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***Application of space based technologies
for Disaster Risk Assessment at the level of
communities***

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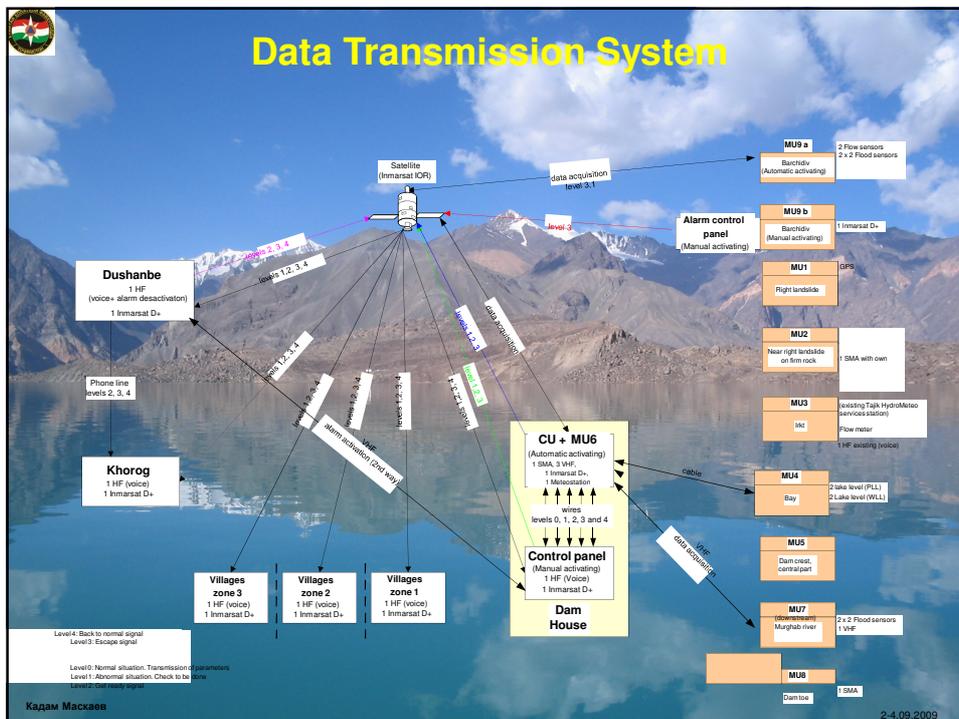
Space Based Technologies Application

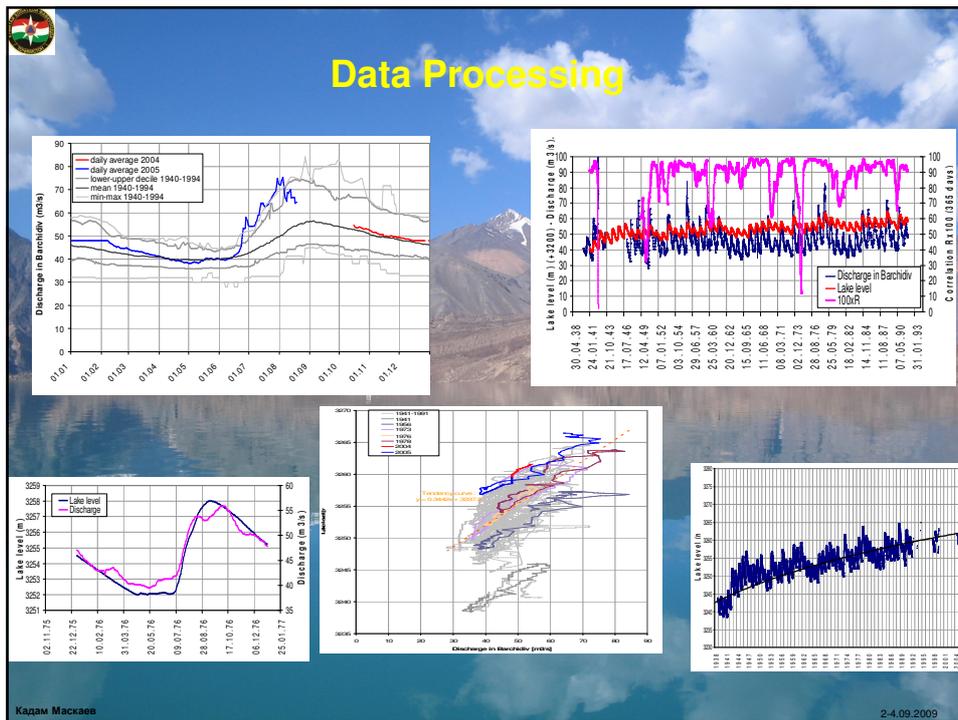
- GIS mapping and application of geospatial information systems, which have become widespread and recognized in Tajikistan, allow to use innovative and effective approaches for the analysis of the information about disasters and solve tasks on their prevention and risk reduction.
- They play an especially important role for decision-making in socio-economic, economic, political and ecological spheres of development, disaster and natural resources management.
- A lot of agencies and departments are getting more and more concerned with the lack of qualified specialists who can effectively use GIS technologies and geospatial information systems for scientific research and decision-making.

