UNEP/Uzbekistan Project
«Uzbekistan: Preparation of the Second National Communication under UN Framework Convention on Climate Change»

Uzbekistan experience in V&A assessment, needs and concerns

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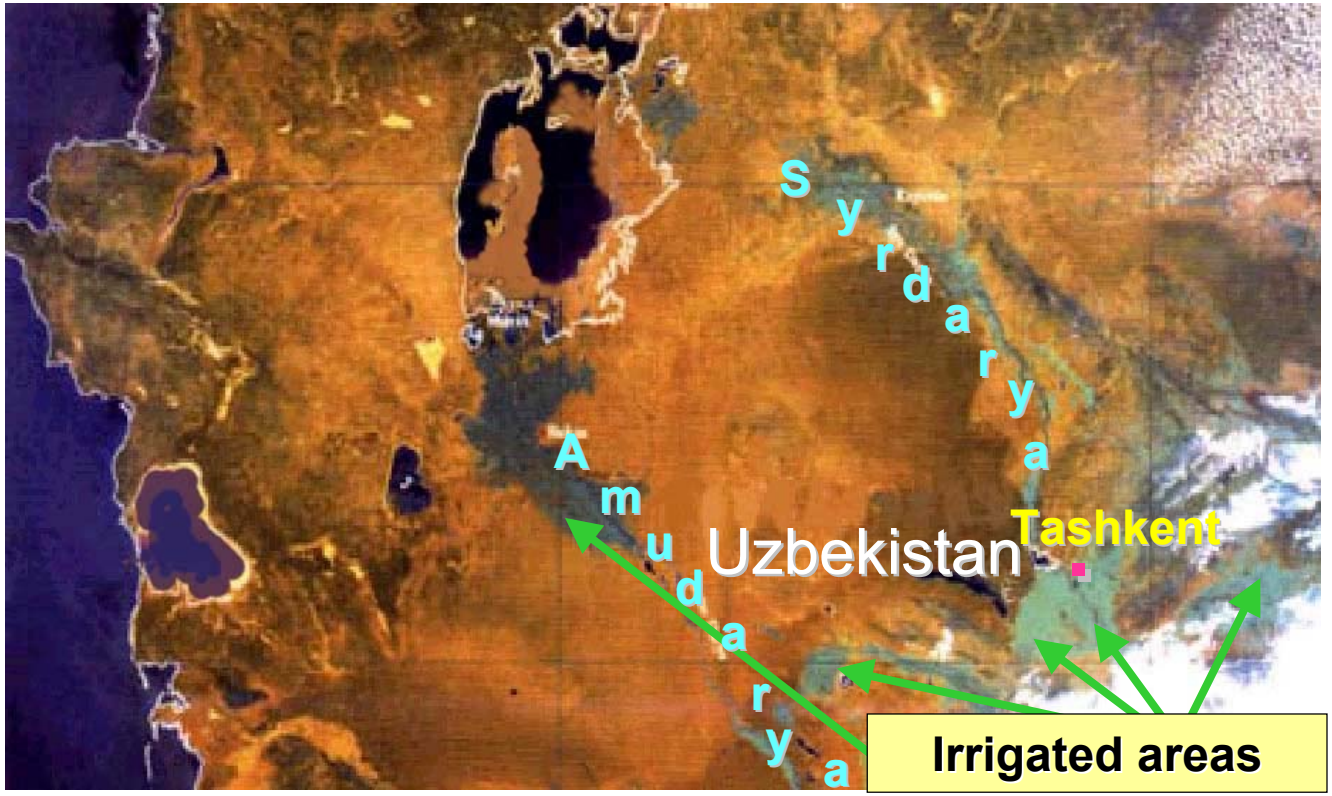


- Uzbekistan belongs to the semi-arid and arid zones, which are under natural water deficit.
- Intensive water use for irrigation needs is the main cause of the Aral Sea crisis.

