Project
"Transboundary Water Management in the Central Asian Region
(GIZ TWMP)"

Component 2 – Database Development
for Basin and Irrigation Systems

FINAL ACTIVITY REPORT

(May 2010 - November 2011)

Federal Foreign Office

giz

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Проект "Управление трансграничными водными ресурсами
в Центральной Азии (GIZ TWMP)"

Компонент 2 – Создание Информационных Баз Данных
для бассейновых и ирригационных систем

ЗАКЛЮЧИТЕЛЬНЫЙ ОТЧЕТ
о проделанной работе

(Май 2010 - Ноябрь 2011)

Project

"Transboundary Water Management in the Central Asian Region (GIZ TWMP)"

Component 2 – Database Development for Basin and Irrigation Systems

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Tashkent

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Abbreviations

CA – Central Asia

FFO – Federal Foreign Office

TWM - Transboundary water management

IWRM – Integrated water resources management

IS – Information system

DB – Database

GIS – Geographical information system

SIC ICWC – Scientific-Information Center of the Interstate Coordination Water Commission

DBMS – Database management system

Relevance of work

In spring 2008, the German FFO launched the Central Asia Water Initiative (also known as the Berlin Process) at the "Water Unites" conference in Berlin. This Central Asia Water Initiative has four pillars.

The most extensive element of the Berlin Process is the Transboundary Water Management in Central Asia Programme, which Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH is carrying out. On behalf of the German FFO, GIZ has laid the groundwork for the programme in each of the five Central Asian states and has developed a programme strategy together with local partner organisations. The strategy has three components. Component 2 *(Strengthening transboundary river basin management)* is in focus of this work.

Transboundary water management calls for multilateral cooperation among different stakeholders at all levels of water governance hierarchy and the elaboration of shared vision for sustainable water resources management and development in CA.

Growing water demands by all economic sectors in the Central Asian states, as well as increasing uncertainty regarding water availability in light of climate change make water management in CA a complex challenge. The situation is more complicated in transboundary river basins, where intersectoral needs are closely linked with national interests of riparian countries. For that reason, application of water use planning and IWRM principles in context of river basins is the most important element of sustainable water resources management. Elaboration and implementation of basin plans will allow local water agencies to meet increasing demands of different economic sectors and of growing population under conditions of increased uncertainty of water availability. In this context, the present-day water management should be based on a wide range of actual data and IS,

such as geographic IS, mobile communications, and DB. All these technologies promote the improvement of decision making in the water sector.

Finally, regular information about status of natural water resources and their forecasts, comparison of predicted and actual data on water use and balances of rivers and irrigation systems allow improving their management and build trust, community, and sense of ownership among water users.

Objective of the Component

The main objective is assisting the Transboundary Water Management in Central Asia Programme in part of DB development for particular selected basins and irrigation systems *(Fig.1)*. These are the Aral-Syrdarya and Chu-Talas basins in Kazakhstan, the Chu-Talas and Isfara basins in Kyrgyzstan, the Bat-Bat canal's irrigation system in Uzbekistan, the Khankhauz irrigation system in Turkmenistan, and the Khodjabakirgan basin in Tajikistan.

