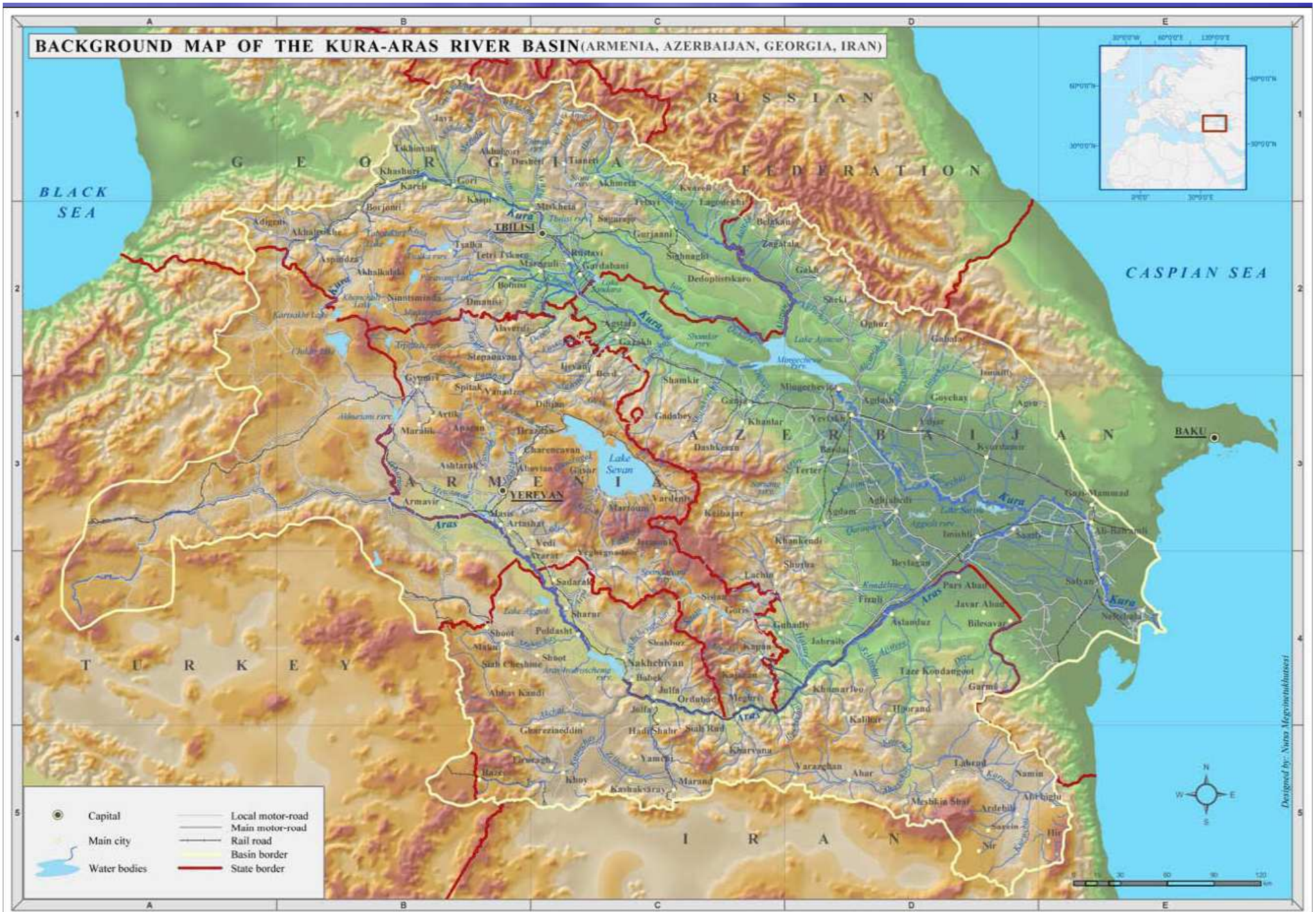
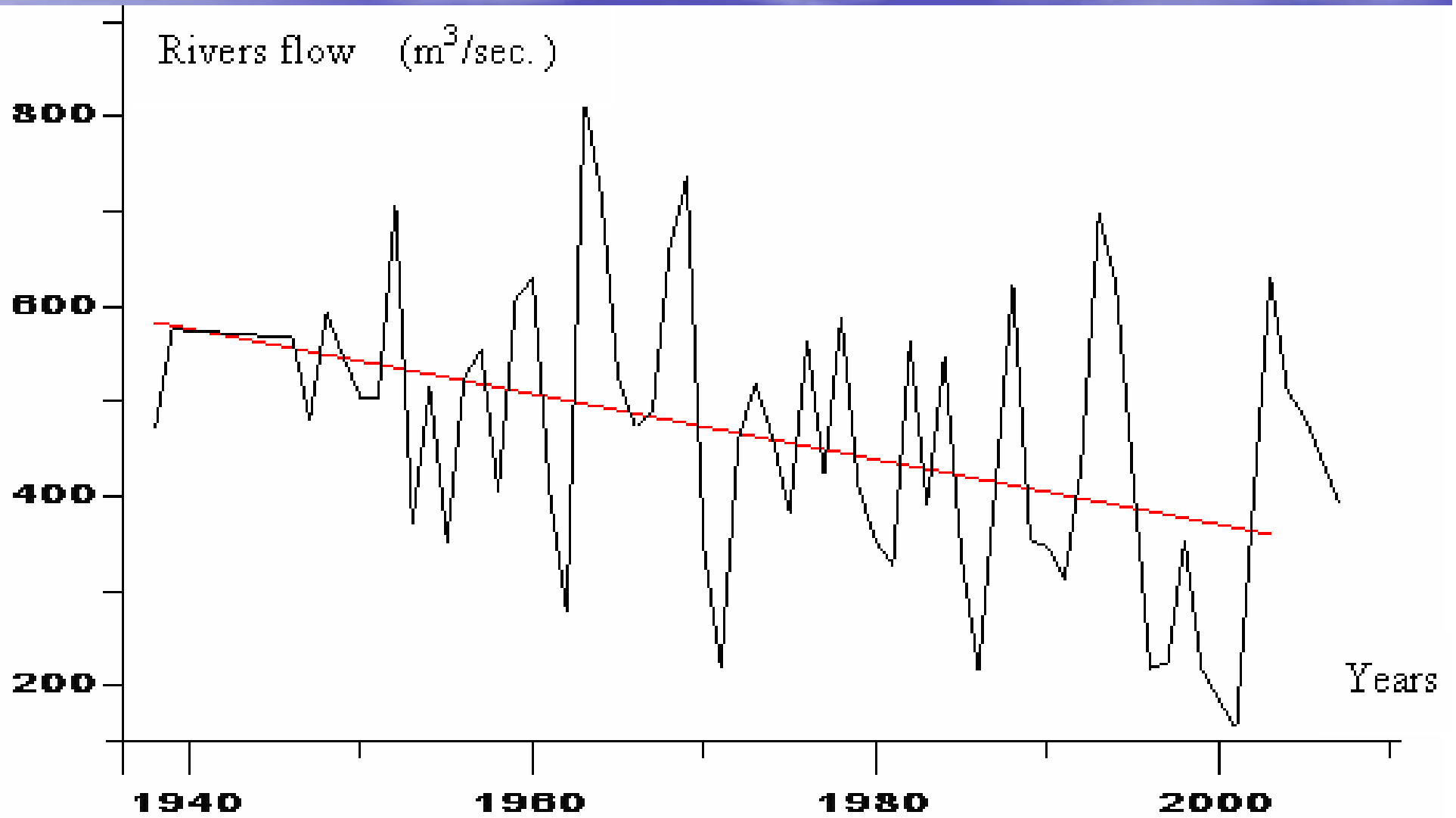


