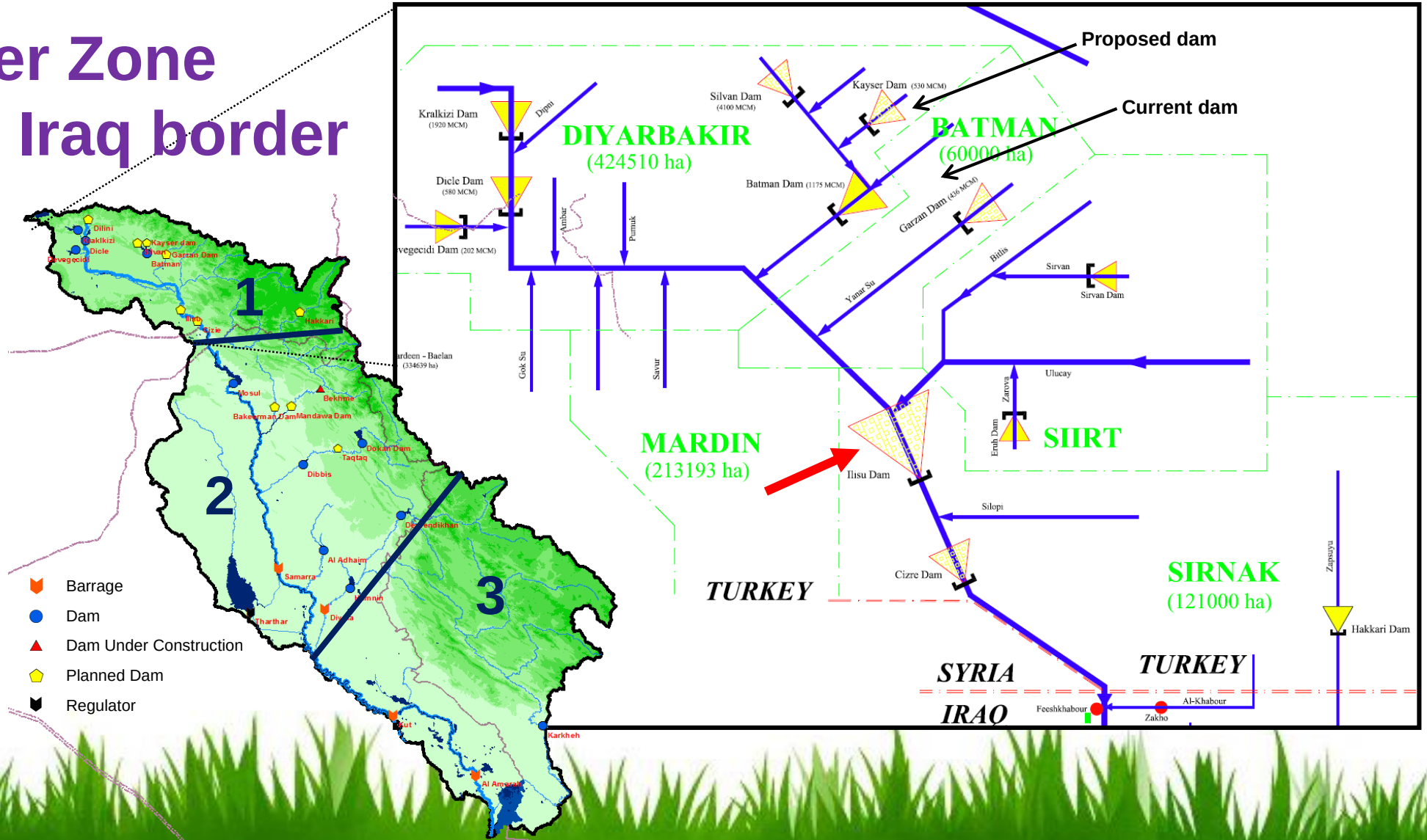
Trans-boundary Water Conflicts: Tigris River Basin case study

