



Setting targets for sustainable water management: the Armenian approach in the Marmarik basin

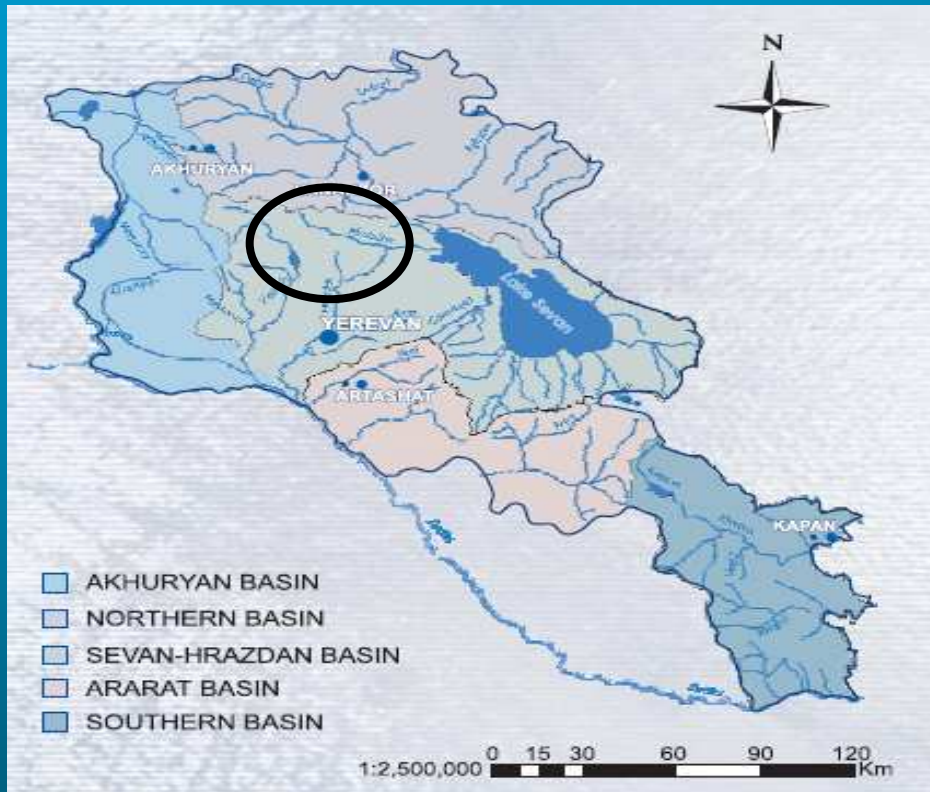
Dr Rainer Enderlein, UNECE

Dr Volodya Narimanyan, Armenia

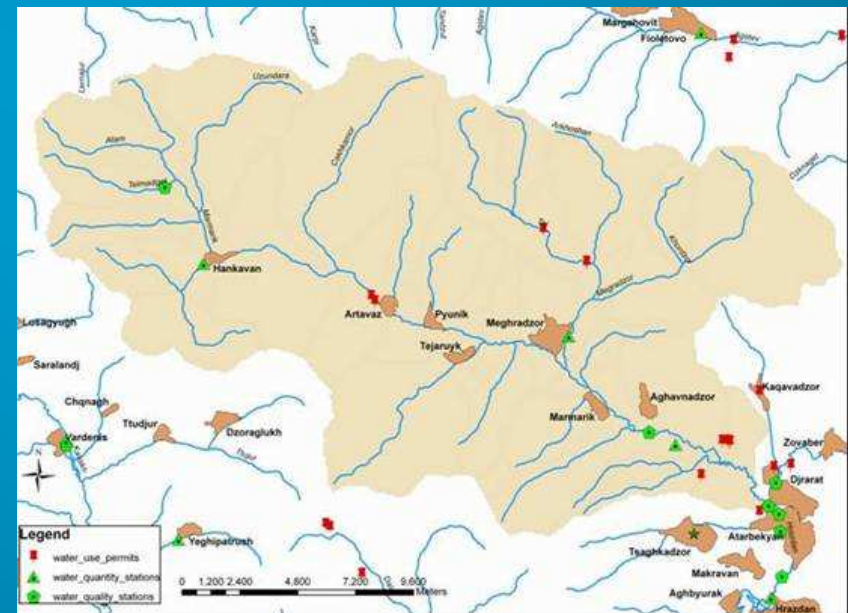
Dr Vahagn Tonoyan, Armenia



- **Identification of key stakeholders**
- **Baseline analysis**
- **Desired conditions** (e.g. requirements of the Protocol, Water Convention, WFD, ...)
- **Prioritization** (e.g. feasibility study, approximate cost assessment and cost-benefit analysis)
- **Broad consultations**
- **Agreement on targets, target dates and relevant programme of measures**



