

MINUTES

of working meeting for workpackage No.7 within the Rivertwin project

Meeting was held on 30.06.2005 in SIC ICWC, Tashkent.

Attendees:

1. Thomas Gaiser - (University of Hohenheim, Germany) – Project manager,
2. Yusup Rysbekov – Leader WP-7,
3. Galina Stulina – responsible for climatic scenarios,
4. Valeriy Prihod'ko – responsible for social-economic block,
5. I.Ruziev – responsible for ecologic block,
6. O.Usmanova - interpreter.

Future development scenarios elaboration for the Chirchik-Ahangaran basin (CAB) within the project mission was considered.

1. Accepted climatic scenarios were presented by Dr.G.Stulina.

Reporter presented results of research and SIC ICWC vision on climatic scenarios. Quantitative characteristics are given to general climatic changes, possible air temperature and precipitation changes in CAB.

Intergovernmental expert group on climate changes proposed set of scenarios on green house gases emission (IS92a,...,IS92f):

IS92a (scenario "business as usual") supposes CO₂ concentration growth by 1% per annum,

IS92c and **IS92d** supposes less growth and **IS92e** and **IS92f** – more CO₂ emission compared with IS92a and IS92b due to the difference in population growth, economic growth, various kinds of fuel and energy sources use.

According to all climatic scenarios biggest warming is expected by 2030 in pre-mountain zone. With higher elevation, response to climate warming becomes weaker.

In particular, in flow formation zone (Charvak reservoir, Pskem and Chatkal river basin) possible changes of air temperature are as follows:

- average annual: 0,6 to 1,5°C,
 - seasonal: (- 0,5) to 2,6°C,
- including average in winter: – 1,0to 2,6°C,
- spring :- (-0,5) to 0°C,
 - summer: – 0,1 to 0,8°C,
 - autumn: – 0,5 to 1,4°C.

Possible annual precipitation increase by 2030 for Pskem river basin is 7-11%, Chatkal river basin – 3-8% from long-term norm.

For the preparation of climatic scenarios a method of statistical interpretation is used by the Hydromet institute including step-by-step plural linear regression. During scenario preparation, graphical data of climatic parameters are used on 10 basic weather stations within CAB.

Taking into account climatic models uncertainty and necessity to reflect possible future range of changes, two models are selected as a base:

- 1) **HadCM2** (UK, Hadley Centre); 2) **ECHAM4** (Germany, Max Planck Institute).

Reporter presented results obtained on models HadCM2 and ECHAM4.

In particular, in the model ECHAM4 average monthly air temperature changes will increase from 0,6 to 1,4°C (Pskem station), from 0,4 to 1,6°C (Oigaing station), 0,5-1,1°C (Chatkal station) for flow formation zone within Chirchik river basin (Pskem and Chatlak river basin). For the same stations on model HadCM2 they will amount for Pskem and Oiganing from 0,3 to 1,2°C, for Chatkal – from 0,5 to 1,1°C.

2. Scenarios of social-economic development are presented by V.Prihod'ko.

It is suggested to consider 4 scenarios:

- «business as usual»,
- «average»,
- «optimistic»,
- «realistic».

For each scenario, assumptions and outputs are presented.

Among the four scenarios, only the «optimistic» scenario realization provides stable development in the future. Main assumptions of the «optimistic» scenario realization is fund rising by the state for priority driven financing of entire agrarian sector and water infrastructure.

3. Ecological aspects of future basin development are presented by Dr.I.Ruziev.

In accordance with ecological loading on ecosystems, the basin is divided into 3 zones:

a) ecologically favorable (mountainous) zones with separation to sub-zones:

- a1) – with altitude higher than 1800m,
- a2) – with altitude within 900-1800m;

b) ecologically satisfactory (mountain-hillside) zones – 600-900m;

c) ecologically unsatisfactory zones - 280-600m.