R. Srinivasan
Prasad Daggupati
Deepa Varma

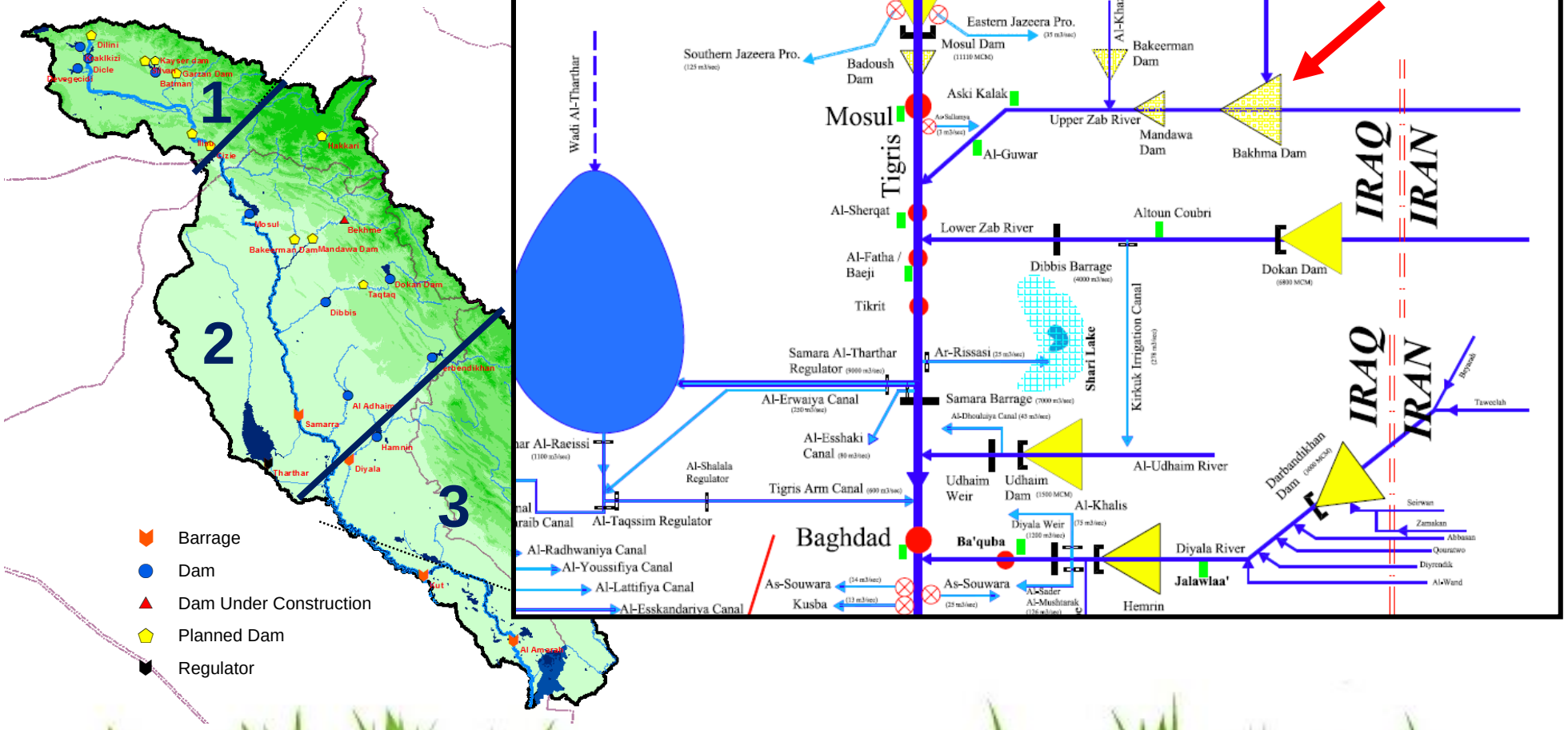
TEXAS A&M UNIVERSITY

Overview of Tigris river, tributaries