

# 2010

## MONITOR II –WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters



Consortium „Bauer Consult”

Version 1.0

2010

tel: +359 2 48 990 71

fax: +359 2 48 990 72



## **Contents**

|       |   |    |
|-------|---|----|
| 1.1   | Spatial data .....  | 3  |
| 1.1.1 | Spatial data web site.....  | 3  |
| 1.1.2 | Executive Environment Agency „ CORINE Land Cover 2006“ project” ..... | 6  |
| 1.1.3 | GEODESY, CARTOGRAPHY, AND CADASTRE AGENCY .....                       | 7  |
| 1.1.4 | Aerospace Monitoring Centre (AMC).....                                | 7  |
| 1.1.5 | Gaps and problems regarding providing of the spatial data .....       | 8  |
| 1.2   | Hydrological data .....   | 9  |
| 1.2.1 | Gaps and problems regarding obtaining of the hydrological data .....  | 12 |
| 1.3   | Historical data .....   | 13 |

## MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters



This report makes a general overview on the existing Bulgarian sources of information regarding natural disasters and it gives short assessment on the data quality.

### 1. Bulgarian information data sources

In Bulgaria the information sources are different state administration which have different kind of data. This situation leads to fragmentation of data, low quality (hardly usable), insufficient quantity of qualified data, difficult and sometimes unregulated access. As a final result it leads to the inefficient risk management and disaster protection.

#### 1.1 Spatial data

According to the Law on spatial data it is necessary creation of a common state information structure, uniform standards and requirements which are included in the state and EU network for services and exchange of information.

This system provides an opportunity for a unified access to existing spatial data and metadata, collected and maintained by twenty public administrations.

##### 1.1.1 Spatial data web site

The EXECUTIVE AGENCY “Electronic Communication Networks and Information Systems” maintains and develops the electronic portal( [bsdi.asde-bg.org](http://bsdi.asde-bg.org) ) for the provision of spatial data. It should be connected with the INSPIRE electronic portal of the European Union.

Unfortunately the data in the web site is insufficient and cannot be used for similar projects.



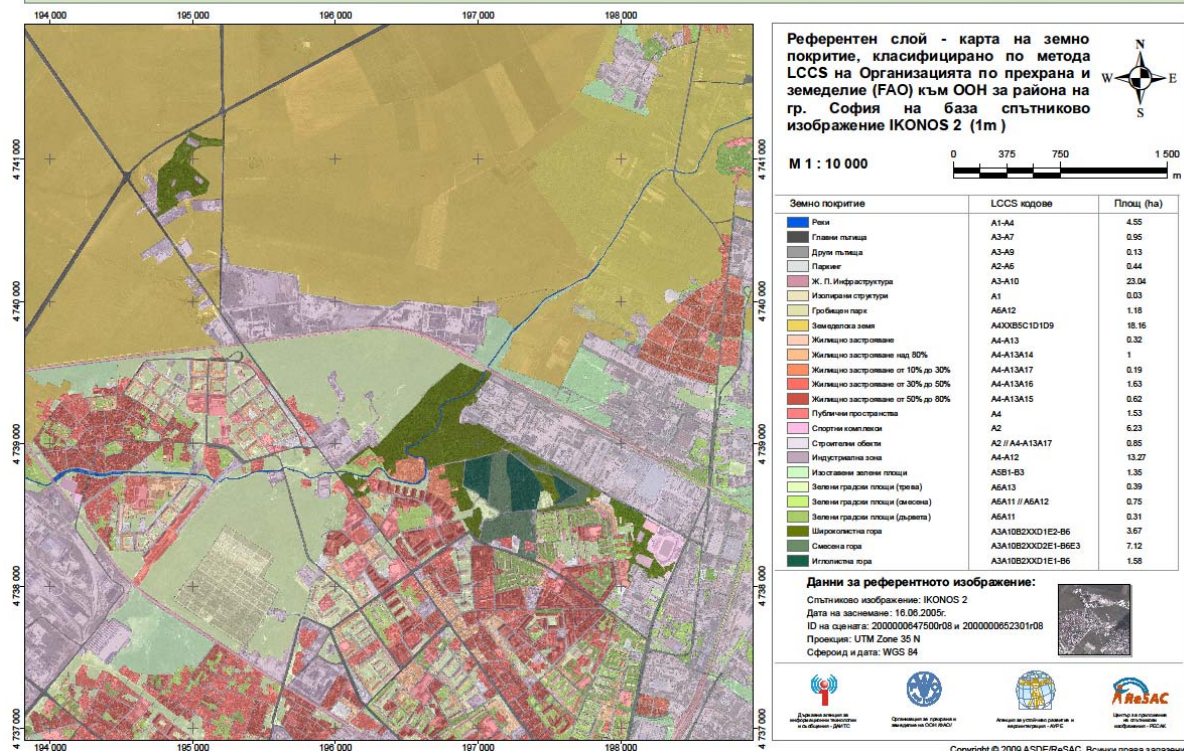
## MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters



### DIRECTION – LAND COVER/LAND USE DATABASE

The result is the preparation of land cover/land use maps for the towns in Bulgaria on the basis of satellite images. The prepared maps are in scale 1: 5 000 , from images with a resolution of 0.5 to 1 metre of different satellites, mainly "Ikonos, Quickbird" and "Eros".

Политика: Създаване на капацитет за оперативната фаза по програма Глобален мониторинг на околната среда и сигурност - European Earth Observation Programme (GMES) и изграждане на референтна база данни за земно покритие, в подкрепа на изграждането на национална инфраструктура на пространствените данни и транспониране на Директива 2007/02/EO- INSPIRE.



The work on the preparation of more detailed land cover/land use maps for the Bulgarian cities is in progress. This way of work gives the possibility to verify cadastre map of the city, the regulatory map, thematic infrastructure maps, as well as maps of lands, environment and agricultural areas around the city.



## MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters



### Satellite images

The products are satellite images which provide a much more up-to-date geographical information than the existing topographical maps.

- ❖ For the project purposes of the project an official letter on behalf of the IAG was sent to the EXECUTIVE AGENCY to provide spatial data covering the territory of the Varbitsa River.

The Agency possesses and can provide us only satellite images of the terrain shot by the French satellite SPOT 5 in 2005, and have a resolution of 5 m.

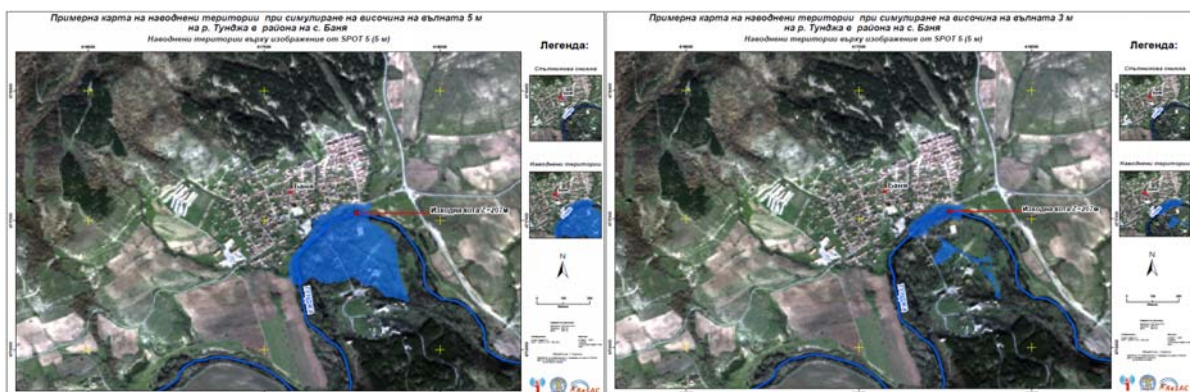


### DIRECTION – “FLOODS”

The graphic materials are prepared by simplified models for simulation of flooded areas. The simulation models mainly incorporate a model of relief on the basis of the topographic maps, satellite images with high resolution and analysis of land cover/land use.

