Non-governmental public organizations can promote the improvement of public awareness through:

- Cooperation with governmental departments on the implementation of the National Action Plan for Climate Change Mitigation;
- The development and use of interactive methods in the education of young people on climate change issues, and youth participation in planning, and the development and implementation of measures;
- Arranging thematic workshops and round tables on climate change, with the participation of leading experts and the scientific community.