and water structures feeding Hawizeh marsh

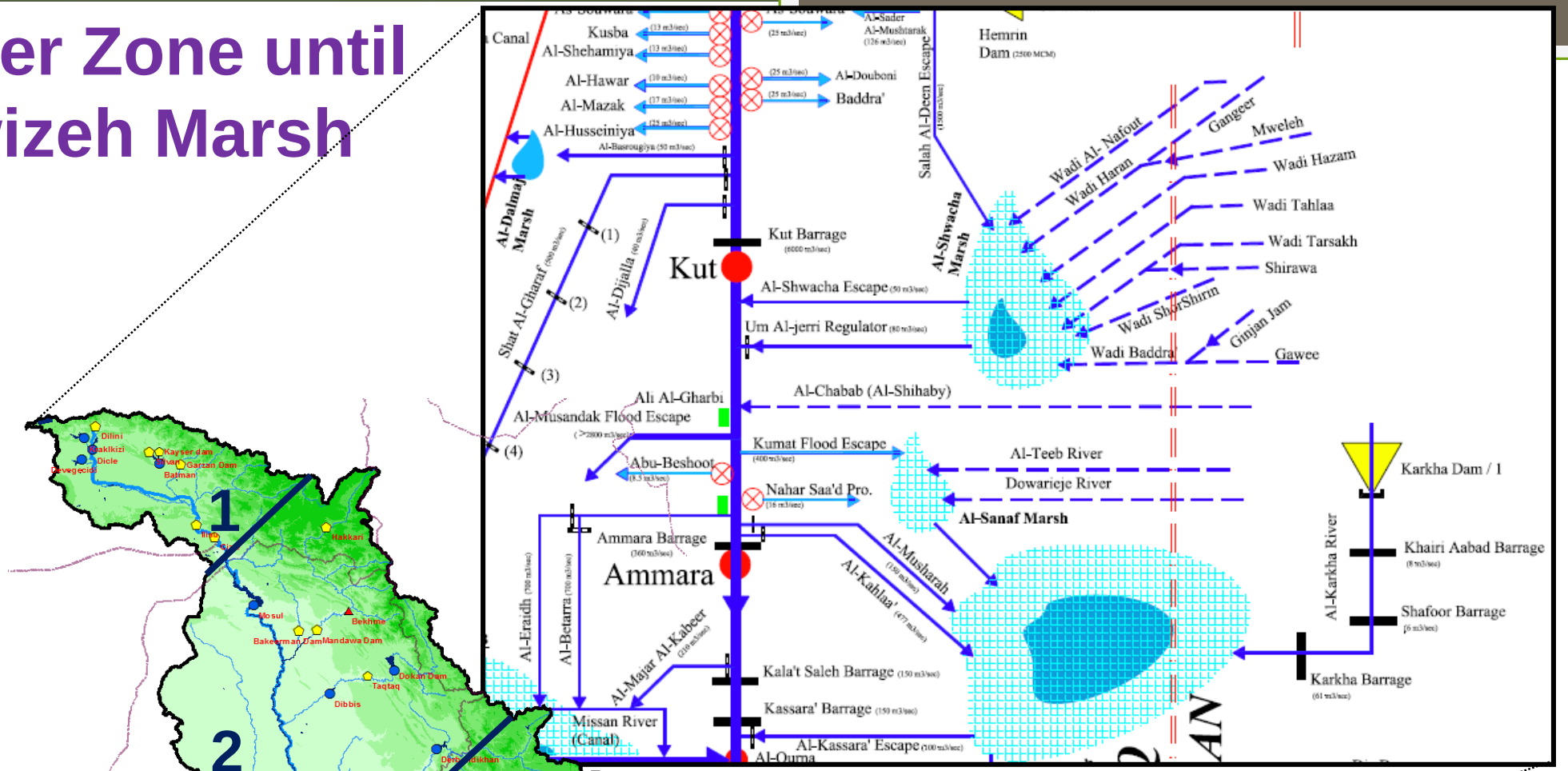
Upper Zone until Iraq border



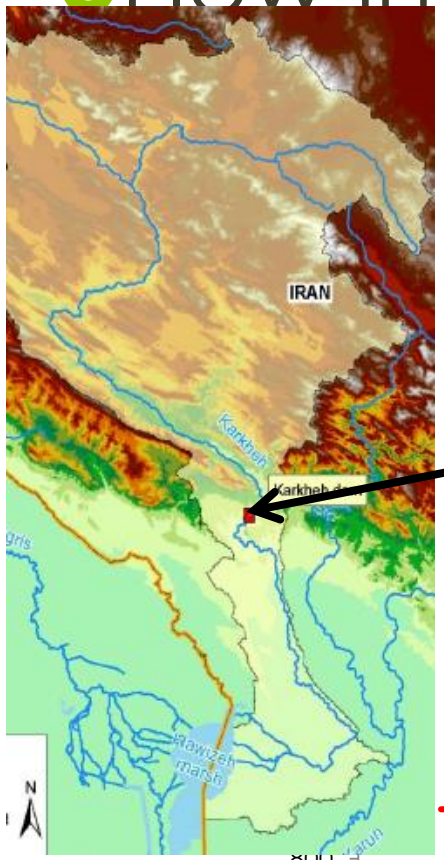