Marmarik basin





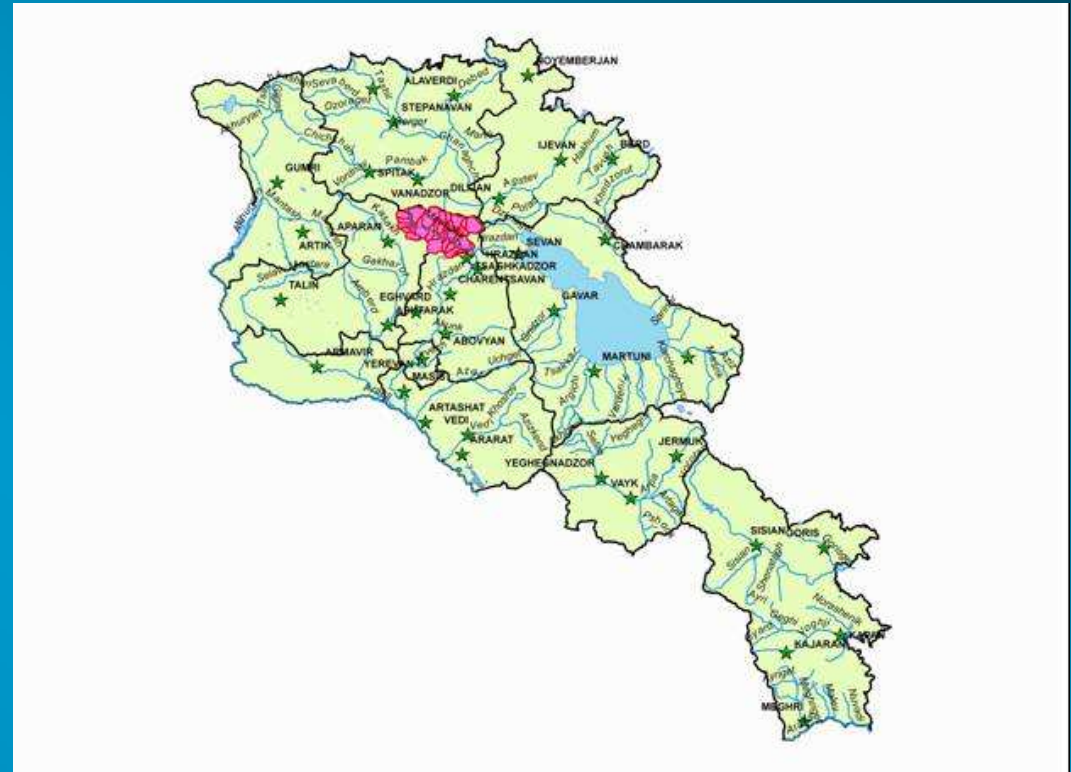
Summary information

Settlements – 12

Population – 7700

Territory – 418 km²
(13% is forest cover)