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**INTEGRATED WATER RESOURCES MANAGEMENT
AS BASIS FOR FLOOD PREVENTION IN THE KURA
RIVER BASIN**



Kura-Aras river basin. Light line is border of the basin

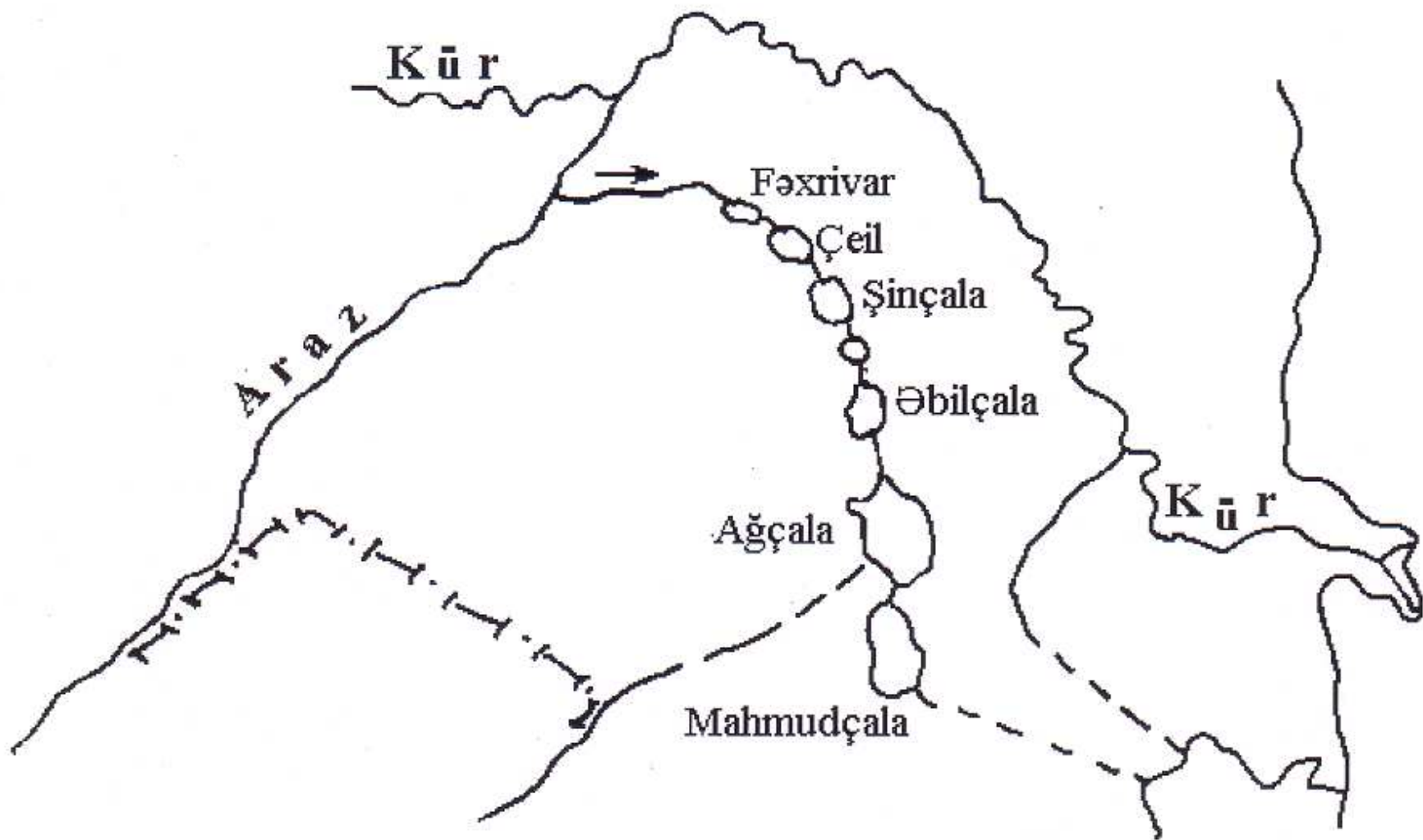


Yearly flow (m^3/sec) and tendency of Kura river (Salyan st.).