Space Based Technologies Application

Recent important achievements of the GIS technologies and remote sensing:

- I. Monitoring and Early Warning System was installed in 2004 at the lake Sarez and it conducts the following kinds of measurements:
 - Surface displacements on the body of the Usoi Landslide Dam;
 - Registration of strong movements during earthquakes;
 - Water level of the lake and maximal wave height;
 - The water discharge of the Murghab river;
 - Turbidity of the drain flow from the lake;
 - Meteorological data.
- Components of the Monitoring System are used for the activation of the warning system and they are integrated into Early Warning System.
- The transmission of all data, warning signals and remote supervision over the system is carried out through the satellite system INMARSAT, or locally, through cables on short distances.
- All the data received by the system, are available on the website of the Committee of Emergency Situations of Tajikistan – www.khf.tj





Space Based Technologies Application

2. Participation in the implementation of JAXA mini-project called "Representation of susceptibility to landslides of Khatlon province and Central regions of Tajikistan". This project has been implemented by the Geoinformational Centre of Asian Institute of Technology in Thailand:
 - During the implementation of this project 32 satellite images have been received and processed;
 - Multispectral satellite images have been used for identification and designing of landslide susceptibility maps of 2 most populated regions of Tajikistan;
 - The satellite data obtained within the frame of this project will be used for the monitoring of important objects, such as nature reserves, dams, glaciers, glacial lakes with outburst flood risk. These data will also help designing developmental maps of regions (for state authorities and decision-making officials), and solving DRR tasks.

