

Concept of WP 7 fulfillment within RIVERTWIN project

1. Main goal of RIVERTWIN project is integrated regional model of water resources strategic planning and management adaptation, calibration and use in twinned basins with different climate, ecologic, social and economic conditions. Regional model will take into account impact on water resources by geographic trends, economic and technologic development, climate change, water and land use and other parameters (water management organizational setup, water supply and consumption, water demand, water quality, economic pressure and incentives, new working places creation, life quality, real population income, public participation, etc.) necessary for description of basin water management.

RIVERTWIN project will determine sustainable development strategy and will be directed at European Water Directive fulfillment in terms of basin water management. River basins twinning will promote sharing experience, knowledge and technologies in water management between European and third countries.

Initially, model is developed and validated for European river basin (Germany, Nekar river basin, temperate humid climate). Model transfer to the regions with other parameters will be tested in river basins of West Africa (Benin, Quem river, tropical semi-humid climate) and Central Asia (Uzbekistan, Kazakhstan, Kyrgyzstan: Chirchik river, high mountain continental humid climate).

Project leadership and coordination are performed by Hohenheim University (Germany); SIC ICWC governs work in Chirchik river basin.

Since model is devoted to scenarios development in appropriate river basins with regard to probable climate warming and land use changes as well as social, economic and ecologic restrictions in time and space, one project objective is natural resources use integrated scenarios formulation with main water consumers in different river basins. Scenarios as a base for basin water management plans, will be developed with main water users participation in selection of social, economic and ecologic indicators of basin development sustainability.

2. On base of each basin modeling integrated scenario of sustainable social-economic development will be developed.

Scenarios should give answers to following questions:

- social, ecologic and economic objectives of basin development;
- expected anthropogenic impact on water quality under current and future water consumption and land use with regard to climate change;
- anthropogenic factors impact on flood and peak flows recurrence;
- recommended measures on sustainable water use without damage to water and environment quality and optimal measures combination;
- ecologic resources and water services with regard to water supplies and demand;
- equality of upper and lower river reaches' interests ensuring;
- public participation degree in water resources management.

3. SIC ICWC as project coordinator and WP-6 and WP-7 executor, determines priorities and key issues in water management to find effective solutions at various levels (transboundary, basin, national). In result of modeling and analysis of existing management structure, requirements to water management system with regard to economic, social and ecologic aspects of the basin development will be developed and integrated model will be prepared. Modeling results will be submitted to appropriate competent bodies as instrument of socio-economic development strategic planning in Chirchik basin.

3.1. WP-7 destination (according to work schedule elaborated by Chirchik team leader prof.V.Dukhovny) is to provide WP-6 with appropriate reliable data for integrated model development and following results receiving:

- completed information system of natural resources;
- improved water resources management setup;
- regional model for integrated water management;
- habitat models;
- justified sub-models of water hydrology, quality and demand;
- minimization of negative impacts of climate changes on water resources;
- land and water use scenarios;
- trained specialists and end users;
- sharing experience, knowledge and technologies in basin water management.

Since regional model and modeling results are devoted to use in decision making, all input parameters will be justified in terms of availability and reliability and received results will be tested with regard to uncertainties of social-economic development in the basin. Assessment of scenarios requires system thinking and interdisciplinary approach for recommendations preparation to decision makers on natural-anthropogenic systems' management in interest of basin sustainable development.

3.2. Within WP-7 (“«Analysis of development scenarios on base of “concerned persons” participation, integrated model elaboration and sustainable water management assessment in Chirchik basin”) in development and provision of Wp-6 results analysis (“Establishing database and sub-model testing and adaptation in Circhik basin”) following main tasks will be solved (for Chirchik basin):

- analysis of existing organizational setup in water management;
- based on analysis and using system approach – work out requirements to water management setup and institutions including lower hierarchic levels and proposals on water management effectiveness increase;
- definition of existing and potential problems of water resources use to justify input parameters and integrated model conceptual scheme and specific version assessment;
- definition of sustainable water-related situation criteria for perspective and establishing long-term social-economic development objectives;
- definition of long-term objectives in water resources management;
- establishing indicators of these objectives achieving monitoring and control;
- preparation of proposals on modeling principal scheme and its changes with regard to opinion of potential water users' opinion;
- participation in sub-models development (hydrologic, hydrogeologic, social-economic, ecologic) and their uniting in single integrated model;
- proposals on sub-models' interaction scheme;
- participation in development of regional water management model (together with WP-6 and German partners);
- integrated model adaptation to Chirchik basin through consultations with potential water and environment users;
- establishing, together with local water management bodies, groups for development scenarios elaboration;
- WP-6 executors provision with necessary data for scenarios development;
- scenarios approbation through numerical experiments using regional integrated model;
- development of climatic scenarios and recommendations on their application;
- drafting, together with scenario development groups on base of expert, draft alternative development scenarios;
- discussion of draft alternative scenarios during special workshops;
- end users' training in sustainable integrated water and environment management