Flooding village in mouth area of Kura river

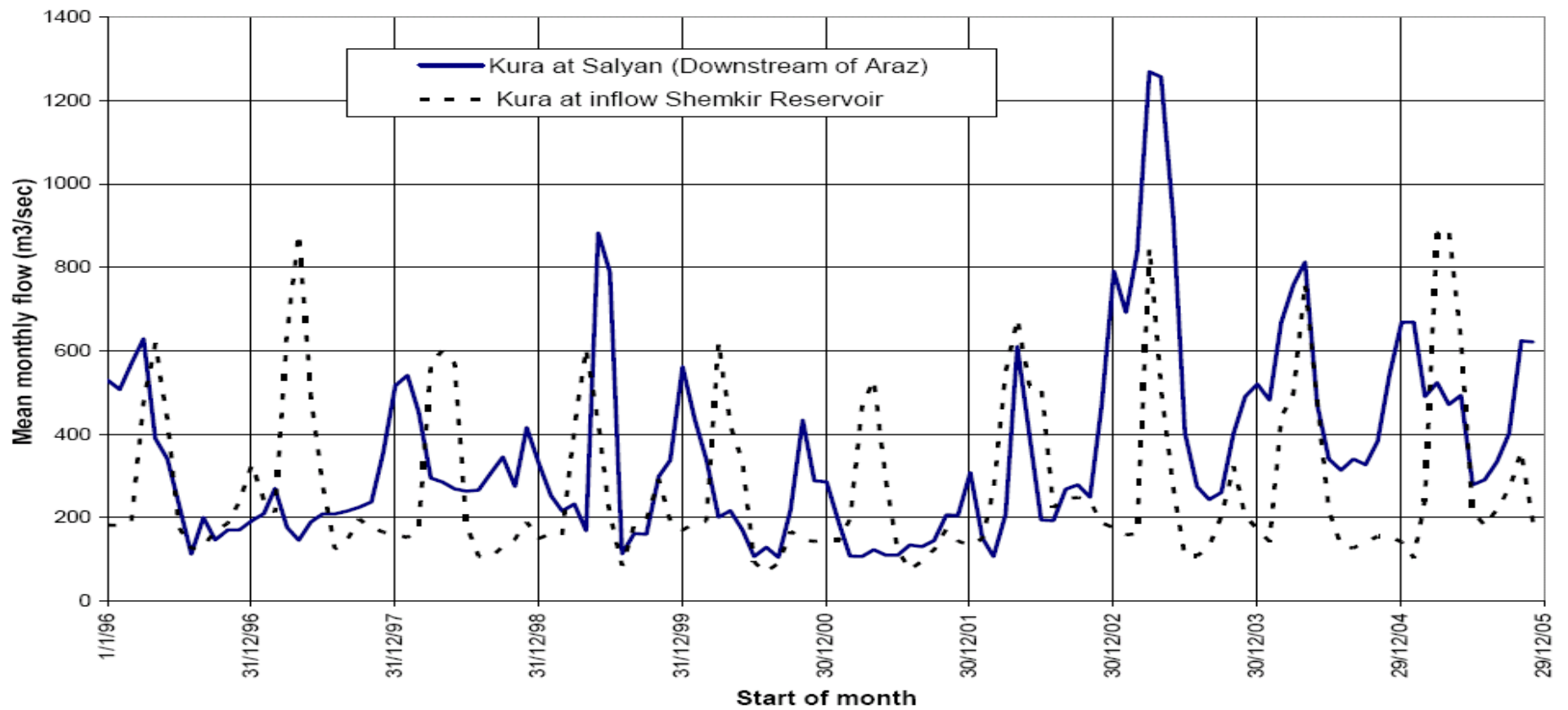




Situation in the end of 19 centuries in New-Araz lake - river systems

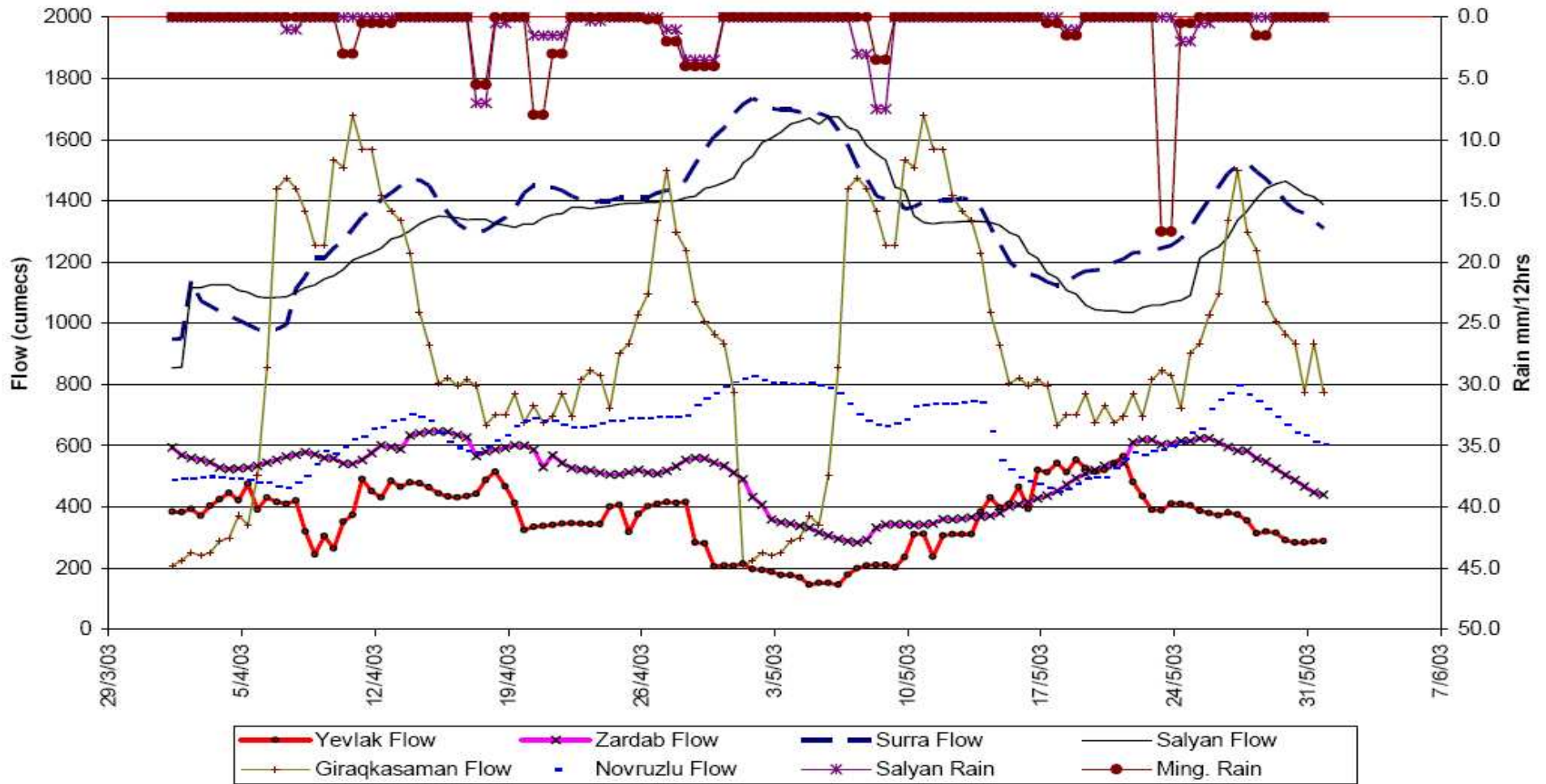
Table Available Flood Data and Analyzes for Large Rivers

Average Return Period (years)	Peak Flow (m ³ sec ⁻¹)									
			4	10	20	50	100	1000		
Annual Exceedance Probability, %			25	10	5	2	1	0.1		
Year	1969		2003							
Location	Catchment area (sq km ²)									
Kura River										
Qiragkesemen	37,000	na	1715							
Inflow to Mingechevir	a	na	na	1,900	2,200	2,400	2,620	2,780	3,500	
Before Mingechevir (1953)										
Kura R at Surra (before Mingechevir)					2,130	2,480	2,710	2,990	3,190	na
Kura R at Salyan (before Mingechevir)					2,150	2,580	2,870	3,220	3,470	
Kura R at Surra	2680		1,648							
Kura R at Salyan	188,000	2,350	1,600		1,280	1,606	1,862	2,150	2,458	na
Kura R at C.B. Bank	2,160									
Araz after Araz headworks										
Araz River at Karala (1)	46,000 approx.	1,690	na		769	1,187	1,349	1,509		
Araz River, Araz headworks inflow					1,100	1,260	na	1,650	2,260	
Araz River at Giziwang (1)	2,230		na		na	1,298	1,577	1,784	1,990	
Araz River, Saatli	100,000	2,600/ 2,700	869		604	803	950	1,170	2,071	2,545



Kura River Monthly Flows

Rainfall



Kura Flood Flows



Examples of flooding coastal zone in result rising Caspian Sea level



Examples of flooding coastal zone in result rising Caspian Sea level

Institutional responsibilities

Ministries with the greatest responsibility for water resources management in Azerbaijan are:

Ministry Ecology and Nature Resources

Azerbaijan Amelioration and Irrigation Company (AAIC)

Other agencies are involved in devising plans and programs related to water resources

protection and use and these include:

1. Ministry of Industry and Energy (water use for power generation)
2. AzerSu (drinking water supply company)
3. Ministry of Health (drinking water quality – health and hygiene)
4. Water User Associations (Irrigators and farmers).