Space Based Technologies Application

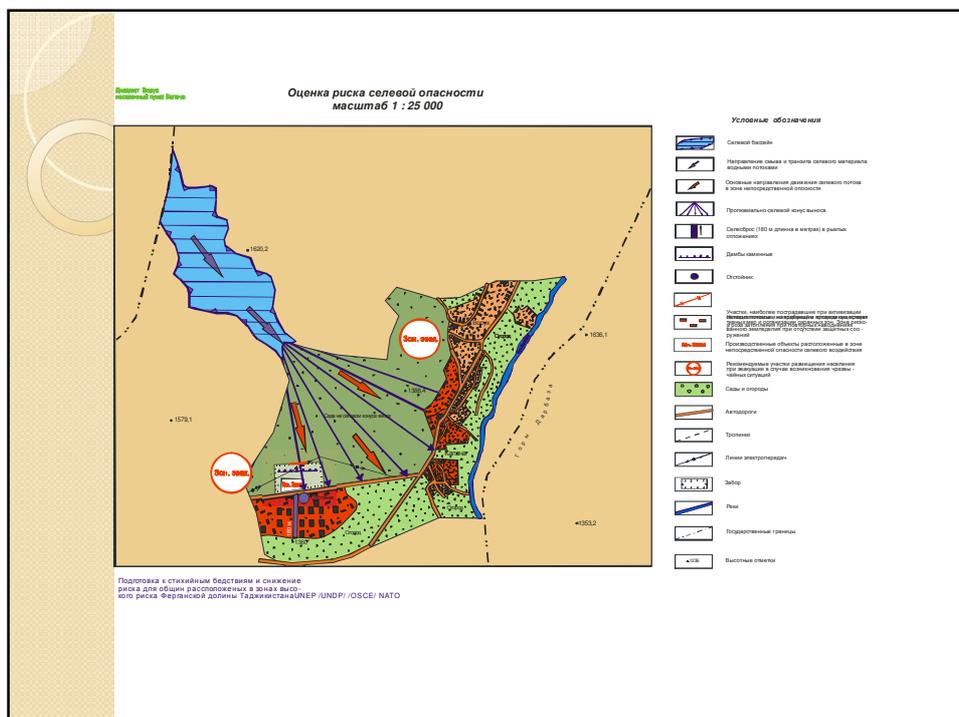
3. FOCUS, JICA, JAXA and Sentinel Asia trainings on the usage of GIS technologies, remote sensing for Disaster Management (loading and processing of satellite images, before and after the disaster), and also for disaster risk assessment:
 - The obtained spatial data and GIS trainings allow to solve problems of Disaster Prevention, Risk Assessment and Disaster Risk Reduction in a more efficient and reliable way.
4. Disaster risk assessment and vulnerability assessment of Tajikistan communities:
 - GOOGLE images are generally used;
 - Space images received from free spatial information systems (satellites), such as GOOGLE, USGS, Sentinel Asia (for example, flooding in Vose' district; earth flows in Kulob, Asht and Muminobod districts in 2010-2012), UN-SPIDER (a massive landslide and a mud-stream in Khuroson district in 2009), NASA (the Medvezhiy Glacieradvancing in Vanj district in 2011) are also used.

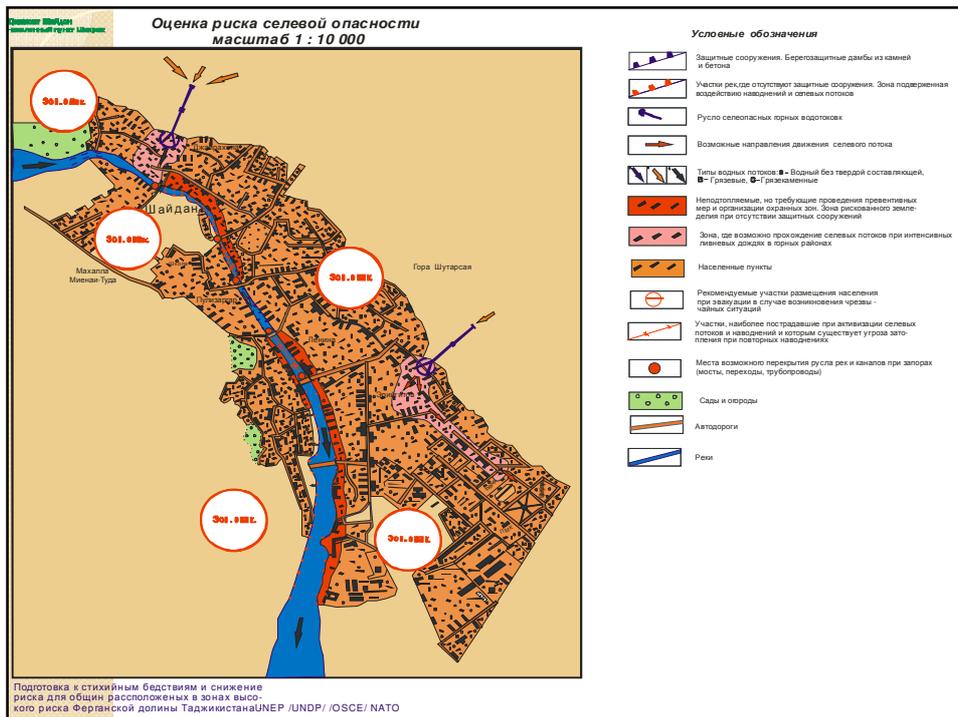
Some examples of the application of
space based technologies for disaster risk
assessment
at the level of communities.