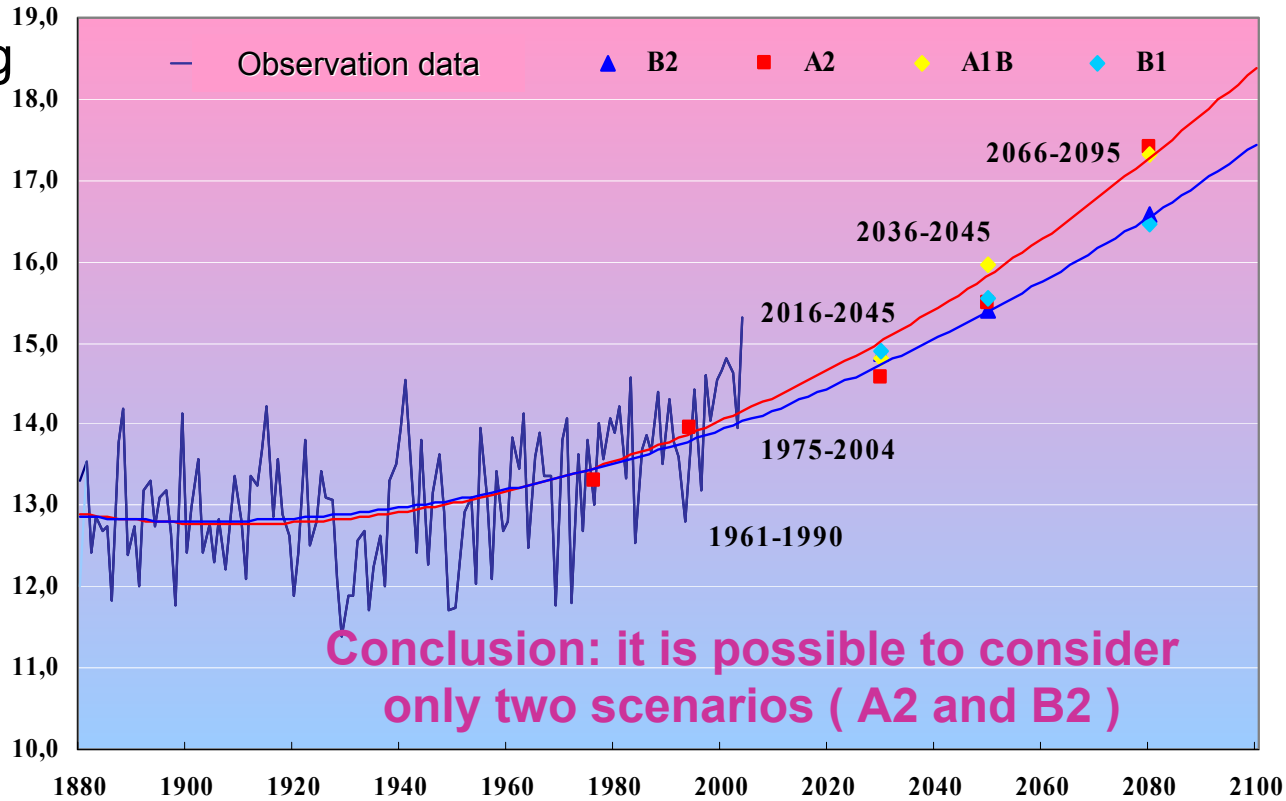
- During the project implementation the sectors were identified which are most vulnerable to climate change (water resources, agriculture, public health, separate ecosystems).
- Integrated approach is being used for assessment of inter-related sectors water resources and agriculture what enables to analyze adaptation strategies (to change areas under crops and kinds of crops sown to assess possible demand for water)
- The areas have been revealed where additional research and assessments are required; barriers and gaps have been identified as well as needs in development of national and regional capacity.

Regional climate scenarios construction on the base of the GCM outputs

Tools: MAGICC/SCENGEN, Statistical Downscaling (averaging of six models, mid climate sensitivity).

Experience:

- Appropriate scenarios were selected with taking into account the high level of their uncertainty.
- As criteria standard errors of calculation of mean values and natural variability were chosen.
- It was shown that by 2050 difference between the scenarios (A1B, A2, B1 и B2) will be within natural variability.