Hydrological reserve – 93.5 km²



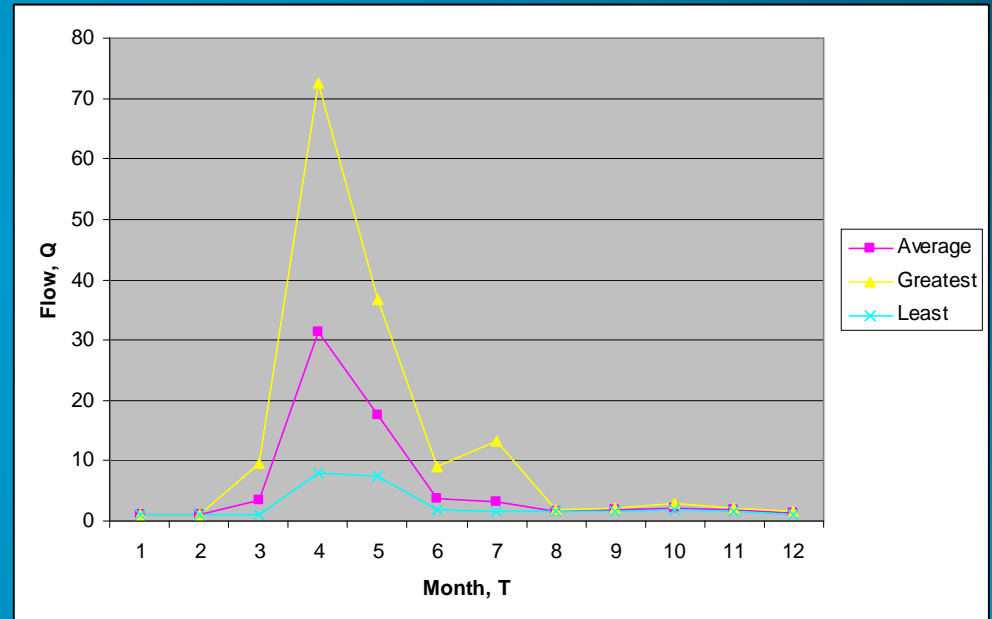


Analysis of hydrological characteristics

Water supply strategy

Water quality analysis

Assessment of anthropogenic and natural impact on water





Baseline condition: water quality

		Ջրագույնի տեսակը կամ ջրային ռեսուրսի պայմանական նշանակությունը										
		Չկատարյալ				Կատարյալ			Խմելու			Ոռոգման
Դիտարկման համարը	Յնակներ	Օրեգնային	Կանարական	ՋՍՏԿԻ	Համախմբված զործակից	Կանարական	ՋՍՏԿԻ	Համախմբված զործակից	Կանարական	ՋՍՏԿԻ	Համախմբված զործակից	Իրիգացիոն զործակից
57	2006	73.4	95.9	0.25	2.22	100	0	0	100	0	0	
	Որակի կարգը	4	1	1	1	1	1	1	1	1	1	1
	Գնահատականը	Poor	Excellent	Excellent	Good	Excellent	Excellent	Good	Excellent	Excellent	Good	Excel
58	2006	73.9	55	2.11	7.19	80.5	0.83	2.83	93.6	0.52	0.98	
	Որակի կարգը	4	3	3	1	2	1	1	2	1	1	1
	Գնահատականը	Poor	Marg	Fair	Good	Good	Excellent	Good	Good	Excellent	Good	Excel
57	2007	73.9	80.7	1.09	5.16	87.1	0.4	1.89	93.7	0.4	1.39	
	Որակի կարգը	4	2	2	1	2	1	1	2	1	1	1
	Գնահատականը	Poor	Good	Good	Good	Good	Excellent	Good	Good	Excellent	Good	Excel
58	2007	64.4	84.3	0.67	3.02	88.4	0.63	3.02	96.2	0.30	0.79	
	Որակի կարգը	4	2	2	1	2	1	1	1	1	1	1
	Գնահատականը	Poor	Good	Good	Good	Good	Excellent	Good	Excellent	Excellent	Good	Excel



Climate change adaptation measures not yet considered

Դիտարկման համար	Յուրացման թվական	Միջազգային մակարդակ									Ներքին մակարդակ	
		Օրեգնային	Կանադական	ՋԱՏԿԻ	Համալիր թվեր	Կանադական	ՋԱՏԿԻ	Համալիր թվեր	Կանադական	ՋԱՏԿԻ	Համալիր թվեր	Բեխթեմի թվեր
57	2006	73.4	95.9	0.25	2.22	100	0	0	100	0	0	
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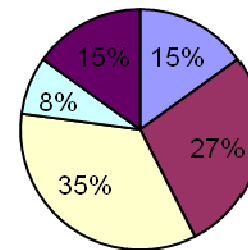
Public involvement

Questionnaires

170 residents, 30 representatives of major water users and local self-governance authorities