INTRODUCTION

The first practice of IMAC carrying out disaster risk assessment on community level was realized within the framework of the UNEP/UNDP/OSCE/NATO international project “Environment and safety in the Fergana valley” in August 2006. Within the framework of this project:

- 18 settlements in Isfara, Konibodom and Asht districts of Sughd province were preliminary examined;
- 12 most vulnerable settlements were detected, and detailed examinations of dangerous exogenous hydro-geological processes were carried out, with the help of experts from corresponding organizations;
- A detailed report was compiled, and hazard maps were designed.

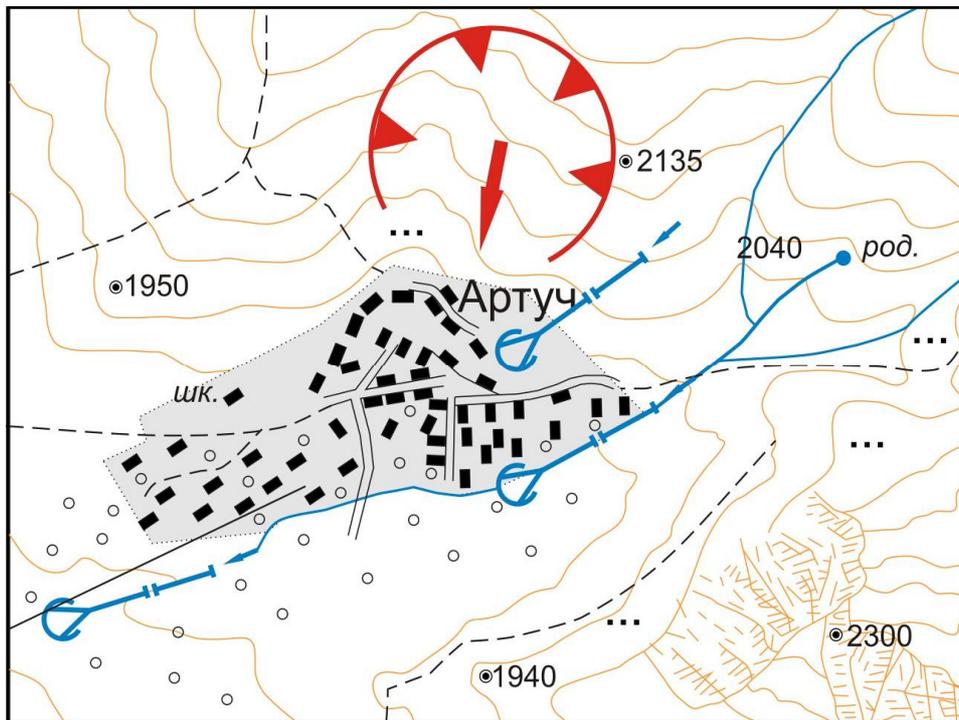




INTRODUCTION

Within the framework of the joint project between the German International Center (GIZ) and the Committee of ES and CD (October-November 2008) :

- Sociological and geological examinations of 259 settlements in 3 districts of the Zeravshan Valley of Sughd province were carried out;
- The results of the examination were used for creating a database in cooperation with experts from the international organization “Mission East”;
- 25 most vulnerable settlements were detected, and additional examinations were carried out with the purpose of developing projects for disaster prevention and reduction of potential disaster damages;
- Schematic hazard maps of communities were compiled, and places for projects realization were defined.