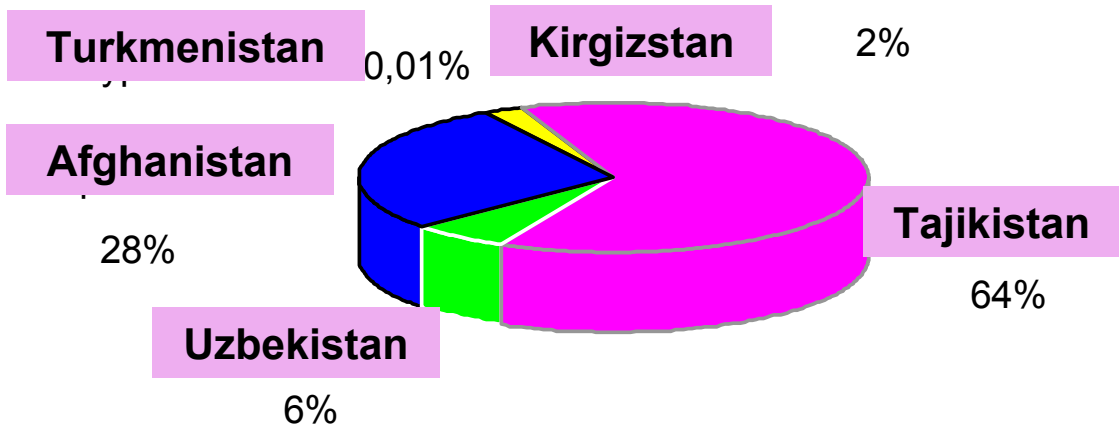
Gaps and needs in capacity building:

- Covering by observational data is insufficient for the GCM outputs interpretation over mountain territory.
- Capacity building is needed in the field of regional climate models application as till present time none country of Central Asia uses them.

Regional aspect for water resources

- Runoff formation zone is mainly the territory of neighboring countries however the major water consumer is Uzbekistan (from 37-45% of total water resources of the Syrdarya and Amudarya rivers, that is 43-52 km^3 of water annually).
- To assess accessible water resources a great volume of information from the neighboring countries is required (meteorological, hydrological and glaciological data).
- At present the rivers in the Aral Sea Basin are completely regulated.

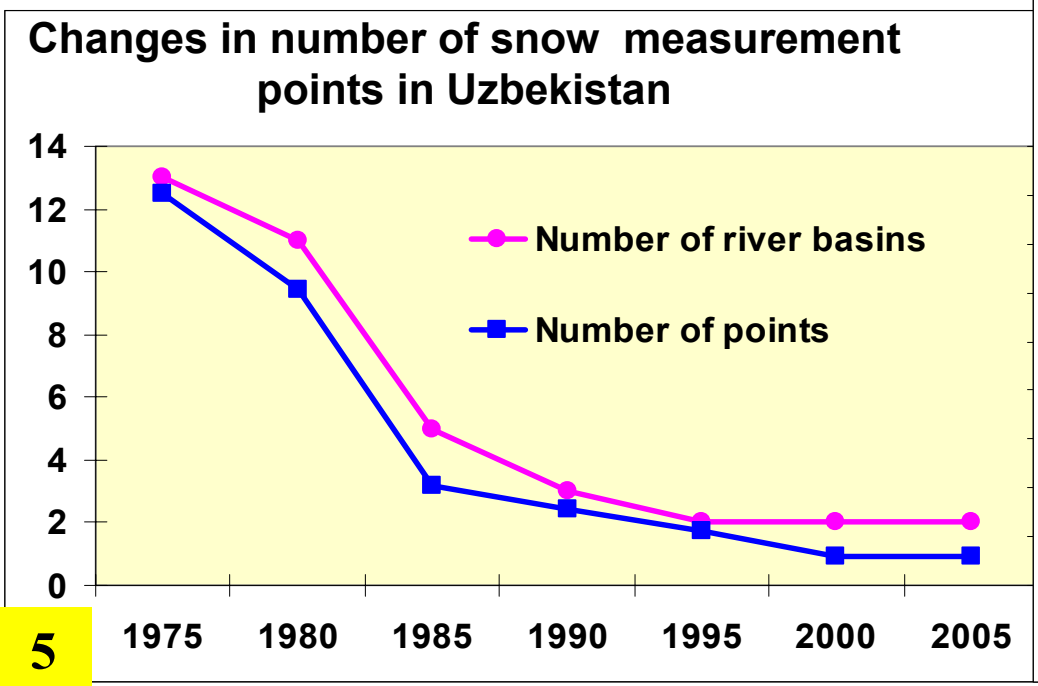
Percentage of water resources formation in each country