The following organizations participate in implementation of scientific-research and other

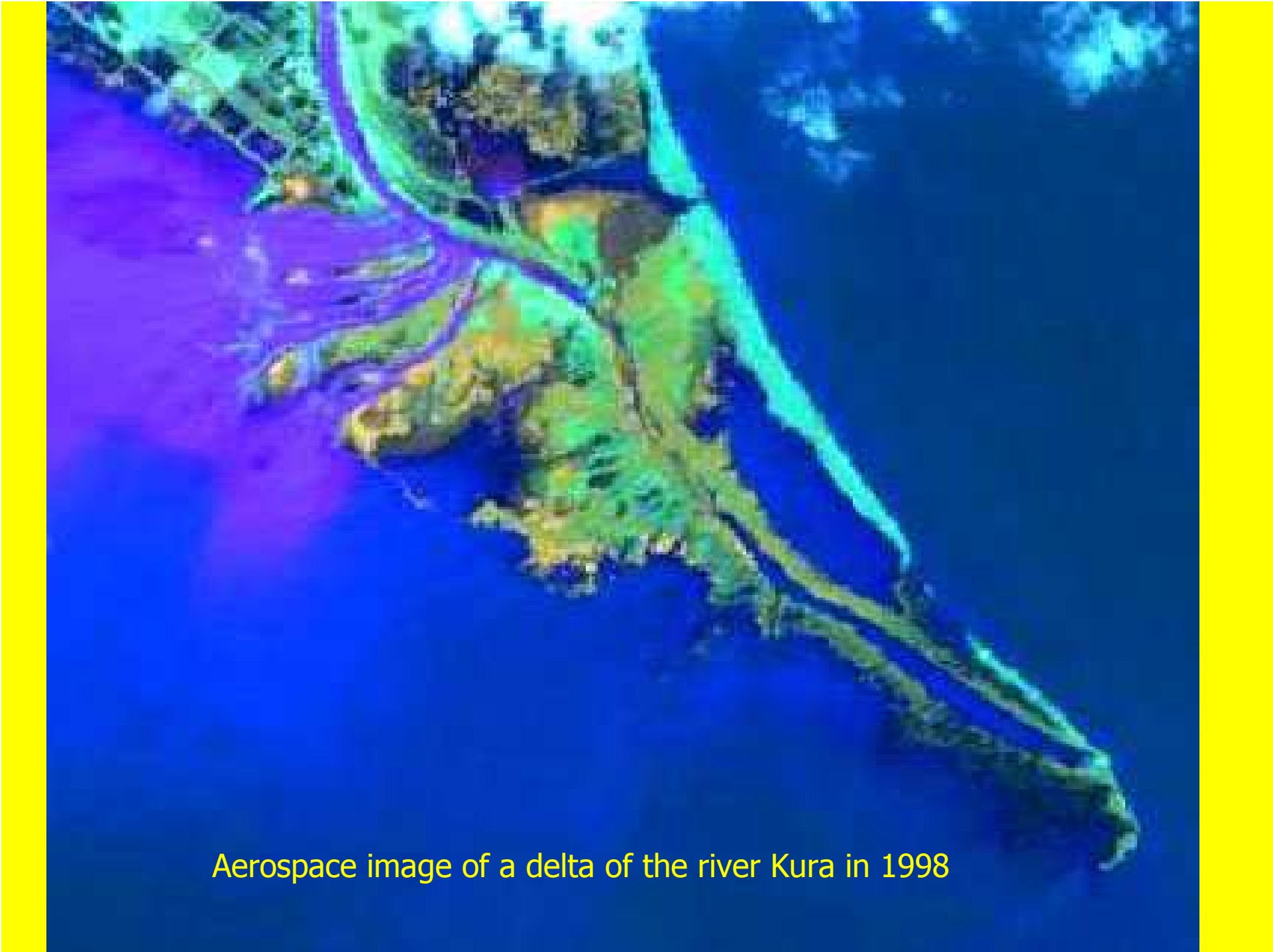
works related to water resources protection:

1. Geography Institute of Academy of Sciences;
2. Azerbaijan Hydraulic and Amelioration Science-Production Unit
3. Azerbaijan Science and Research Water Problems Institute
4. National Committee on International Hydrologic program UNESCO;
5. Environmental NGOs