Introduction

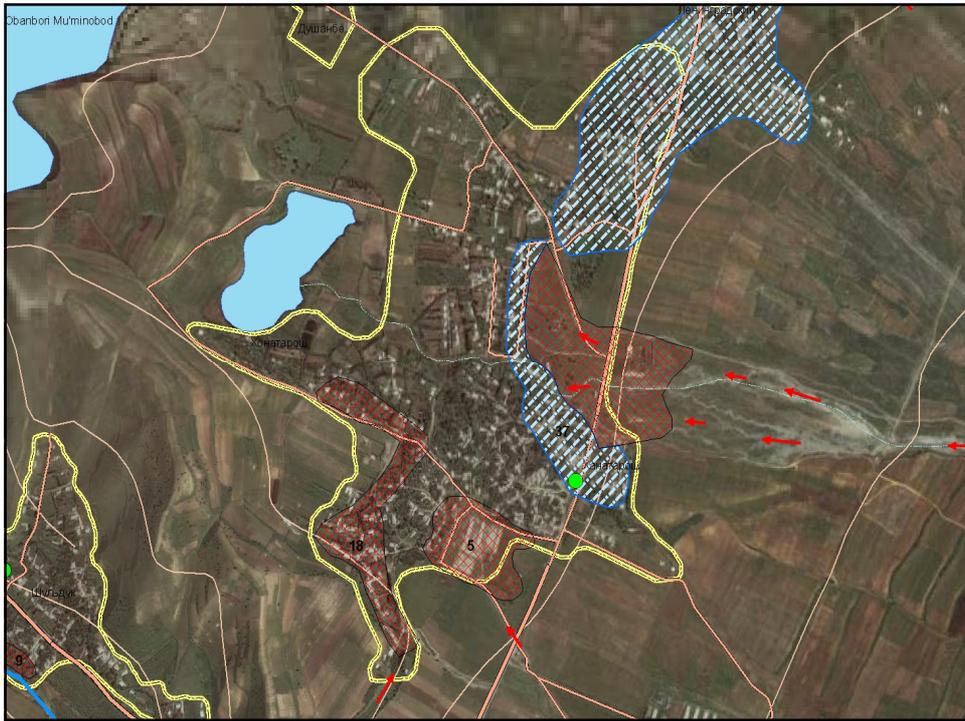
- In the course of implementation of separate projects within the framework of DIPECHO program (2003-2007), during the examination of separate settlements for present hazards and vulnerability, it became obvious that a methodology for disaster risk management was needed.
- Such methodology was developed in Tajikistan by organizations "Mission East", "Caritas" (Switzerland, Luxembourg), "Oxfam" (Great Britain) in close cooperation with IMAC of the Committee of ES and CD. The method was named MECO (the abbreviation of the names of the above mentioned organizations).

Results

- The methodology was initially tested in 100 settlements of Kulob district in Khatlon province of Tajikistan (2007-2008).
- Then the methodology was improved and tested during the implementation of the German International Center (GIZ) project in 259 settlements of the Zeravshan Valley (Panjakent, Ayni and Gornaya Matcha districts) of Sughd province (2008-2009).
- This method was applied for sociological and geological examinations in settlements of Asht district in Sughd province, Khuroson, Hamadoni, Farkhor, Shurabad and Panj districts of Khatlon province, Rasht, Nurobod and Tojikobod districts of Rasht region (2010-2011).

Results

- From May till August, 2009, an examination for disaster risk assessment was carried out in 86 settlements of 10 districts of Kulob region in Khatlon province. This examination was conducted with the support of international organizations “Mission East”, “Caritas”, “Oxfam”, and new methodology, improved during an implementation of GIZ project in Zeravshan Valley (October 2009) was applied.
- It was the first attempt of the application of space based technologies, in the form of GOOGLE images, for the assessment of disaster risks.