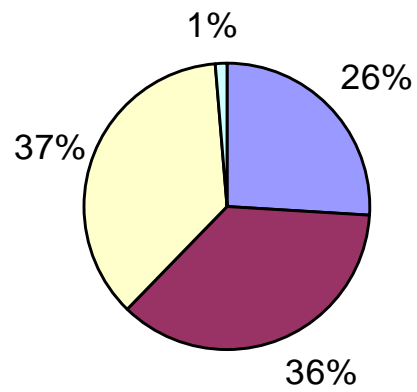


Damage caused due to disasters



- Infrastructure
- Plough land
- Farms adjacent to houses
- Livestock
- No damage

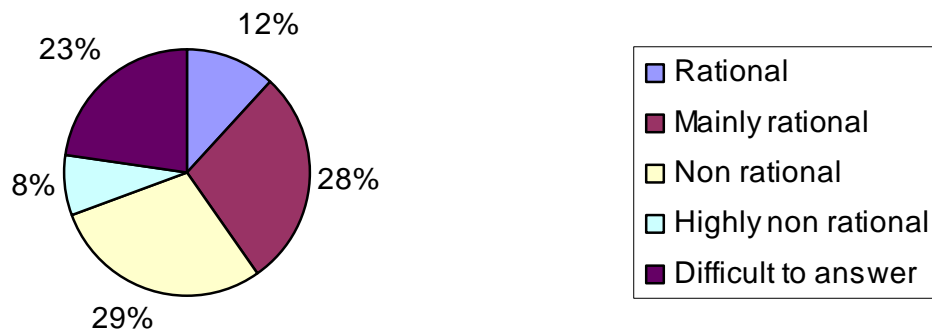
Proposed measures against disasters



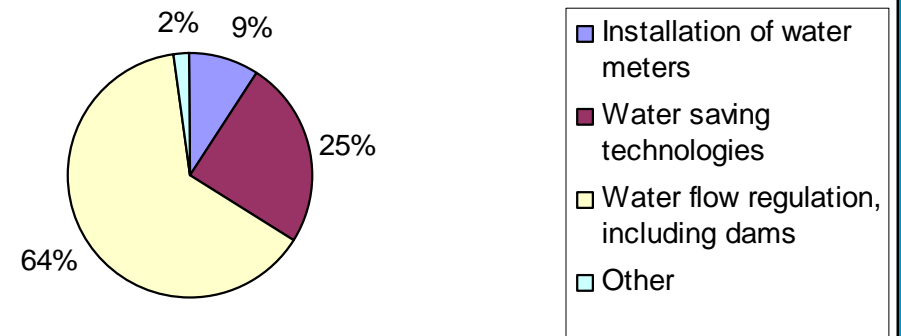
- Regulation of flow
- Flood control structures
- Water discharge
- Other