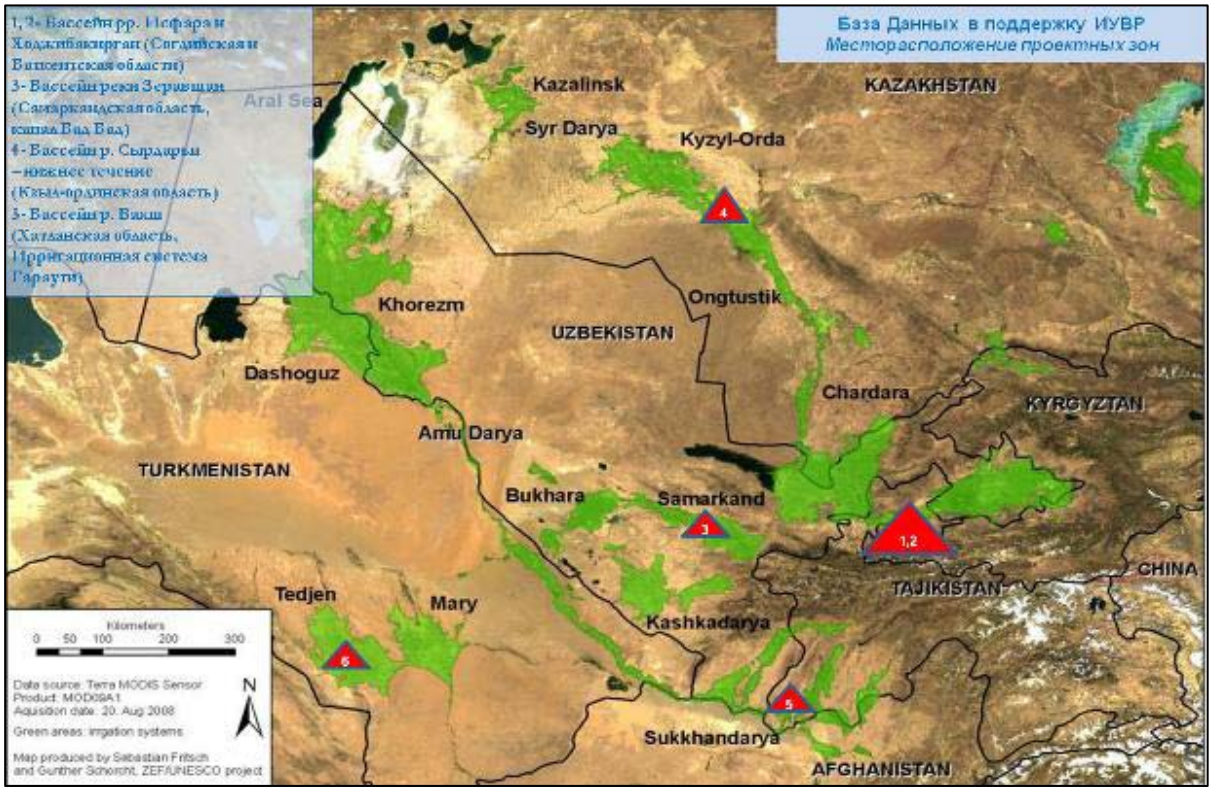


Fig.1 - Pilot project sites

Indicators:

- Development of single-type information DB in on-line regime *(through Internet)* for all head water-management organizations in the selected basins and/or irrigation systems;
- Organization of national training for staff of local water organizations;
- Preparation of methodological guidelines and manuals.

Results

1) Four IS' of short-term planning with on-line access were developed over the reporting period for water organizations dealing with basin planning. The IS' allow their users to assess regularly and timely the efficiency of water use by all actors of joint management and estimate more precisely unproductive water diversions.

On-line DBs were developed for the following river basins during the reporting period:

- Chu-Talas - http://river-basins.kg/chu-talas *(Fig.2,3)*;