The affected areas by high wave terrain from 1m to 5 m are defined only on the base horizontal rise of the River level with 1m to 5 m, not on the basis of hydrology and hydraulic modeling.

In providing of additional data and information by the respective municipalities regarding available protective hydro-technical facilities, precipitation, soil layer, as well as other data this model can be up-graded and can obtain more precise results.



## MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters



### 1.1.2 Executive Environment Agency „CORINE Land Cover 2006“ project

Mapping the territory of the country in classes due to land cover through interpretation of satellite images-methodology "Corine – land cover ".Bulgaria is part of the project of the European Union" CORINE Land Cover 2006 "(CLC 2006).



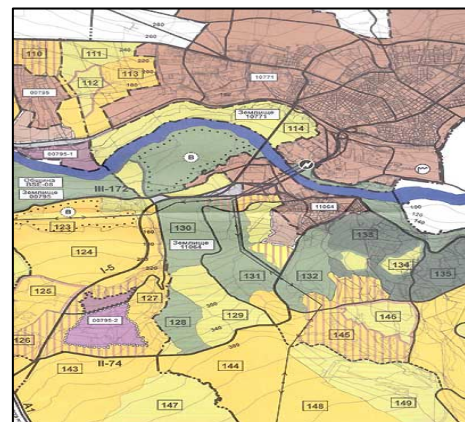
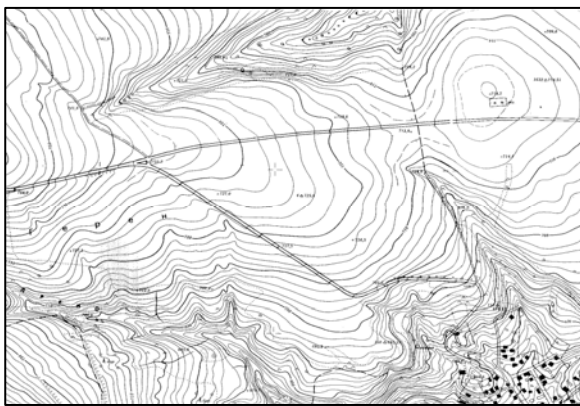
On the basis of this project and other similar projects implemented by the Agency, we were supplied with the following data in the shape format with very good quality.

- „ GRID“ terrain model
- Layer „RIVER“ including the main channels from the irrigation and drainage system
- Layer „ Lakes and Dams“
- Layer„ Boundaries of the smaller watersheds“. Distribution of the watersheds and Varbica's feeders
- Layer „Soils“
- Layer „ROADS“
- Layer „POPULATION“
- Layer „Settlements“
- Layer „ Relief“
- Layer „Altitude“
- Layer „ Inclination of the slopes“
- Layer „ Geographic slope direction“
- Layer „ Land use/ Land cover“
- Layer „ Land property“

## MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters

### 1.1.3 GEODESY, CARTOGRAPHY, AND CADASTRE AGENCY

The main priority of the agency is the preparation of a digital cadastre and property register. The agency also maintain a common state geodetic base for carrying out the geodetic and cartographic survey. The agency provides up-to-date terrain information for the country territory by topograph maps.



The topographic maps (1: 5000, 1: 25 000, 1: 100 000) in the agency database, cover the entire territory of the country. The cards are 20 years old, so that they do not fully reflect the reality of terrain.

The Agency prepare and maintain cadastre maps of the cities, villages and maps of the areas around the settlements for the needs of municipalities and forestry administrations. These maps are in digital format, but they do not covering the entire territory of the country

### 1.1.4 Aerospace Monitoring Centre (AMC)

Aerospace Monitoring Centre is designed to support disaster protection actions on nationwide. The centre obtains data by the methods of remote sensing studies of the Earth from space (by satellites), about basic physical parameters for the current situation on the Earth's atmosphere and surface.

Received and processed data will enable to analysis and making of the correct decisions in case of crises, natural disasters, fires, landslides, floods, industrial accidents, and others. That information will allow a precise determination of the risk and damage in emergencies situations. This will increase the effectiveness of reconstruction activities.