- workshop carrying out to support scenarios of high reliability for ecologically sustainable basin development;
- based on scenarios, definition of water resources development strategy;
- water resources management scenarios justification and use for preparation or correction of prospective development plans (up to 2030);
- information flows support for integrated water management scenarios elaboration between basins under consideration (Chirchik, Quem, Nekar).

3.3. Above tasks solution will allow to receive following results:

1. Of intermediate character:

- analytical note about effectiveness and proposals on water management perfection;
- analytical note about water management long-term objectives and water resources development sustainability indicators;
- justification of input parameters and climatic scenarios development;
- proposals on integrated regional model management;
- analysis of scenarios run in integrated model;
- presentation of scenarios run to main water users, decision makers and planning bodies;
- accepted water management scenarios agreed with main water users, decision makers and other concerned groups;
- workshops with participation of water and environment related bodies' representatives.

2. Final, planned by project coordinator:

- climatic scenarios of high resolution up to 2030;
- adapted and tested integrated regional model and trained personnel (Chirchik-Ahangaran basin administration, BWO "Syrdarya");
- final analytical report about alternative water resources management and sustainable development scenarios.

3.4. During integrated model development and alternative scenarios justification following

activity should be taken into account:

- economic assessment of current and potential water resources;
- current and prospective water demand and water right differentiation for upper, middle and lower Chirchik river reaches;
- ecologic and social water value apart from economic one;
- water needs of various economic sectors and environment;
- dynamics of water resources formation and use including in-year flow fluctuations in years of different humidity;
- geographic and geophysical processes impact on water resources formation dynamics (forest cover and erosion impact on river flow re-distribution);
- water ecologic state and its impact on water consumption in various sectors;
- dynamics of anthropogenic pressure on water and other natural resources;
- economic incentives of water conservation and its productivity increase;
- other factors influencing modeling results and social-economic development scenarios.

3.5. According to RIVERTWIN project ideology and unlike WP-6 dealing with database establishing, WP-7 deals with institutions cooperation in development of water

resources sustainable management. Within WP-7 water institutions and their personnel will be familiarized with:

- methodology of scenarios development in Chirchik basin as a base for long-term basin water management plans;
- principles and description of modeling processes and main models' driving forces (influencing input parameters) participating in decision making concept discussion;
- trained in modeling results physical interpretation.

Model developers (WP-6) will help to basin bodies (BWO "Syrdarya", CABA) in models application.

4. Within WP-7 assistance will be given to solution of WP-6 range of tasks:

- during database establishing on surface and ground water, water demand with regard to sectors' needs (industry, agriculture, municipal needs, hydropower engineering, recreation, fish-breeding); land resources; agricultural resources (agricultural production indicators, pricing, economic incentives, etc.);
- impact on social-economic development: dynamics of water demand and supply within existing restrictions (organizational, juridical, ecologic, transboundary);
- assessment of anthropogenic load on ecosystems within flow formation and dispersion zones, analysis of ecosystems' sustainable functioning parameters, water resources management improvement;
- analysis of basin's natural, social-economic and ecologic parameters for definition of similarity criteria and zoning;
- development of zoning criteria and irrigated and non-irrigated area zoning, planning zones singling out;
- assessment and forecast of basin water availability for perspective, analysis of water demand models for future development scenarios elaboration;
- assessment of surface and ground water, management of their amount and quality, perspectives;
- water resources distribution strategy impact on economic subjects within river basin in future;
- perspectives of social-economic development and water resources role in sustainable water and environment use;
- water management in the basin and policy (national and regional);
- other tasks requiring joint participation of WP-6 and WP-7 executors.

Main links between WP-6 and WP-7 position are presented in item 2.1.5 of report (Concept of CAKIB).

5. For WP-7 tasks (social-economic and ecologic) solution additional study will be carried out jointly with partners and local authorities' representatives.

Accepted parameters of biophysical processes modeling spatial resolution, modeling outputs' temporal resolution (growing season – 6 months), time steps for sub-models, temporal scale for modeling outputs are presented in appropriate sections of inception report.