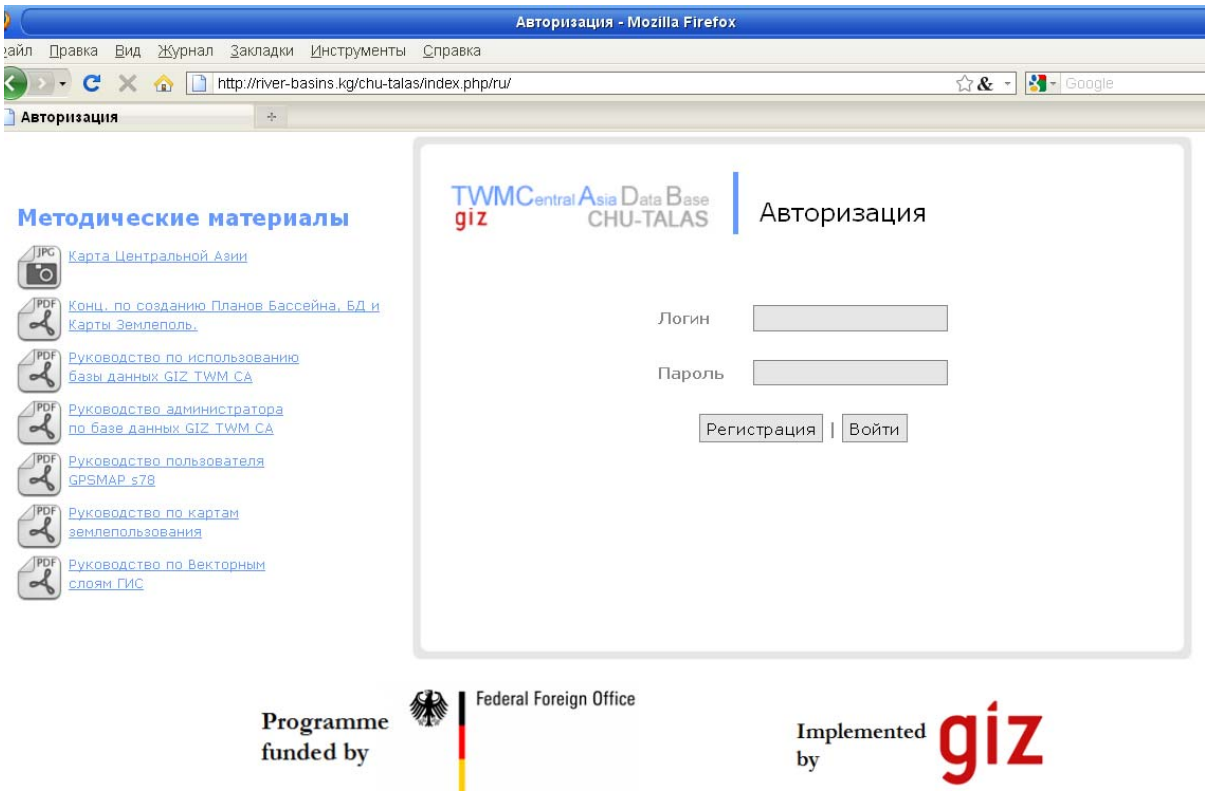


Fig.2 – Screenshot of the registration web-page of on-line DB for Chu-Talas

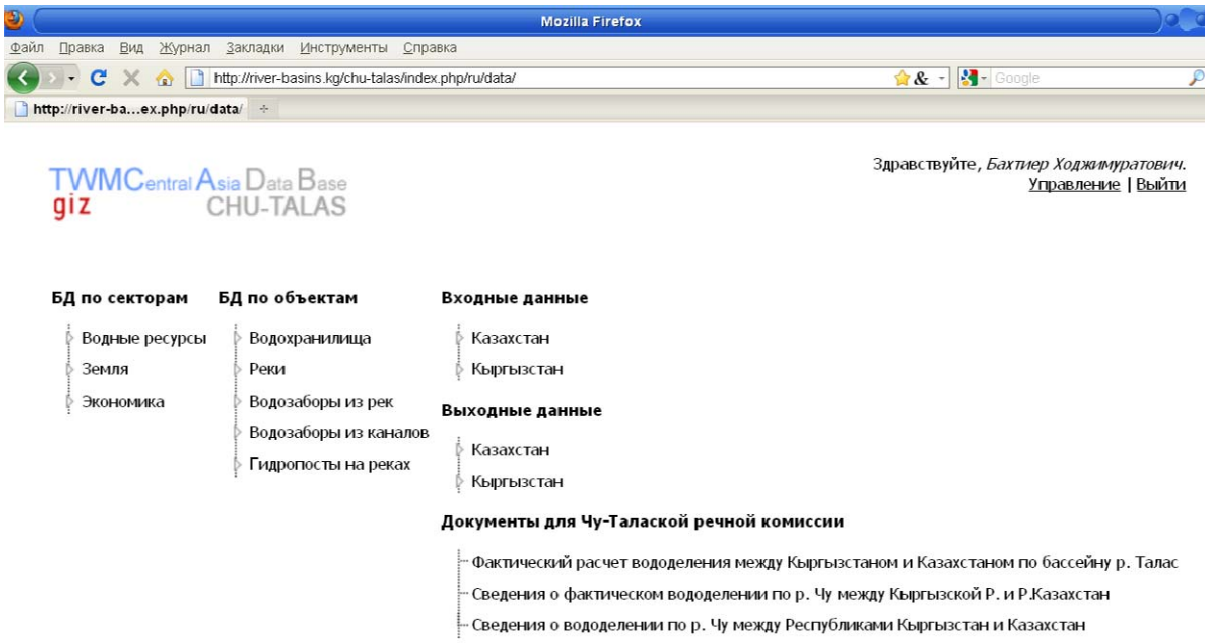


Fig.3 – Screenshot of the main interface of on-line DB for Chu-Talas

- Isfara - http://river-basins.kg/wmdb *(Fig.4,5)*;