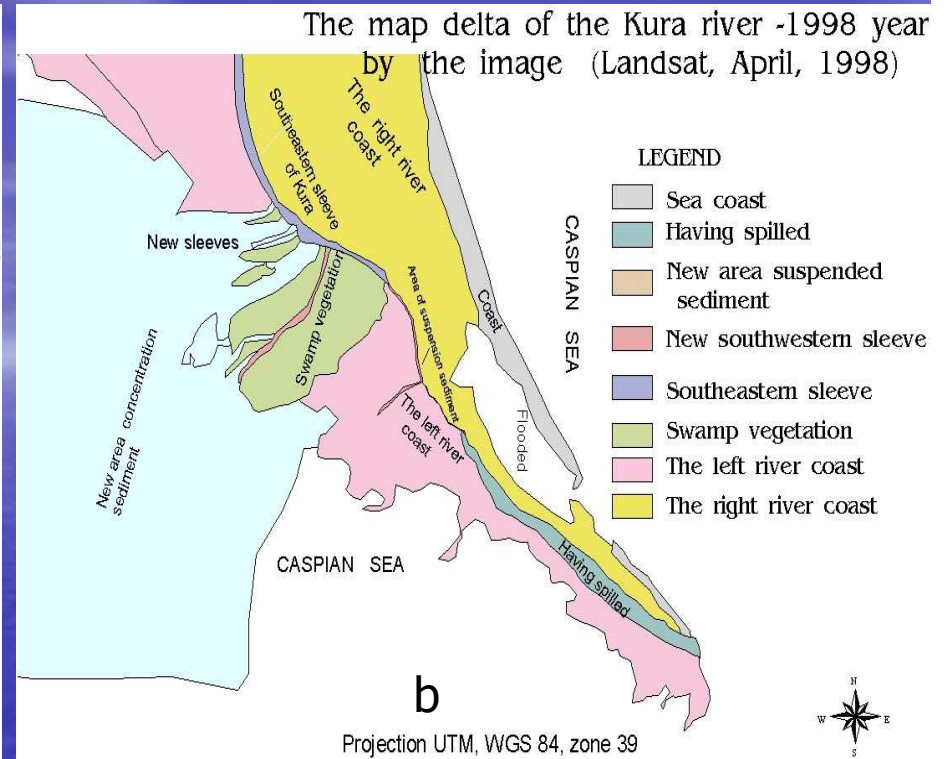
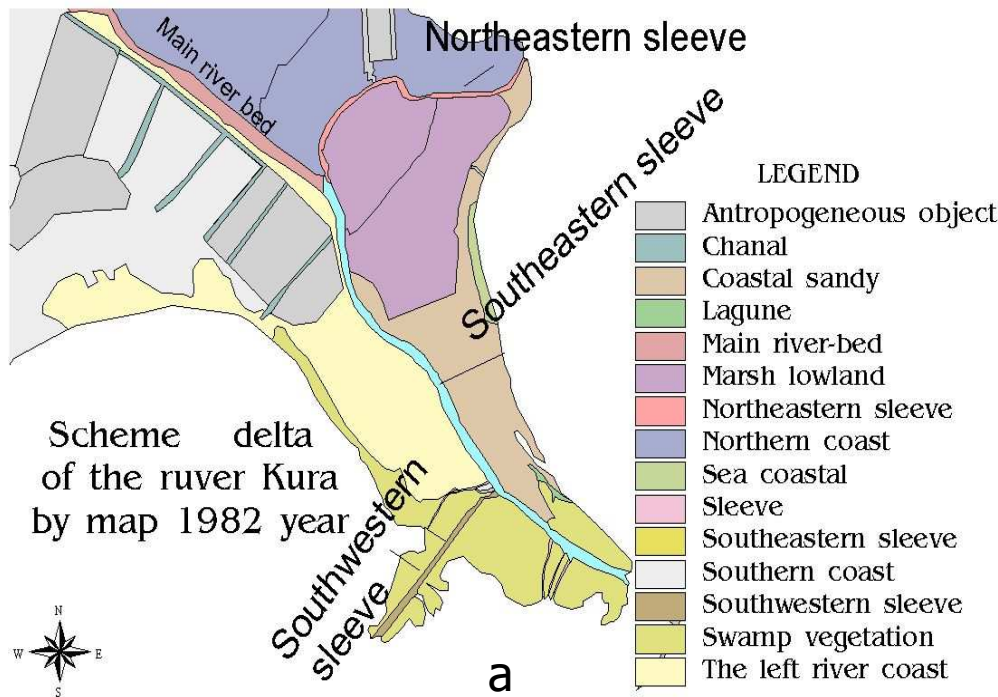
Role of water basins in reduction flood risk