Water use efficiency

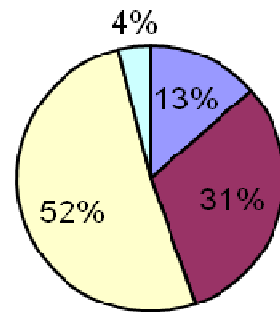


Proposed approach for rational use



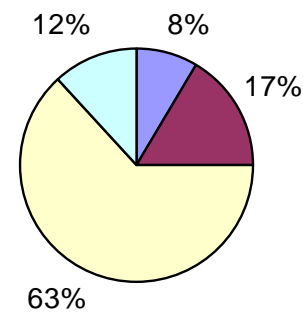


Drinking water quantity



- Sufficient
- Partially sufficient
- Insufficient
- Difficult to answer

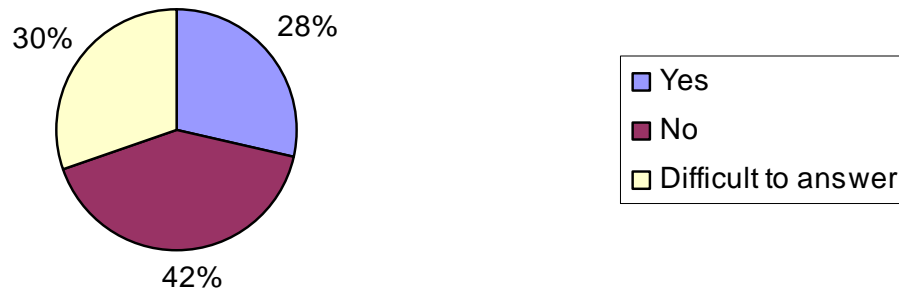
Irrigation water quantity



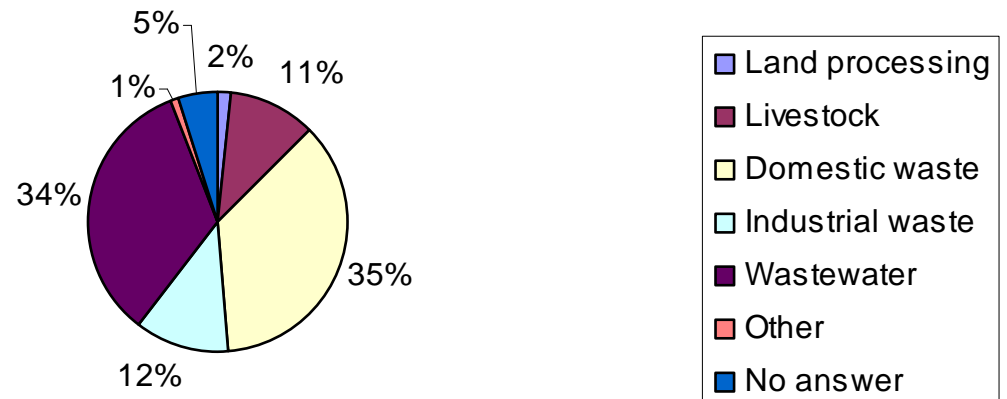
- Sufficient
- Partially sufficient
- Insufficient
- Difficult to answer



Are there water related diseases?



Main source of water pollution





WORKS IMPLEMENTED BY OTHER DONORS

River basin planning guidelines developed with the support of USAID

Impact of climate change of water resources in Marmarik basin within UNDP project

Pilot project in Marmarik River Basin within EU TACIS Water Governance Project



Challenges

See handouts with ten target directions of work

See table with measures/actions

- § Legal framework
- § Necessity for strengthening the institutional set up
- § Technical measures

In addition

- § Improvement of coordination and cooperation
- § Strengthening of capacities of RBMO

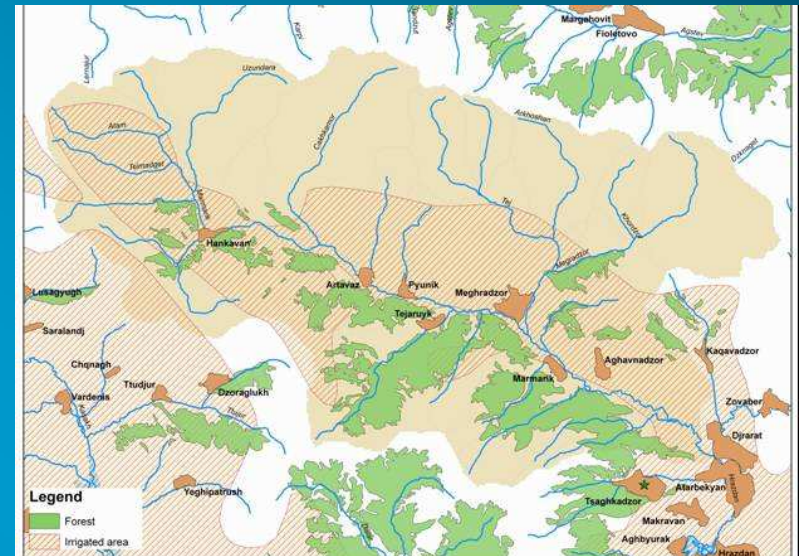


Water use in 2007–12.5 million m³

Hydropower - 3 million m³

Irrigation demand – 49 million m³

Irrigation period – water demand deficit



=== > Dam construction programme (33 million m³) ???????



Identification of legal, institutional and technical measures to achieve desired conditions; preliminary cost estimate (USD)

Desired conditions	Legal	Institutions	Technical	Total
Quantity	670,000	360,000	7,400,000	8,430,000
Quality	480,000	45,000	2,800,000	3,325,000
Total	1,150,000	405,000	10,200,000	11,755,000

Total amount equals 1,500 USD per inhabitant



Costs of the project (without UNECE secretariat's involvement)

Experts: 16,000 USD

Meetings: 15,000 USD

Estimated amount to cover all basins:

250,000 – 300,000 USD