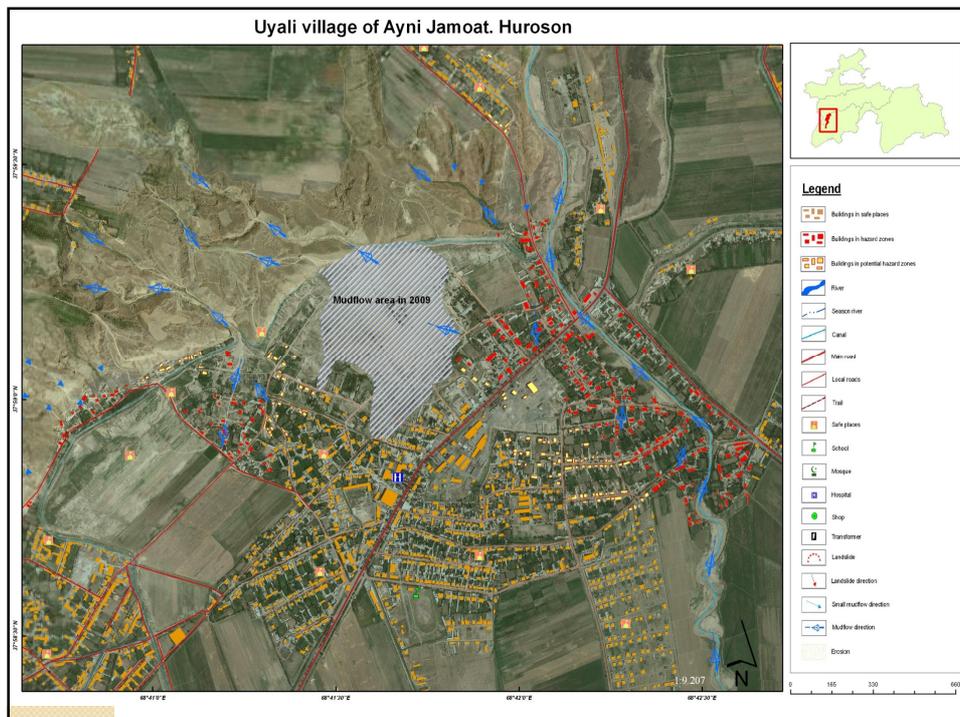


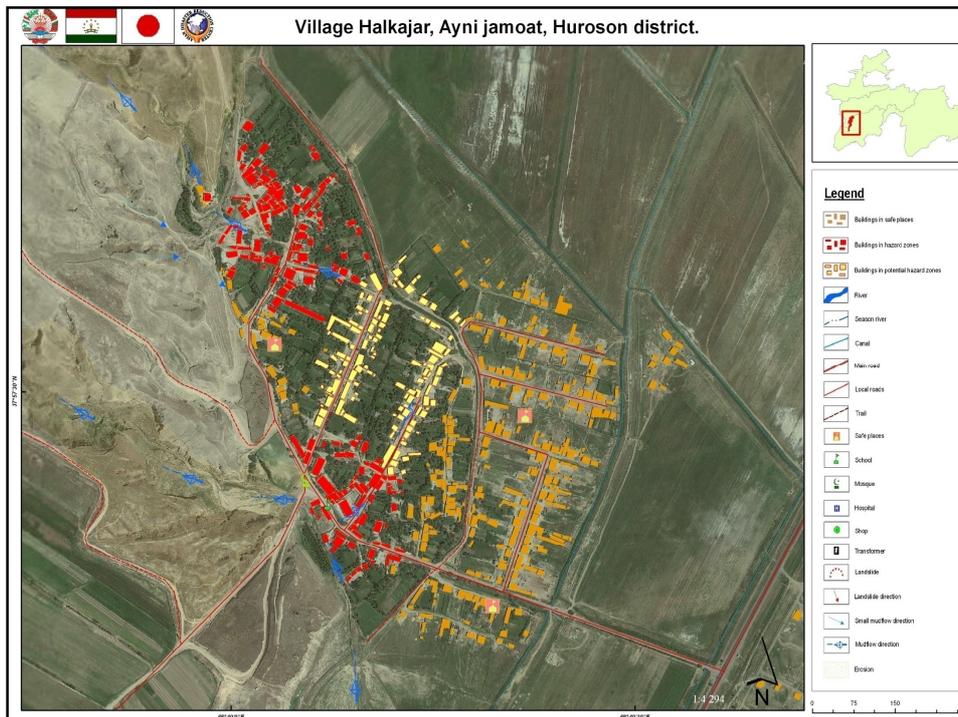
Results

- The implementation of ADB Project (in cooperation with ACTED) on disaster hazard assessments in 130 vulnerable settlements of 4 pilot areas of Khatlon province (Shurabad, Farkhor, Panj, and Hamadoni districts, 2010-2011).
- Examinations for disaster risk assessment were carried out in 20 settlements of Asht district in Sughd province with the support of ACTED organization (Khujand, November-December, 2010).
- Maps of disaster hazards were developed for settlements of Pandjakent and Ayni districts in Sughd province in cooperation with “Mission East” (September-October, 2010).

Results

- Disaster risk assessment was carried out in 19 settlements of Khuroson district in Khatlon province with the support of the Asian Disaster Reduction Center in the period from December 2011 till March 2012.
- Disaster risk assessment was conducted in 47 settlements of Rasht, Nurobod and Todjikobod districts of Rasht region, and also Ayni, Pandjakent districts of the Zeravshan Valley (Sughd province).





Conclusion

The following results were acquired in the process of disaster risk assessment at the level of vulnerable communities of Tajikistan:

- A methodology for disaster risk assessment at the level of communities (settlements) was developed.
- On the basis of this methodology, sociological and geological examinations were carried out and hazard maps developed for more than 600 settlements of Khuroson, Hamadoni, Farkhor, Shurabad and Panj districts of Khatlon province; Rasht, Nurobod and Todjikobod districts of Rasht region (2010-2012).
- The results of assessments in regions are issued as separate reports and combined into a developed unified database, which is regularly edited and updated.
- Its methodology is relatively low-technological and helps communities to observe, analyze and deepen their understanding of disaster risks in the surrounding them environment.
- One of advantages of this methodology is that it is an express method allowing of fast examination and studying a considerable quantity of communities using limited resources.
- The results acquired with the help of this methodology have increased its importance not only for communities, but also for the officials and NGOs working on disaster risk reduction and management.