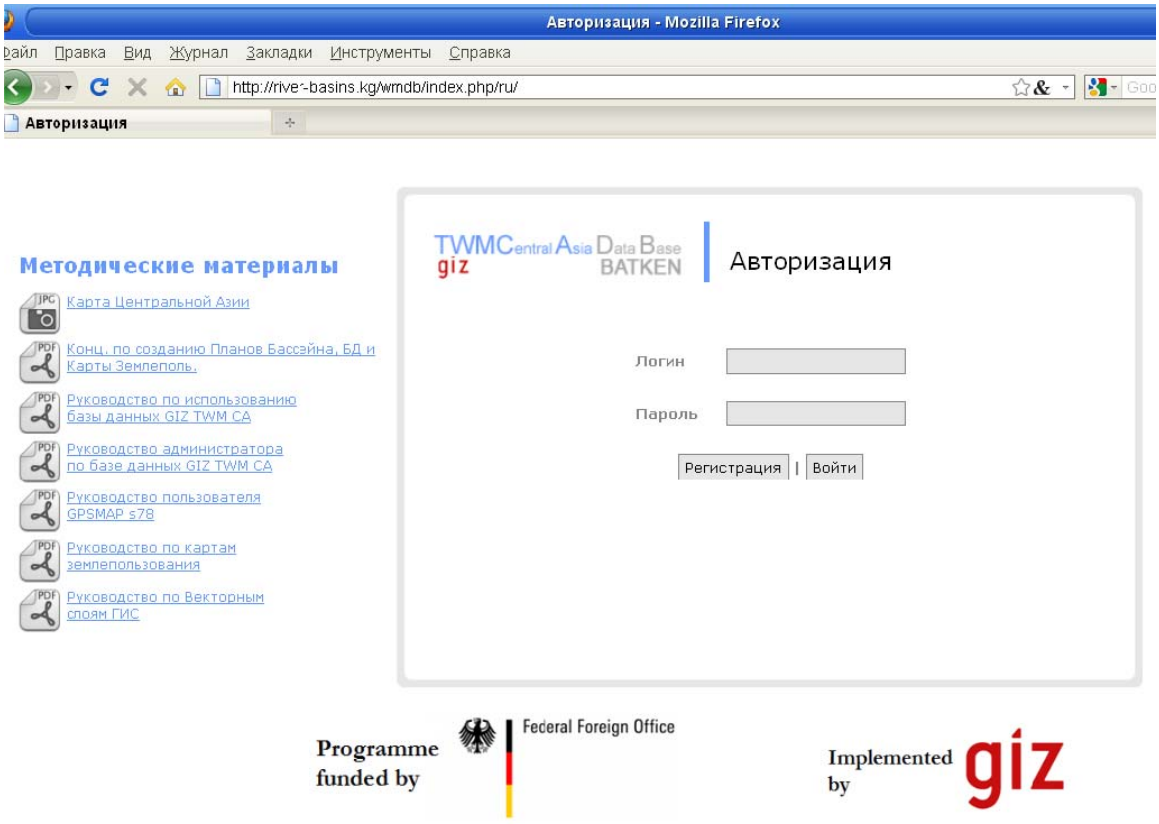


Fig.4 – Screenshot of the registration web-page of on-line DB for Isfara

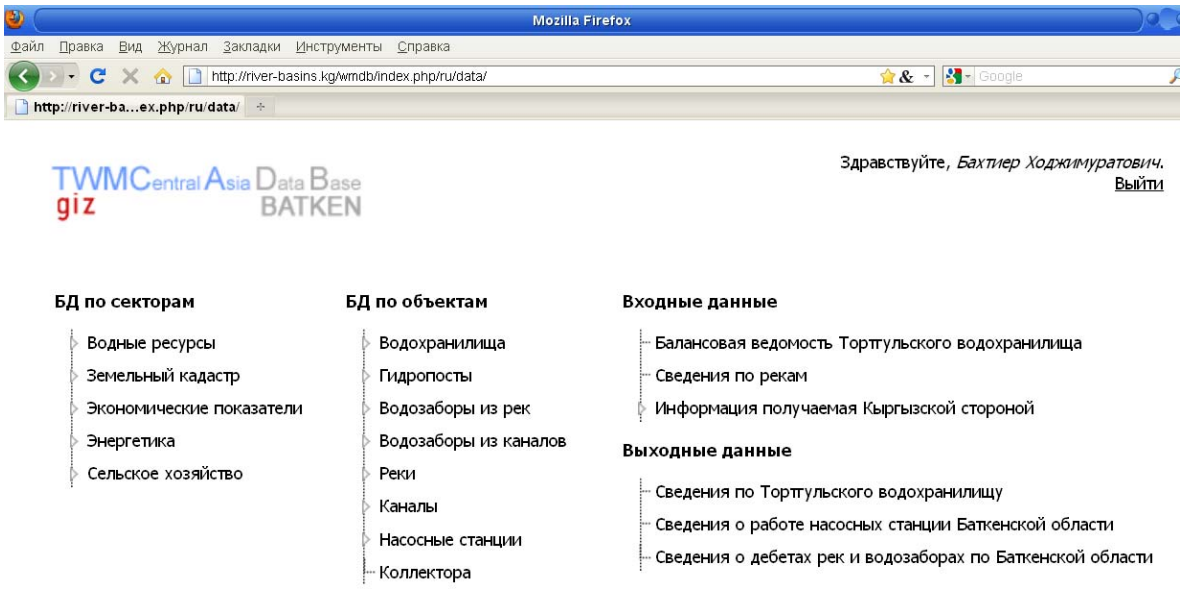


Fig.5 – Screenshot of the main interface of on-line DB for Isfara

- Zarafshan - http://waterdata.uz *(Fig.6,7)*;