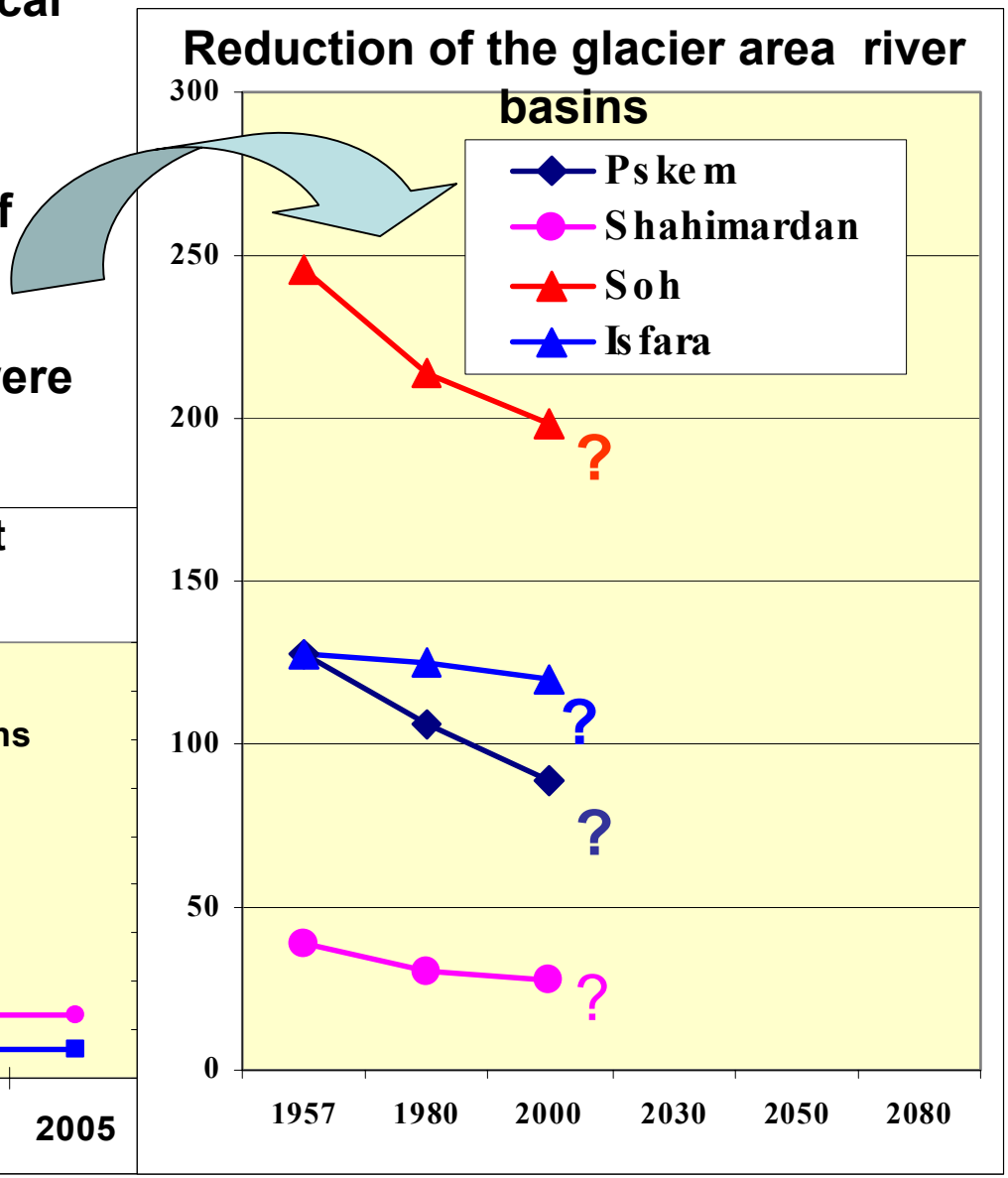


- Runoff regulation distorts natural regime and complicates calibration of hydrological models.
- Regional cooperation is needed to increase number of observational points over the territory.

Regional problem – snow-ice resources in the runoff formation zone. All kinds of observations were stopped in mountains due to financial and organizational difficulties.

- In the past 10-15 years the glaciological observations practically have been stopped.
- Comprehensive assessment of glaciation was performed at the end of 80's. Due to climate warming such assessment should be repeated.
- In 2000 only the separate glaciers were estimated with use of satellite information.