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Conclusion

Space images and other spatial data acquired in the course of implementation of separate projects and trainings allow to use them for:

- carrying out of disaster risk and vulnerability assessment and designing hazard maps in especially vulnerable regions of Tajikistan.
- monitoring of the important objects (nature reserves, dams, glaciers, glacial lakes with outburst flood risk), as well as for working out of developmental maps of regions, and handling other problems.
- As an effective and reliable solution of the problems of Disaster Prevention and Disaster Risk Reduction.
- analysis of the information on disasters and handling the problems on Disaster Prevention and Disaster Risk Reduction.
- decision-making in socio-economic, economic, political and ecological spheres of development, disaster and natural resources management.
- integrating of Disaster Risk Reduction in the programs of regions development.

Suggestions

We propose international Space agencies, and other international organizations, expansion of informational exchange opportunities and activities on capacity building in developing countries, i.e.:

- To develop mechanisms of granting satellite images of territories not only after disasters, but also for projects and researches on disaster risk reduction.
- To simplify the procedures of granting satellite images during disasters, before publication in mass-media the information about disasters, and/or receiving data on damage or victims.
- Granting satellite data of high resolution of the limited (small) territory, for a better assessment of the situation during disaster.
- Organization of joint research projects on capacity building and replenishment of the scientific knowledge base in the field of disaster risk reduction.
- Experience exchange in the fields of application of new methods of risk assessment, advance research based disaster early warning, new technologies based successful projects results, and within the framework of RESAP planning.
- Granting of the archival satellite data accompanied with trainings on the usage of space data, remote sensing and GIS solutions in the field of Disaster Risk Reduction.



**Thank you for
your attention!**