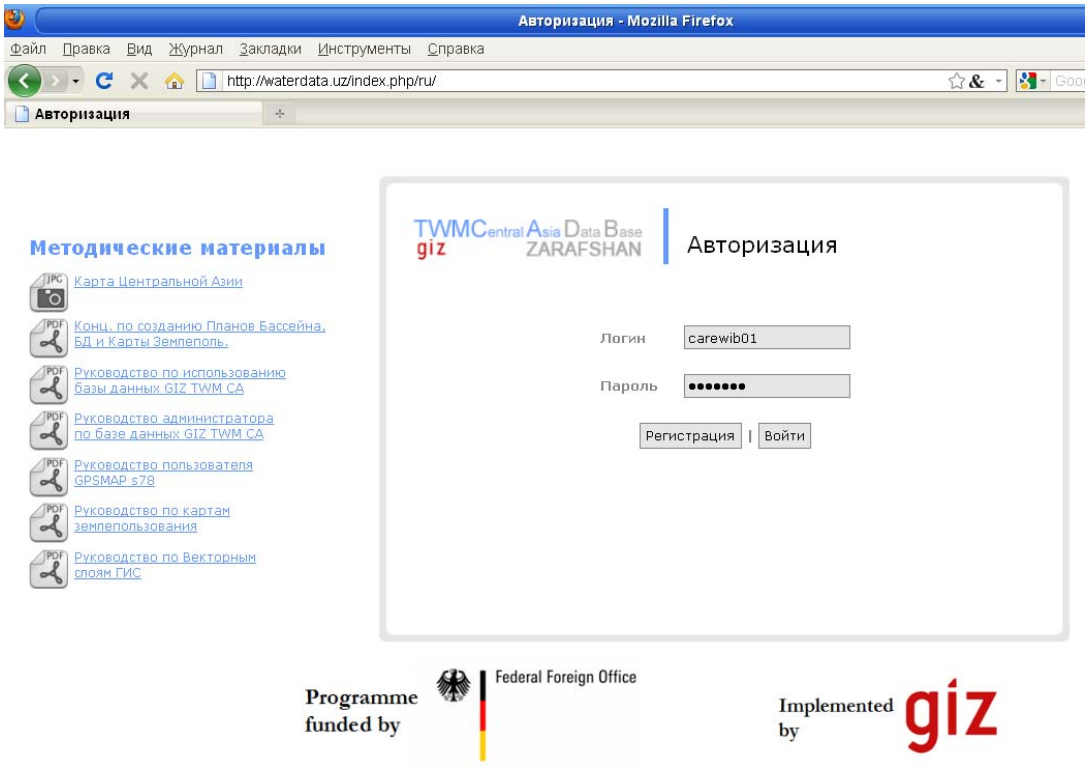


Fig.6 – Screenshot of the registration web-page of on-line DB for Zarafshan

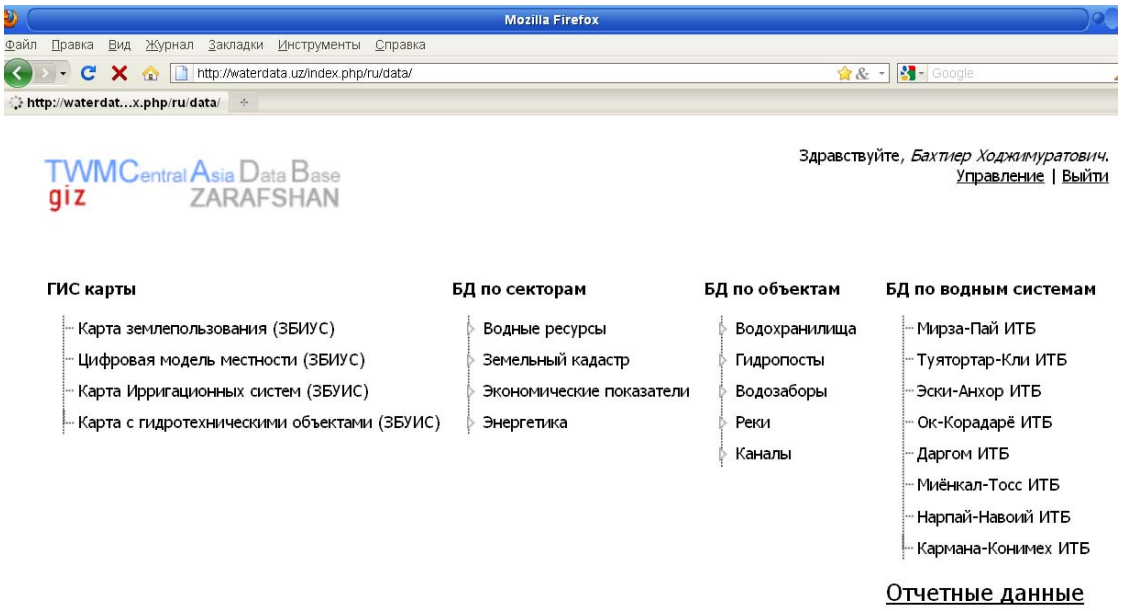


Fig.7 – Screenshot of the main interface of on-line DB for Zarafshan

- Khodjabakirgan - http://www.isfara-wmdb.tj *(Fig.8,9)*;