2. Assessment of water resources vulnerability in the mountain runoff formation zone including extreme hydrological phenomena (floods, mudflows)

Experience

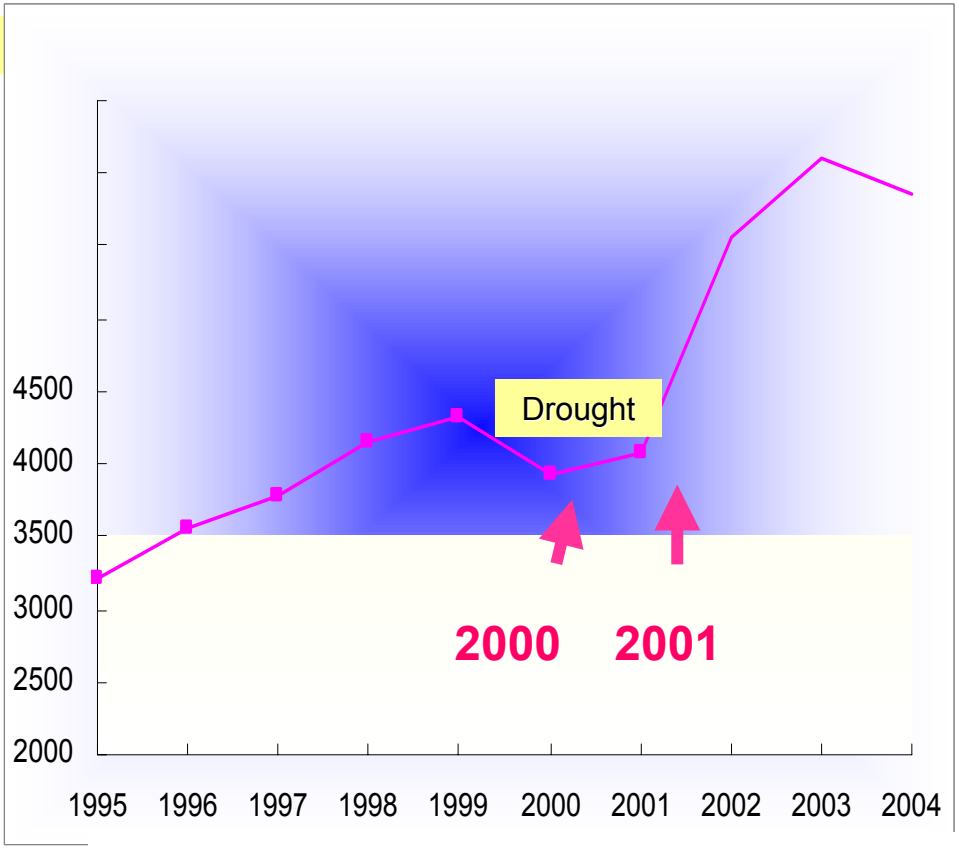
- To assess climate change impact on water resources the model of river runoff formation developed at the Central Asian Research Hydrometeorological Institute has been selected.
- The model permits to take into account the main regularities of surface water formation under climate factors, including intra-year runoff distribution in each separate river basin.
- To assess warming related mudflow risks the model of maximal discharges was applied.

Gaps and needs

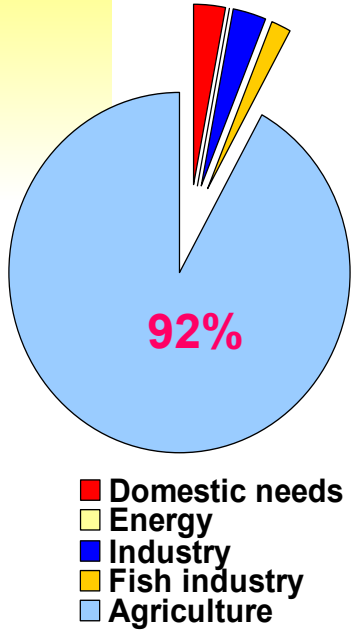
- Covering by observational data is insufficient for assessment of change in snow-ice resources.
- Satellite images of high resolution are required and capacity should be built for their processing.
- Stationary observation network is needed to develop in the mountain area.
- Cooperation needs to be enhanced between the countries having transboundary water courses (the Amudarya and Syrdarya river basins).
- Researches are needed in probabilistic estimate of infrequent recurrence phenomena.

Agricultural sector of Uzbekistan is most vulnerable to climate change due to its dependence on water resources

In years of droughts consequences of water deficit are especially great: total grain-crop yield is reduced both in separate provinces and throughout the country



Uzbekistan: total grain-crop yield from 1995 to 2004



Gaps

- Presently difficulties exist in use of crop-models (lack of specialists).
- Assessment of change in crop yield is mainly performed basing on expected irrigation water deficit.
- Data on crop yield and irrigation water intake including transboundary apportioning of water are often uncertain.