## **MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters**



- ❖ On the meeting with AMC was reached a general agreement for cooperation in the implementation of the project. In this stage it is necessary to make a decision for the legal providing of the data from the Aerospace monitoring centre, because they are an administration in the Ministry of the Interior and have some secret data.

### **1.1.5 Gaps and problems regarding providing of the spatial data**

The GIS data is a basis of the risk management and especially for the operational management of the crisis. Currently it is not used for this, because part of the data is only on paper and such information remain the most widespread.

There is a discrepancy between the need from GIS data and the information which is available or is produced in the moment. There is also a misunderstanding how to use the GIS data before or after the period of crisis, as part of the risk management in order to prevent and/or to be ready for response.

- ❖ In Bulgaria there is no administration which collect an update the GIS data centralized, no mater if we speaking about production, management or practical use.
- ❖ The spatial data needed for risk management in Bulgaria are still scattered among different institutions. The collection is very difficult, not only from a financial standpoint, but also due to the lack of modern, common digital database for collecting, storage and processing of the data.
- ❖ If the data is more specific, availability and demand for such data becomes more difficult. It is also important to note that the data is on paper and as a whole is not a geographic fixed.
- ❖ There are only few producers of data, most of them are private company, as well as only few users. On that way the exchange of data is also not prevalent way to get information.
- ❖ Regarding the European context of risk management, only few users are aware of international frameworks and strategies for the management of the environment and risk management. The recognition of the European practices is an area mainly reserved for a small number of experts in the state administration.

**The presented data information sources may be used by experts to develop measures on the prevention and risk assessment phase relating with natural disasters.**





## 1.2 Hydrological data

The National Institute of Meteorology and Hydrology/NIMH/ is the only authorized office in Bulgaria, which can provide reliable hydrological data flow for the rivers flow. NIMH maintains and operates the hydrometeorological network of the country, consisting of a total of 1255 observation points. Meteorological measurements shall be carried out in 36 measurement stations ( 5 in the mountain ), 98 weather stations and 293 precipitation measurement station. 209 hydrometric measurements stations and 511 hydrogeological points (for measurement of groundwater).

### The NIMH /National Institute of Meteorology and Hydrology /main activities

- Development and implementation of modern instruments and methods of observation, analysis and forecast of the processes in the atmosphere and hydrosphere.
- Investigation of spatial and temporal characteristics of climate and water resources.
- Studying and forecasting the processes, the composition and changes, anthropogenic or natural, to the physical and chemical properties of the atmosphere and hydrosphere on regional and global scale.
- Provision of special hydrometeorological services over the country and the Black Sea for governmental institutions, public sector and industry, including the safety of life and property in case of natural disasters and industrial accidents.

### The present-day research priorities

- Optimization of basic observation networks, improvement of methods of observation, processing, interpretation and dissemination of information.
- Assessment of hydrometeorological resources – climatic, agroclimatic and water resources, their variability over the country and their use in the various sectors of national economy.
- Development of short and medium-range weather forecasting techniques with application of current means like: satellite and radar observations, local numerical forecasts and their extensive use for specialized forecasts in case of natural disasters and industrial accidents.
- Study of atmospheric processes, climate changes, and development of methods for long-term weather prediction.
- Studies in the physics of clouds and aerological research.
- Research on the content of the atmosphere and hydrosphere, and regional and global scale variations of natural and anthropogenic origin. Research and numerical modelling of transport processes of pollutants, including sediment regime of rivers.

## MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters



More important national and international engagements of NIMH – BAS/Bulgarian Academy of Science/

- Supplying the state institutions with data, analyses, expertise and different type of forecasts about the development of the hydrometeorological processes over the country and the western part of the Black Sea.
- Preparation of specialized short-term forecasts and expert assessments for the needs of the Permanent Governmental Commission for protection of population in case of Disasters and Accidents, country defense, etc.
- Maintenance of the national hydrometeorological archives, creation of data bases, supplying services to the great number of users.
- Preparation of analyses, expertise, consultations and forecasts for air and water pollution dynamics.