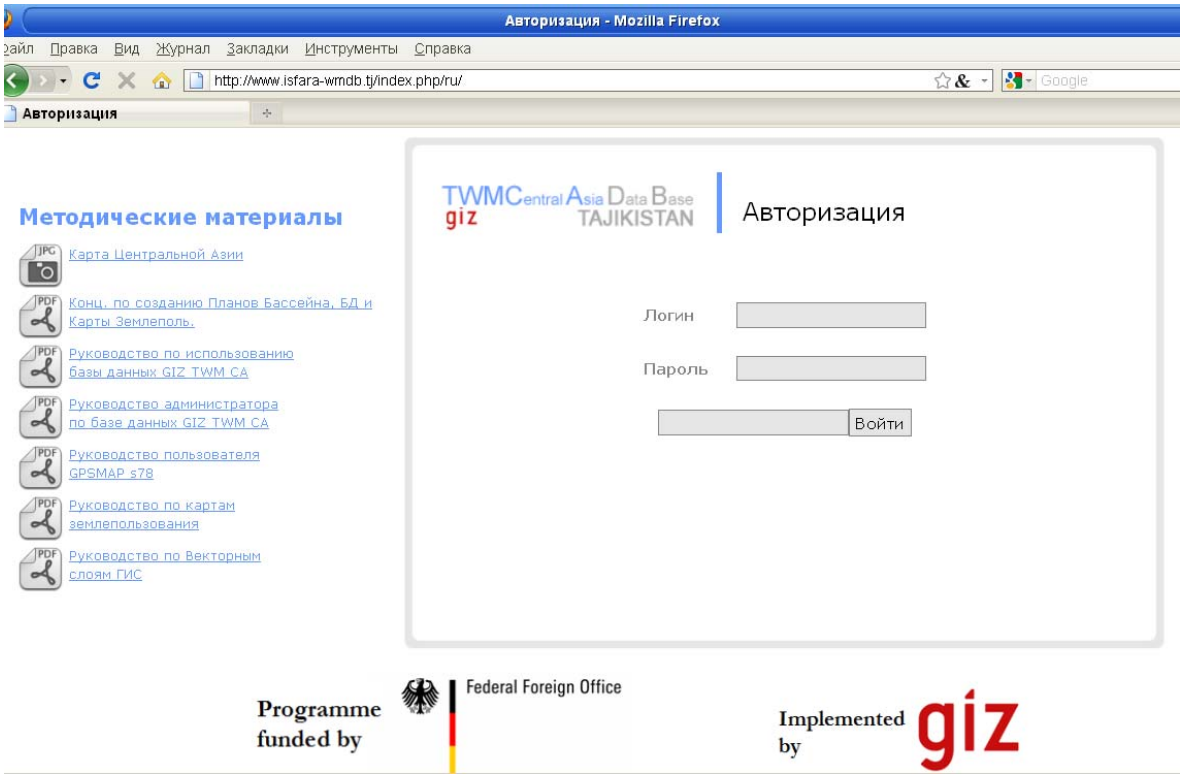


Fig.8 – Screenshot of the registration web-page of on-line DB for Khodjabakirgan

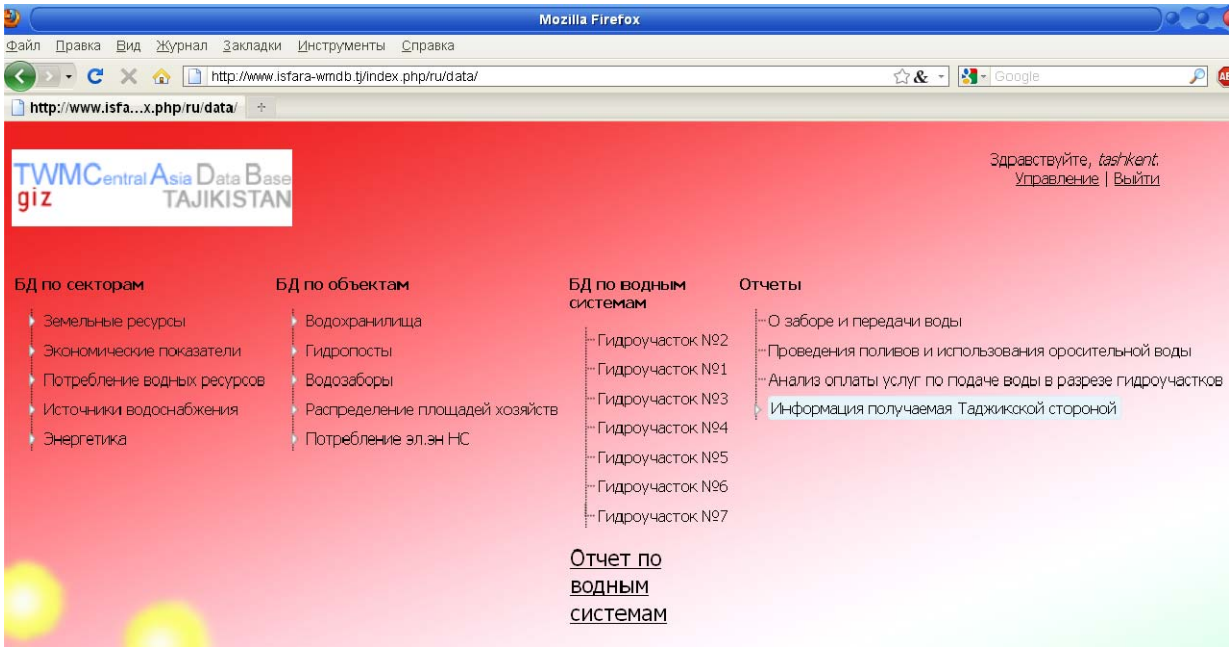


Fig.9 – Screenshot of the main interface of on-line DB for Khodjabakirgan

By mid 2011, the information support systems for the four key points (Uzbekistan - Zaravshan BISA; Tajikistan - Khojent water-management organization (WMO); Kyrgyzstan - Batkent WMO, Chu-Talas) have become fully functional and now can provide timely, regular and relevant information on given irrigation systems for decision makers, as well as for stakeholders and the general public. This information covers the most part of the water sector sphere, water resources, and other associated matters.

The information systems on water and land resources developed by the project together with Basin Authorities are the software systems designed on the basis of databases to allow the user to make search of, import, store, protect, process, and export information by using special developed methods.

These systems are the practical tool for comprehensive assessment of water-management situation (usable water resources and their distribution by river reach, province, district, and water-management system; regimes

of reservoirs and HPP; losses, deficits, imbalance; environmental releases; water quality indicators, etc.) and will allow national organizations to use a single "information language" that, in turn, will contribute to improved reliability of used data and thus to higher effectiveness of water management. The IS will allow the user to import, process, and analyze needed information in blocks: "Water resources", "Land cadastre", "Economic indicators", "Energy" (this list is extendable).

2) The experts from Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan were trained successfully in the use and operation of IS during several training workshops. More than 25 persons - representatives of water-management organizations - took part in these workshops. SIC's experts participated in a number of training workshops and work meetings; at the work session during the Almaty Conference "Building sustainable partnership in water resources management in CA: TWM Programme experience" (31 October – 1 November 2011).

Photos 1, 2 – Almaty Conference

Photos 3, 4 – At the workshops

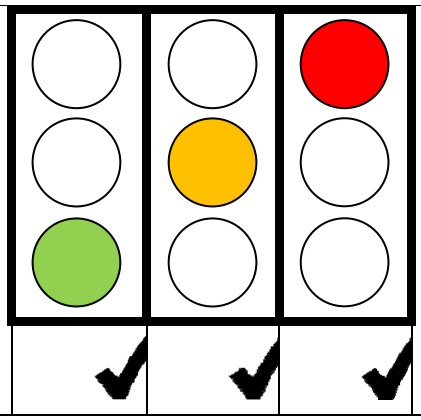
3) The Manual on the use of DB and the Administrator's Manual were prepared *(see Annex)*.

The Manual on the use of Database is a guide for beginners, i.e. those people, whose access is limited and who have "read only" status.