Main Characteristics of Reservoirs on the rivers Kura and Araz in Azerbaijan

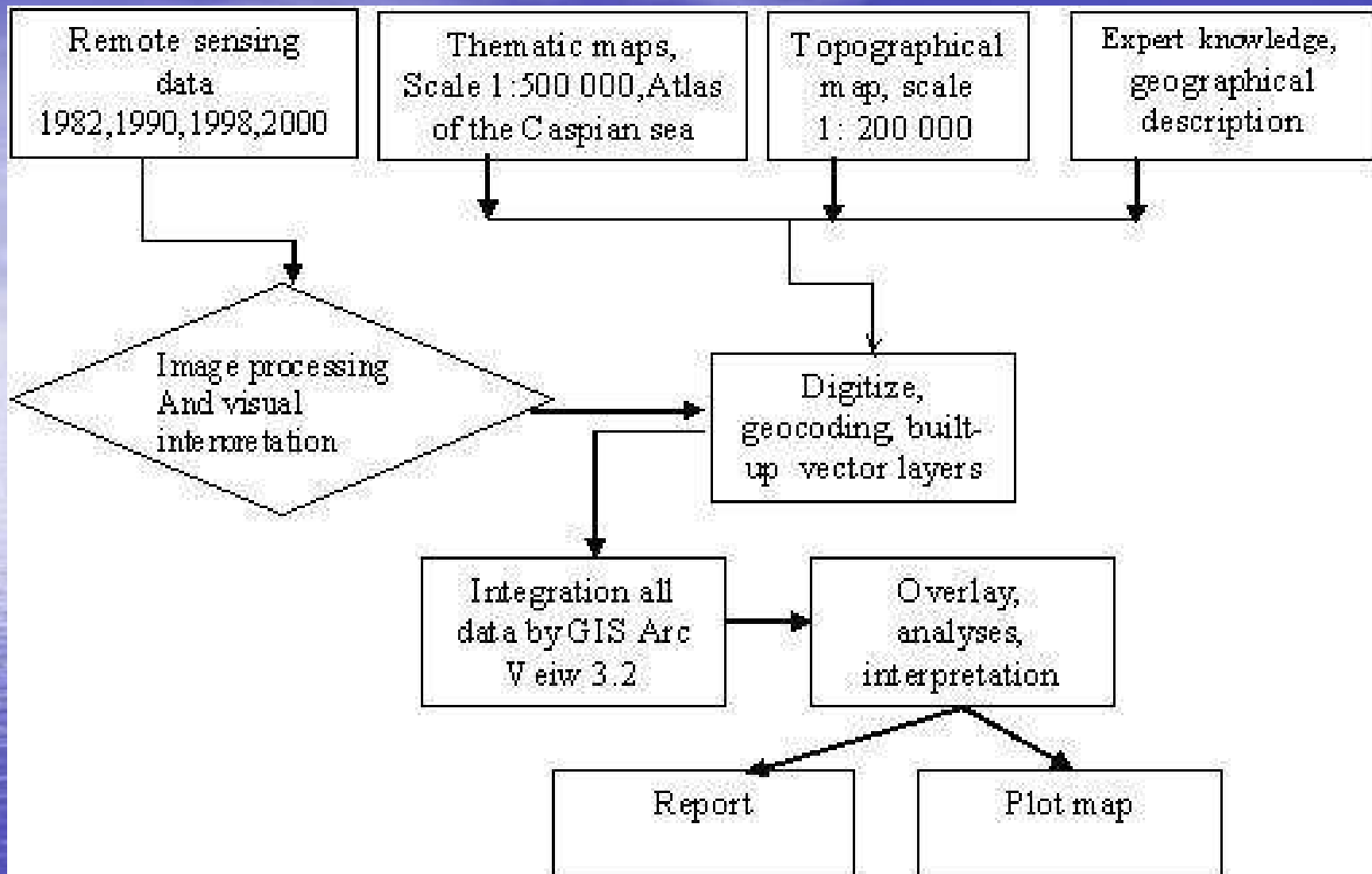
No.	Names of Water Storage	Built	River Basin	Total capacity, mln.m ³	Surface Area SA (km ²)	Dam Height DH (m)	Location
1	Varvara	1952	Kura	62.00	21.40	12.00	Yevlakh region
2	Mingachevir	1953	Kura	15,730.00	605.00	80.00	Mingachevir city
3	Shamkir	1983	Kura	2,677.00	115.00	70.00	Shamkir region
4	Yenikand	2000	Kura	158.00	22.61	24.00	Shamkir region
5	Araz	1971	Araz	1,350.00	145.00	40.00	Nakhchivan AR



Aerospace image of a delta of the river Kura in 1998



The scheme of change of a water area of a near-shore area of a delta of the river Kura: a) and b) layers accordingly imaging the information on a condition of basin of a delta of the river Kura as of 1982 and 1998 years.