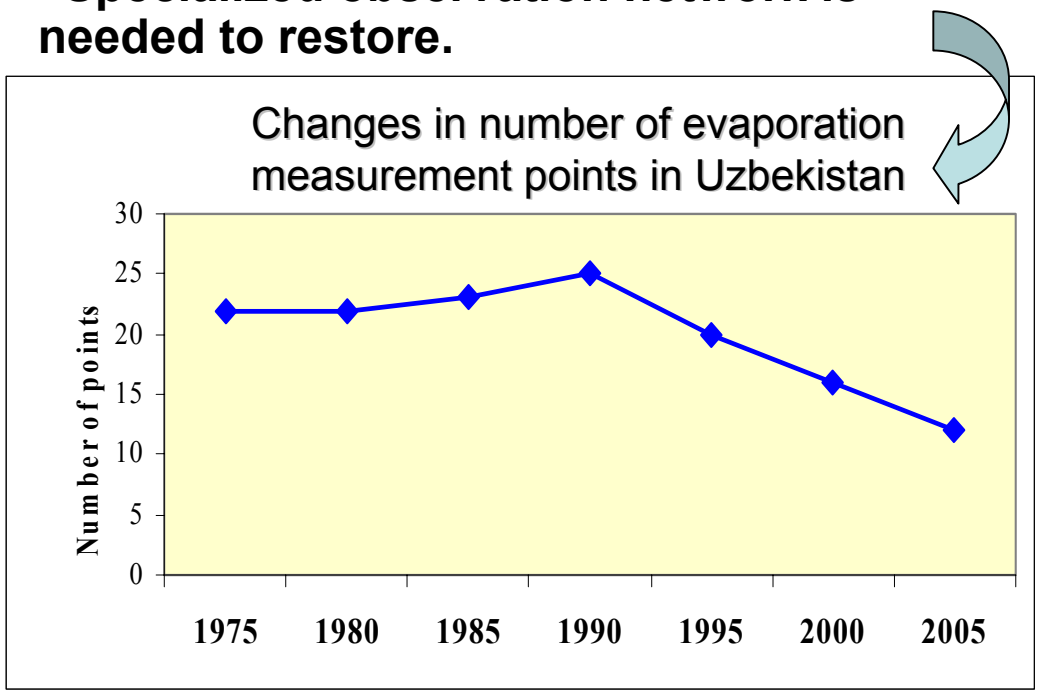
3. Climate change impact on the irrigation regime and water supply

Experience

- The CROPWAT and ISAREG (The Irrigation Scheduling Simulation Model by the Institute of Agronomy, Technical University of Lisbon) models were used.
- The ISAREG model permits to simulate alternative irrigation schedules for different levels of admissible crop water stress and various water constraints.
- Calculations of irrigation rates for different provinces have shown a big spread in values depending on crops, soil peculiarities and underground waters level.
- To reduce uncertainties of future demand for water it is necessary to widen researches with models application.

Gaps and needs

- Proceed with investigation of models calibration.
- Specify crop coefficients for different types of soils.
- Field investigations are lacking (calibration was performed only for cotton and wheat according to the data of field investigations in the last years).
- Specialized observation network is needed to restore.