Middle Zone until Bagdad

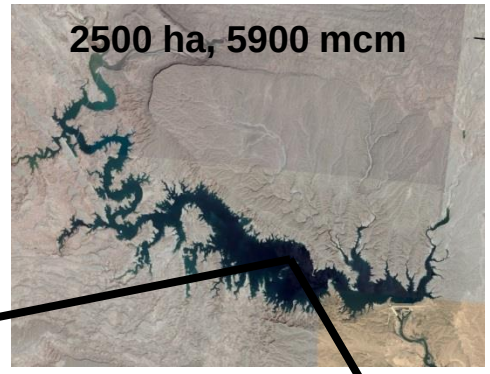


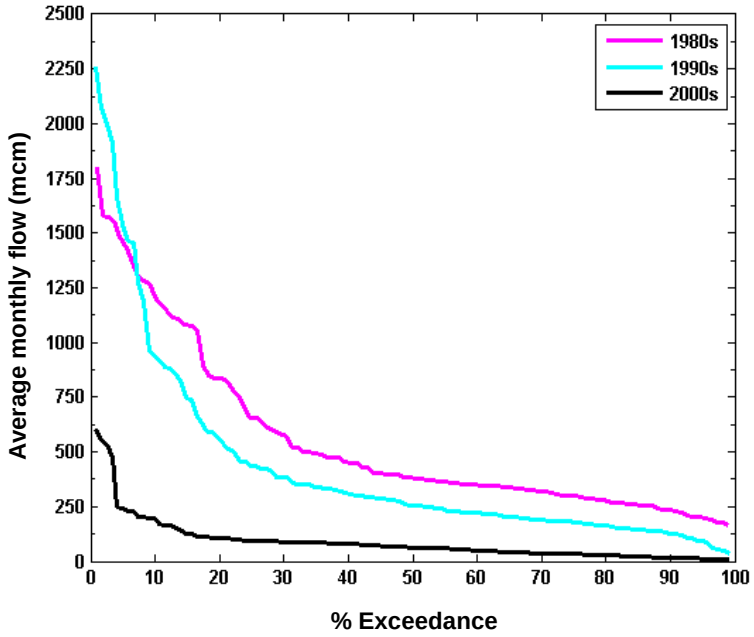
Lower Zone until Hawizeh Marsh