On Varbica watershed there are six precipitation measurement stations,

- Tokachka
- Momchilgrad
- Kirkovo
- Benkovski
- Zlatograd
- Djebel

and two hydrometric station.

Picture from the up stream station Varly Dol ( N- 41° 21' 22" ; E- 25° 21' 08" )



From station Varly Dol, the daily measurements are transmitted at weekly intervals.

## MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters



Picture from the down stream station Djebel ( N- 41° 34' 04" ; E- 25° 23' 22" )



From station Djebel the measurement data can be transmitted in real-time or near real-time.

The data which are derived from the two measuring points and provided by NIMH on system are the following:

Daily:

- average water level (H)
- average water discharge(Q)

Monthly :

- average water level (H)
- average water discharge(Q)
- min. monthly water discharge(Q)
- max. monthly water discharge(Q)
- monthly average deposit

Annual :

- average water level (H)
- average water discharge(Q)
- min. annual water discharge(Q)
- max. annual water discharge(Q)
- annual average deposit
- 

Other specific data and information regarding river flow can be obtained after defining which parameters are needed and for which period. In order to obtain these data from NIMH on the appropriate type and quantity , there is a need for additional time for synthesizing, which in case where required rapid project development can lead to a delay of the project terms.



## **MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters**

- ❖ For the purposes of the project an official letter on behalf of the IAG to provide hydrological data for Varbitsa River was sent.

Unfortunately a NIMH could give the data, only if we pay for it.

The price is unacceptable according to the project budget.

### **1.2.1 Gaps and problems regarding obtaining of the hydrological data**

- ❖ Lack or insufficient hydrological studies, leading to:
  - short hydrological lines(row)
  - not homogeneous hydrological lines(row)
  - incorrect application of methodologies
- ❖ Hydrological data necessary for the water and risk management in Bulgaria are focused mainly in the NIMH. The collection is very difficult from a financial standpoint, and due to the lack of modern, common digital database for collecting, storage and retrieval of the data.
- ❖ In the hydrometric stations is measured disturbed river flow as a result of the active anthropogenic activity in the catchment area. On the other hand hydrometric station for monitoring are located unevenly in the river basin, which makes the assessment of the river flow difficult.
- ❖ The equipment in the hydrometric stations is old .
- ❖ Data obtained from private monitoring systems and measuring stations or other services must be approved and coordinated with NIMH. The data derived from such private stations, is difficult to use because they are invalid if they are not approved by NIMH. The projects which are developed with such data from private stations could be not approved.

## **RECCOMENDATIONS**

- ❖ It is necessary to reassess the number and the location of the hydrometric station by improving the quality of measurements getting with equipment for automatic continuous records



## **MONITOR II – WP3\_3.1: Analysis and assessment of the information sources regarding natural disasters**



- ❖ It is necessary to change the legislation regarding granting of this type of data. This will facilitate the implementation of the important public projects aiming at the disaster protection of the population.

The experts in the NIMH and the obtained data from meteorological, precipitation and hydrometric stations can be used for the development of prevention measures and risk assessment relating natural disasters. The experts responsible for natural disaster forecasting and decisionmakers in response phase also could use that data.

### **1.3 Historical data**

#### **1.3.1 Gaps and problems regarding providing of the historical data**

The data sources for such information are the municipalities and civil protection services.

Materials describing the flood scale and the damage amount are prepared by Municipal officials. On this basis, the municipality can apply for funds necessary for after disaster reconstruction.

The access to these data is difficult, because the employees in these administrations do not understand the importance of these data for similar projects and they do not cooperate .

#### **1.3.2 General recommendations for the organisation and providing of the data**

European practice shows that all necessary data for risk management is stored by the specialist services, which make them available for free use of the municipalities, businesses and other stakeholders involved in the risk and protection management.

For our country is also necessary to develop such common available system, in order to facilitate work on similar projects.

It is necessary to train the administration staff to work with such data. On that way they will know more about its specification and how to work with it. This will lead to the correct communication between public administrations and the people involved in the disaster risk management as well as effective measures to protect from natural disasters.