Methodology of information model of a delta of the river Kura



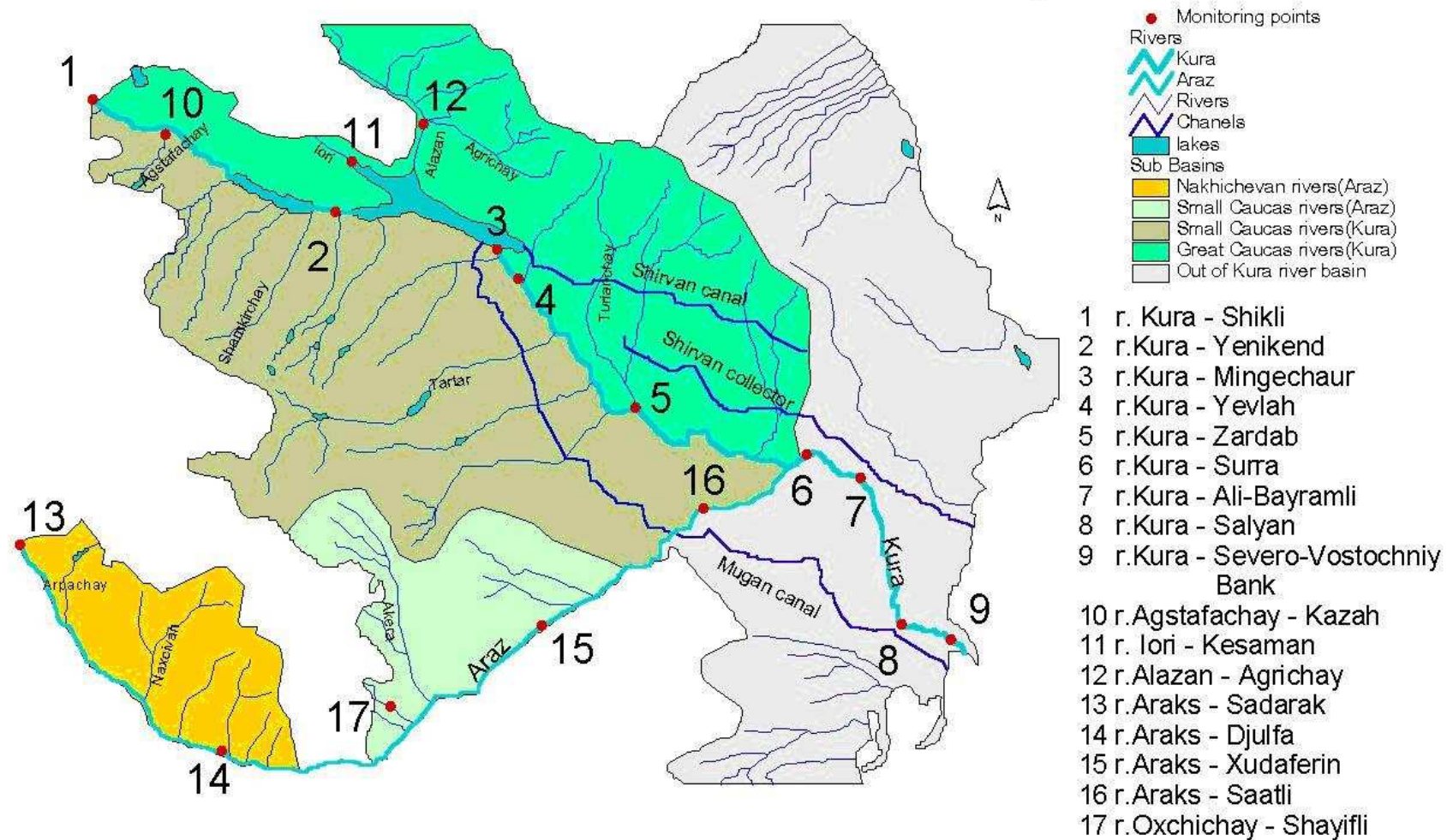


Internal activity for reducing flood risk

Lack of knowledge does not allow to make a full estimation and the universal analysis of influence and consequences of flooding. It is necessary to note especially mentioned below:

- Insufficient amount of stations of hydrological monitoring and inefficient data exchange between the coastal countries;
- Absence of the authentic and effective forecast of flooding. Existing approaches do not meet modern requirements. The out-of-date technologies and the equipment are used.
- Absence of data about frequency and scale of the flooding which have happened for last twenty years in view of an inefficiency of systems of hydrological monitoring, i.e. it is impossible to estimate influence of global warming;
- For warning of flooding and their reasons investments which should be directed first of all on rehabilitation existing systems are required.
- In addition to it is necessary to develop strategy on management of risks of flooding, and also national and regional plans on universal rehabilitation противопаводочных systems in all pool of the Kura.

River Monitoring Stations Network with historical data in Azerbaijan



Regional cooperation and joint activity

List of Regional Projects Related to Water Management in Kura river basin

Title of project	Organization	Period
South Caucasus Regional Water Management Project	USAID	2000-2002
Synergy	USAID	began in 1998
Joint River Management Programme	TACIS	2001-2003
Regional Environment Center	EU-TACIS, USEPA	began in 1999
Kura-Araks Coalition NGO	Giorgi Dzamukasvili	began in 1997
Cooperative River Monitoring among Armenia, Azerbaijan, Georgia and the USA	NATO Science for Peace Programme	2001-2005
Reducing Transboundary Degradation of the Kura-Aras River Basin	GEF	2005-2007
Supporting River Basin and Flood Management Planning Project	Asian Development Bank, Republic of Azerbaijan	2007-2008

Conclusions and suggestions:

The following recommendations are made: in relation to Georgia on water resources of the Kura River;

- establish forum with ministers as representatives,
- agree with Georgia on forum support arrangements,
- identify supporting unit in Azerbaijan,
- present issues of concern for further discussion,
- initiate data and information exchange arrangements

In the short term in relation to Armenia, investigate monitoring requirements and act to strengthen monitoring capacity for water quality in the lower Araz River and western tributaries of the Kura River.

In the longer term in relation to Georgia, continue cooperation arrangements as follows:

- establish coordinating arrangements at technical and operation level,
- develop real time warning systems as required,
- agree notification procedures,
- develop agreement on waters of the Kura River.

In the longer term in relation to Iran, if assessment of flood impacts shows potential for

significant further flooding in Azerbaijan:

- propose cross-border flood study,
- agree study results to be used as benchmark for further action,
- agree principles for further flood protection schemes, based on minimization of impact by both parties.