Participants were acquainted with main ecological issues in various zones (water pollution, major pollutants, anthropogenic load in flow formation and dispersion zone, industrial, municipal and agricultural wastewater treatment). In context of prospective development stress is made on actions and measures differentiation depending on ecological zones in order to maintain ecological stability (first zone), prevent worsening of the ecological situation (second zone) and improve situation (third zone).

In all ecological zones, in particular in third most tense one, development should be based on ecologically safe technologies (decreasing agricultural wastewater, better wastewater treatment, water reuse in industry etc).

Ecological aspects of fish breeding and hydropower engineering development are considered separately concerning future construction of Pskem hydropower plant.

4. Common approaches to scenario development are presented by Dr.Yu.Rysbekov.

It was underlined:

- political and legal base for IWRM principles introduction oriented at sustainable development at the regional and national level is available. Basin principle in water resources management at the national level is fixed in national legislation of the basin's countries, at the regional level – in relevant agreements between these countries. In particular, CAB zone is included in BWO "Syrdarya" command zone;

- scenarios of basin development should serve as a base for preparation of proposals for decision makers and planning bodies to revise existing normative documents on CAB development. In this case, alternative scenarios can be considered in applied aspect because existing official

development plans (schemes) were worked out by the government assignment with participation of known scientists and specialists;

- development scenarios should be restricted by water intake limits. Prospective development of Uzbek (Tashkent oblast), Kazakh (Keles massif of Shimkent oblast) and Kyrgyz (Chatkal zone of Jalalabad oblast) parts of the basin should be restricted by ICWC established limits for these zones. Limits (or limit volumes) of water withdrawal are set by ICWC. The average annual surface water volume for ChAKIR is estimated to be 8,67 km³, of which Uzbekistan's share is 87%, Kazakhstan – about 12%, Kyrgyzstan – less than 1%. In years, other than normal year in terms of water availability, national water withdrawal limits are reduced or increased proportionally;

- stress should be made on intensive development. Taking into consideration low revenue per hectare of irrigated main crops, during first stage efforts should be concentrated on the increase of the productivity of land that is already cultivated; new land development should be limited to in-contour development;

- GNP growth more than 4-5% per annum should be accepted. At that, GNP growth should be taken in hard currency or in local currency by its purchasing capacity. In particular, in Tashkent oblast during recent years GNP growth in UZBEK currency (SOUM) is found, but in hard currency (US Dollar) it declines;

- foreseen by «General scheme of irrigate agriculture development in Uzbekistan up to 2015» (Vodproekt, 2002) terms of development should be postponed. Delay can be 10-15 years (2030) according to scenarios developed within Rivertwin project;

- from the development scenarios suggested by project coordinator (University of Hohenheim) – A) «globalization», B) «regional development – the second one can be applied for CAB with regard to local specific features;

- climatic scenarios for CAB should be considered in context of climate changes impact on water resources volume and distribution dynamics.

Modeling results by the Hydromet institute show that in the basin significant changes of water resources by 2030 will not happen. In particular, in Syr-Darya basin water resources volume will remain the same or will a little increase: in Ahangaran basin increase can amount for 3 - 9%, Chatkal – 2 - 6%, Pskem it can decrease by 3%. According to models ECHAM4 and HadCM2 as well as the regional scenario some decline in river runoff during growing season is expected. By ECHAM4 model during growing season Chatkal runoff can decrease by 8%, Pskem – by 1%; by HadCM2 model Chatkal runoff can increase by 3%, Pskem – by 3% from long-term runoff.

More disturbing trend is found in ice stock within the basin. Reduction of glacier area results in decreased glacier runoff. Assessment of glacial conditions in the Pskem river basin shows that over the last 20 years, glaciation of this region decreased by 17% as compared to 1960. According to estimations, by 2020, glaciers would lose another 17% and the total loss of glacier mass would account to 1/3 of that in 1960.

Because climate becomes more arid, snow melting contribution is expected to decrease by 5-10% and rain contribution to increase by 7-10%. In general, flood frequency increase is the most important negative consequence.