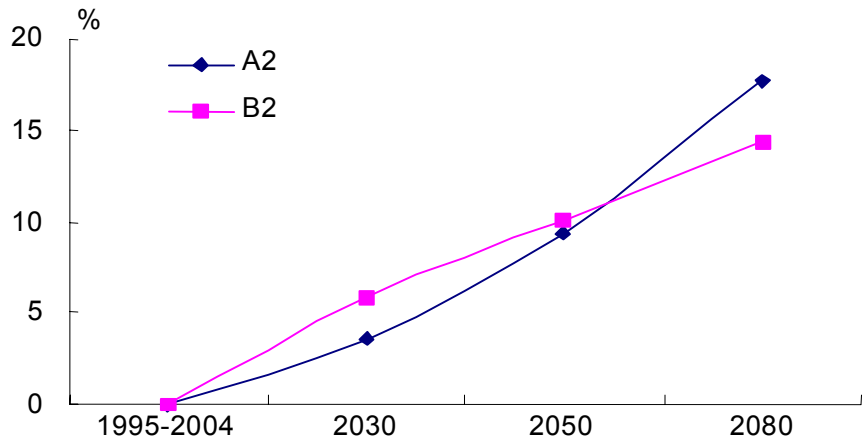


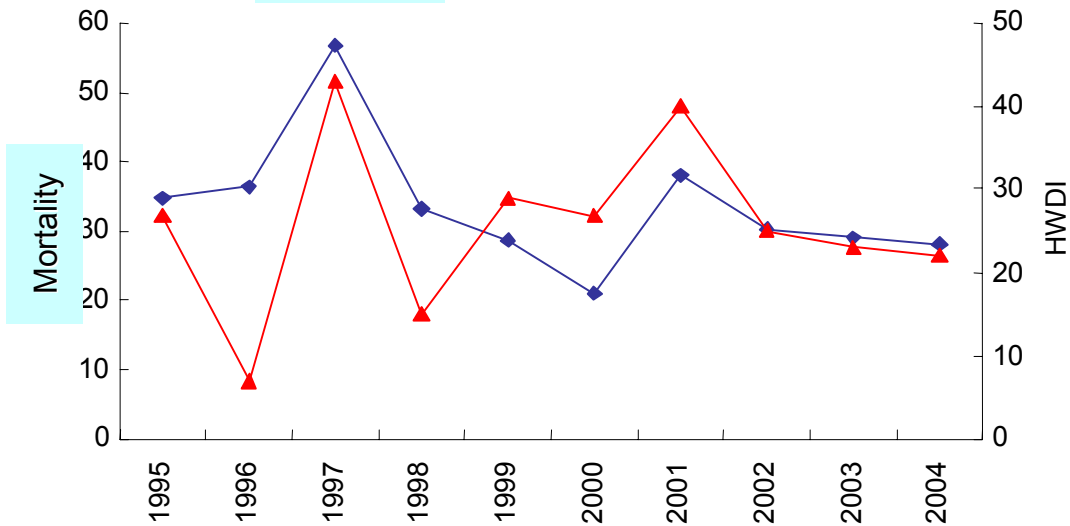
4. Impact Assessment of Human Health

Experience

- Assessment was made of change in “transmission window” of malaria according to air temperature and relative humidity data. Risk of malaria transmission is increased.
- Increase in the incidence of diarrhea with air temperature rise was estimated for the Tashkent city.
- Increase in maximal heat loads was estimated for the scenario conditions for provinces.
- Trends of heat wave duration indices and extremely high air temperatures were studied and compared with mortality due to cerebral-vascular diseases for the Nukus city.

Possible increase in incidence of diarrhea without taking preventive measures





Relationship between mortality in Nukus city and heat waves duration

Gaps and needs
Public health

- Much of the data needed for the impact assessment on human health is not yet accessible. Special permission is required to access some data sets.
- Such an important aspect as water quality impact on health has not been studied due to lack of specific data and time. Mathematical models were not applied. The project "Climate and Health" to be implemented in Uzbekistan will promote to capacity development in this sector.

Other sectors

- At present assessment of climate impact on pastures, water ecosystems and forest sector is being implemented.
  Main problem is lack of specialists and data.
- Assessments are being made for the scenario conditions with WEAP application throughout the country. The difficulties arisen are related to unreliable information on water intake. There is a need in transboundary monitoring of water resources.

Adapation analysis

- As WEAP is the most relevant tool for analyzing adaptation measures in the water resources and agricultural sectors it may be advisable to proceed with its application in the regional scale for the main transboundary river basins. It will enable to assess regional measures.

- Analysis of adaptation measures efficacy presents difficulty due to a great uncertainty in social-economic data and scenarios of development

- Practice is lacking in financial estimate of damages. Information is needed on best practice and methods of indirect estimate of damages and risks.

- A big number of the programs already developed and are being developed include measures which can be considered as adaptation ones. Basing on them an integrated plan of actions on adaptation to changes occurring (climate change, desertification, loss in biodiversity) can be developed.

Proposals

UNFCCC can render a great assistance through:

- **training on subjects (crop-and irrigation models application, best practice in WEAP, models for impact assessment of health);**
- **training in the field of using satellite information including international sources of big resolution, GIS application in different areas (agriculture, ecosystems, snow-ice resources);**
- **training for groups of countries with the same language and similar problems;**
- **engaging of several specialists from each country to establish expert groups (with following monitoring);**
- **allocating of small grants for conducting field experiments, subject investigations and assessments with relevant models.**