The Administrator's Manual is designed for administrators of IS' and can help changing the DB structure and keeping track of DB operation and management in on-line regime. This Manual is written on the basis of the User's Guide (April 2011) and supplemented by examples of IS management and development for individuals, who are skilled in DBMS and are the main supporters of trouble-free operation of IS at the local level (water-management divisions). Every registered user with administrator's rights has his/her login and password to access the IS' protected zone (DB design algorithm) in on-line regime. These rights should be strongly confidential and not be made public in order to avoid unauthorized access to DB algorithms.

Monitoring and reporting

Work meetings were held with the project staff every month during implementation to discuss routine issues and tasks. Every week, interim reports (see their format below) were submitted to the Project office:

Reporter:	
Country/Component:	Data Management support IWRM- component 2
Reporting Period:	
Distribution list:	
Ablauf, Rahmenbedingungen und Themen	
Traffic light 	Justification if yellow or red (including explanation of impacts on implementation schedule): Link to up to date plan of operation on dms: Due to delays in approval of DM by partner Ministry in Turkmenistan no activities has been conducted
Project implementation update (important achievements, meetings, events …):	
Project implementation forecast (arrangements, next steps …):	

Monitoring of project activities was made by the Regional manager from the German Agency for International Cooperation (GIZ), Coordination office in Tashkent under supervision of GIZ Country Director in Uzbekistan. The monitoring included regular meetings of the coordinator of the GIZ Regional water program with the project's persons in charge.

Future prospects

Work could be continued on the improvement of DB on all key project points. This would help to improve quality and effectiveness of operation of water-management organizations.

Development of similar IS' for other transboundary basins in the region, as well as possible aggregation into a single system of data monitoring, processing, and transmission for all project parties.

With the support of GIZ, it would be possible to establish partnerships with water-management organizations in other basins and irrigation systems and invite other similar projects in order to exchange experiences in area of IS development.

Lessons

The main lessons learnt are shown in the following conclusions: weak operation of focal points in Kyrgyzstan (Batkent) and Turkmenistan both in terms of implementation of general work and regarding upgrading of their skills in operating IS.