Groundwater use, agricultural sector development, small power engineering, fish breeding issues were also considered.

5. Thomas Gaiser familiarized participants with European approaches to scenarios development for Neckar river basin (Baden-Wurtemberg province, Germany). (Preliminary on 27.06.2005 draft scenarios developed by University of Hohenheim were circulated among project participants - “Entwicklung von Zukunftsszenarien für das Neckareinzugsgebiet”, version dated 21.06.2005).

It was suggested to consider two reference scenarios of Neckar basin development:

- **scenario A:** globalization oriented at the market and technologies,

- **scenario B:** regionalization with stress on ecological and social problems.

Time period of scenarios is 2005-2030. Neckar basin is divided into 4 regions with their specific features determined in following order:

1. Urban agglomerations. Two agglomerations dominate in the basin:
 - Stuttgart agglomeration,
 - Mannheim/Heidelberg agglomeration.
2. Urban agglomeration peripheries (municipalities within agglomeration impact).
3. Rural localities divided into 2 groups:
 - 3a) Rural localities themselves,
 - 3b) Agglomerations around rural localities divided into 4 clusters.

Accepted in main scenarios assumptions are as follows: economic growth, directions of profit investment, population growth, human potential, capital and technologies, cooperation, political tension degree, local authorities' role, public participation, public values and local traditions etc.

Special attention in scenarios is drawn to role of local partners and scientific-research institutes taking part in scenarios development, priority driven directions of intervention (capital investments), major driven forces of development (population, economy, water demand, land use etc) with regard to their trends in time and space.

In accordance with main assumptions, reporter presented forecast of future development of the basin for its various zones (urban, rural, peripheries).

Special attention is paid to indicators (economic, ecological, hydrologic), which should be achieved or within which development is possible and expected outcomes depending on selected scenarios (A or B) by 2030 for Neckar basin (for instance, demography, main economic indicators, water and land use).

Thomas Gaiser summarized the meeting results as follows:

- during alternative scenarios development clear separation of calculable parameters and non-calculable parameters (scenario assumptions) should be done;
- there should be more than two scenarios, but their number should be limited. It is necessary to be oriented at scenarios, that are plausible. Thomas Gaiser proposed that some specific interventions should be separated from the economic scenarios (like increase of water use efficiency or fertilizer subsidies) and should be imposed on each combination of climate x economic scenarios.
- it is necessary to work out intervention policies (directions of effective investments). Interventions could be acceptable or unacceptable depending on stakeholder evaluation; that's why it is expedient to be oriented at interventions that are proposed and evaluated by stakeholders;
- determining driving forces, regional differences within the basin should be taken into account. In CAB these differences could include both transboundary (interstate) aspects and upstream, midstream and downstream peculiarities;
- reliability of outcomes by scenarios will depend on availability and reliability of input parameters for models, to which special attention should be paid. Simultaneously, additional obligatory condition of reliable data is deep analysis of main reasons and factors, which can impact development parameters. Because of that, serious attention should be drawn to analysis of development scenarios with regard to all concerned parties;
- for hydrological model (HBV) independently from river basin (Neckar, Chirchik, Oueme) daily data of air temperature and precipitation are necessary;

Following questions were discussed:

- development scenarios orientation – at free market (1) or regulated one (2);

- air temperature increase extrapolation – proportional linear (1) or another relation (2);
- air temperature increase will lead to river runoff dynamic change and further glaciers mass decrease – to their regulation capacity reduction and, as a consequence, to mud flow frequency increase.

All questions concerning CAB scenarios development as well as database filling mutual understanding has been achieved between project manager (Dr.Thomas Gaiser) and responsible executors from SIC ICWC. Agreement is reached to place CAB development scenarios in project web-site, using the same layout and structure as for the web presentation of the Neckar basin scenarios. Details have to be discussed with Andreas Printz, who is responsible for the presentation of the scenario results

**Deputy Regional Team Leader,
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Yu.Rysbekov