Noted poor performance on filling DB with historical data, which is needed for assessment of the basin's water situation

The decision support system for management of water objects is based on well-known principles of the administrative and technical system management theory. However, it has some features related to considerable spread and geographical dispersion throughout the Central Asia within the Aral Sea basin and riparian countries of water bodies, hydraulic structures and other objects, as well as linked with specific character of diverse connections and relations between processes and phenomena of geographical environment. All the above-mentioned particularities require specific approaches to construction of the decision support system and necessary use of mapping and spatial representations of management processes.

GIS as a control system serves for decision making on optimal management of water objects. In this case map data are used among others for decision making. GIS integrates a number of new spatial data analysis technologies. Therefore, GIS represents a powerful tool for transformation and synthesis of diverse information for water resources management tasks.

GIZ supported the "CAREWIB" Project in procuring software products for GIS operations. The indicators were – 1) installation and activation of GIS-server and ensured operation of this server with GIS applications via Internet. 2) Organization of training for SIC's staff with invitation of experts from ZOI Company.

ArcGIS Server - a product of Esri company - provides a user-friendly platform for creating enterprise GIS. The enterprise GIS is a set of applications with centralized management that are operating a single map database, have well-developed GIS-functionality and support simultaneously many users. ArcGIS Server consists of two components: the GIS server and the Application Developer Framework (ADF) for .NET и Java *(Fig.10)*.

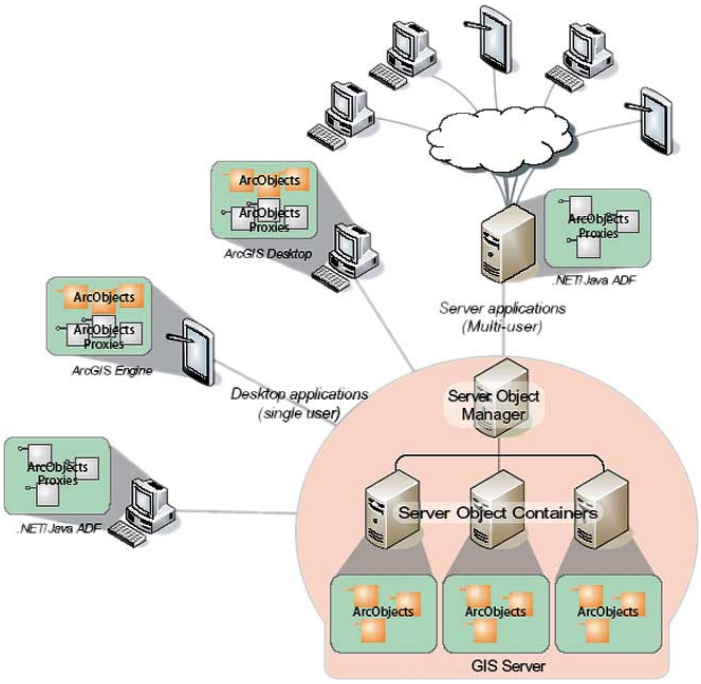


Fig.10 – Structure of ArcGIS Server

ArcGIS Server provides the standard development framework GIS - server - applications on the basis of the same software items as desktop ArcGIS products (ArcView, ArcEditor и ArcInfo). ArcGIS Server supports enterprise applications, such as web-applications running in the server and supporting many users. ADF web application runtime is not licensed that allows running of multiple server applications in a number of web-servers.
Support of multiple users operation by these applications is included in the cost of GIS-server's license.

For implementation of tasks the GIZ Office in Tashkent procured the license software Windows Server 2003 R2 *(Fig.11)* and ArcGIS Server Workgroup 10 *(Fig.12)*, and a contract was signed with SIC ICWC for an amount of EUR 7400 for purchasing special computer facility (Fig.5), training of SIC's staff and activation of GIS-applications on the Internet.

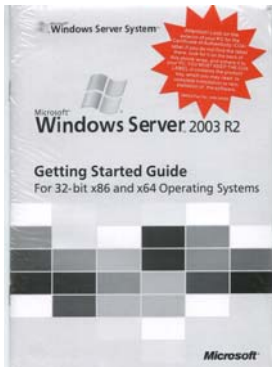


Fig.11

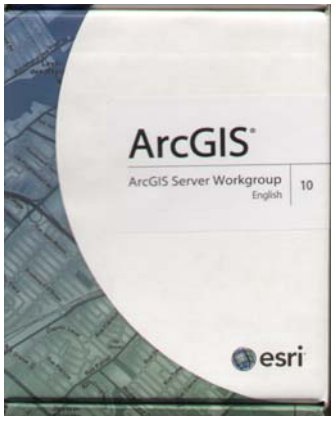


Fig. 12

By holding a bidding, SIC ICWC has bought computer facility in an amount of EUR 1,500 from the QASHGAR-KARAKUL" Company and has installed it in SIC office. GIS training for SIC's staff was held with invitation of an expert from the "Zoï Environment Network" Company in May 23-28, 2011.