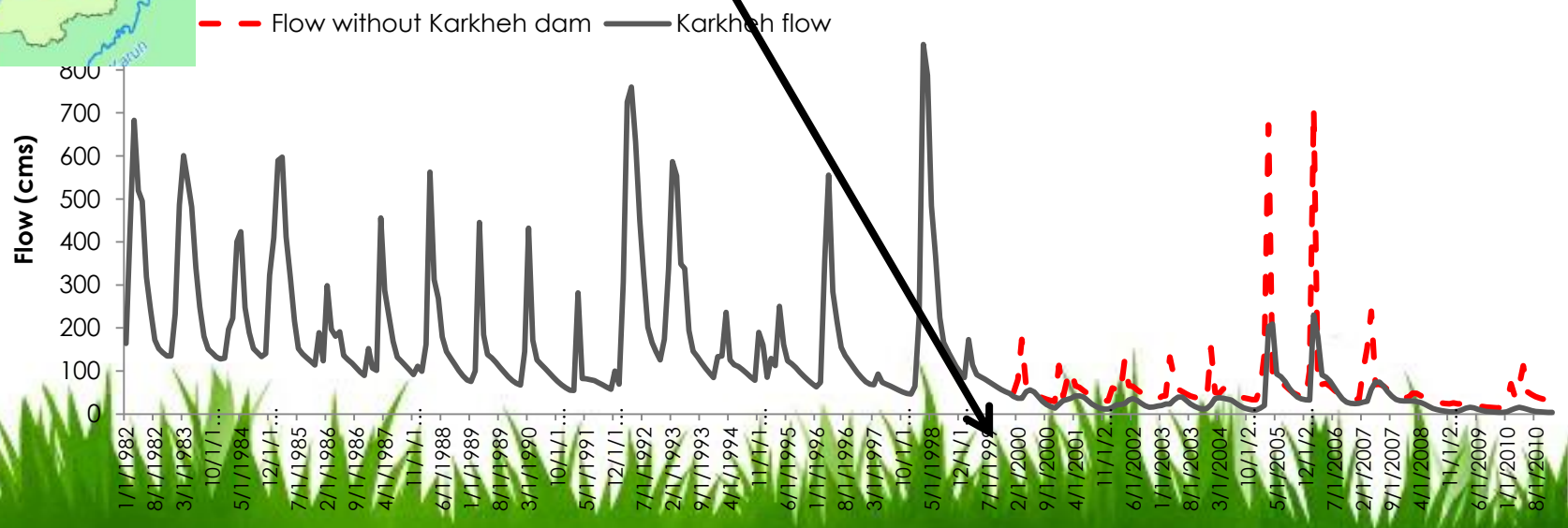


Flow into Hawizeh marsh from Karkheh

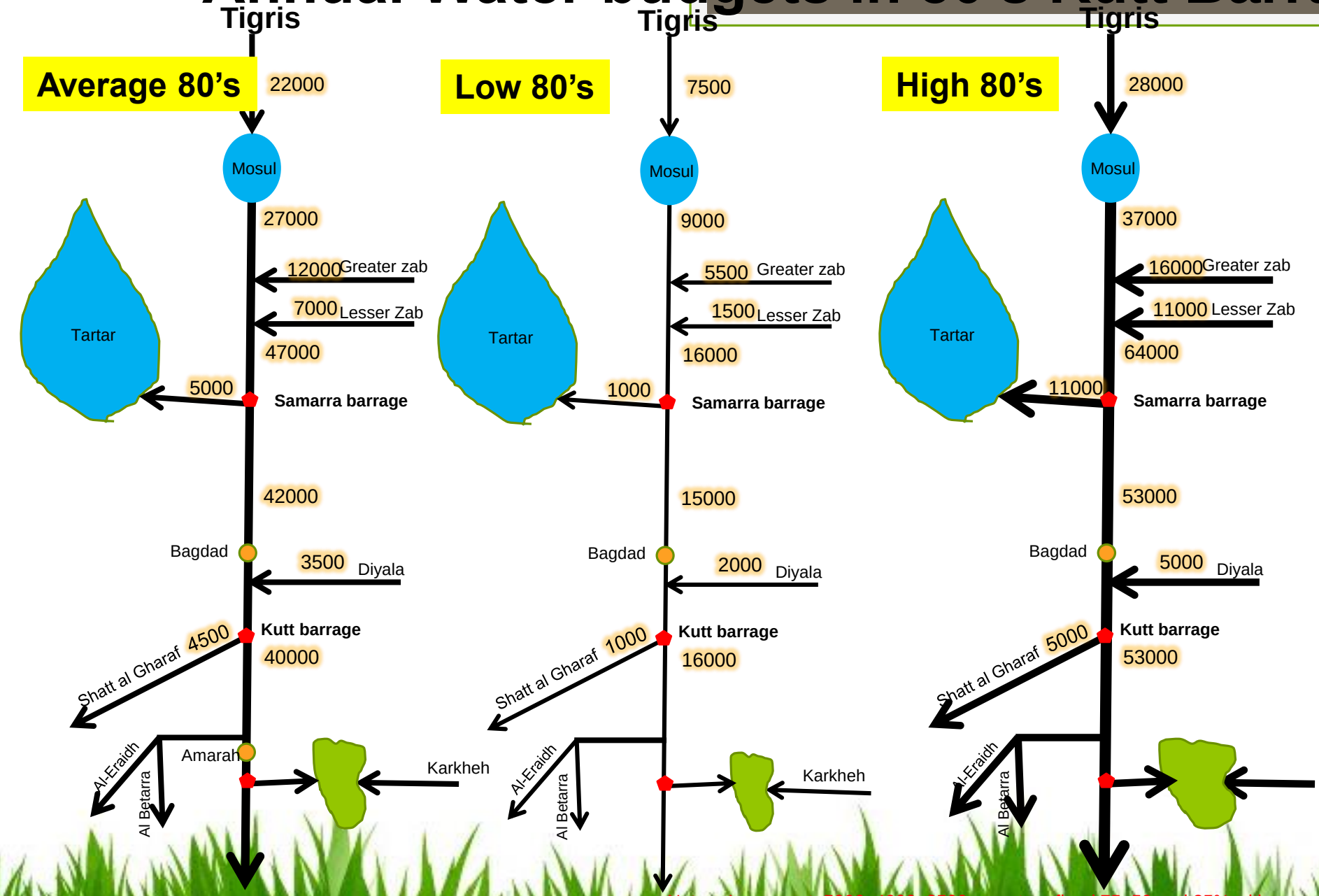








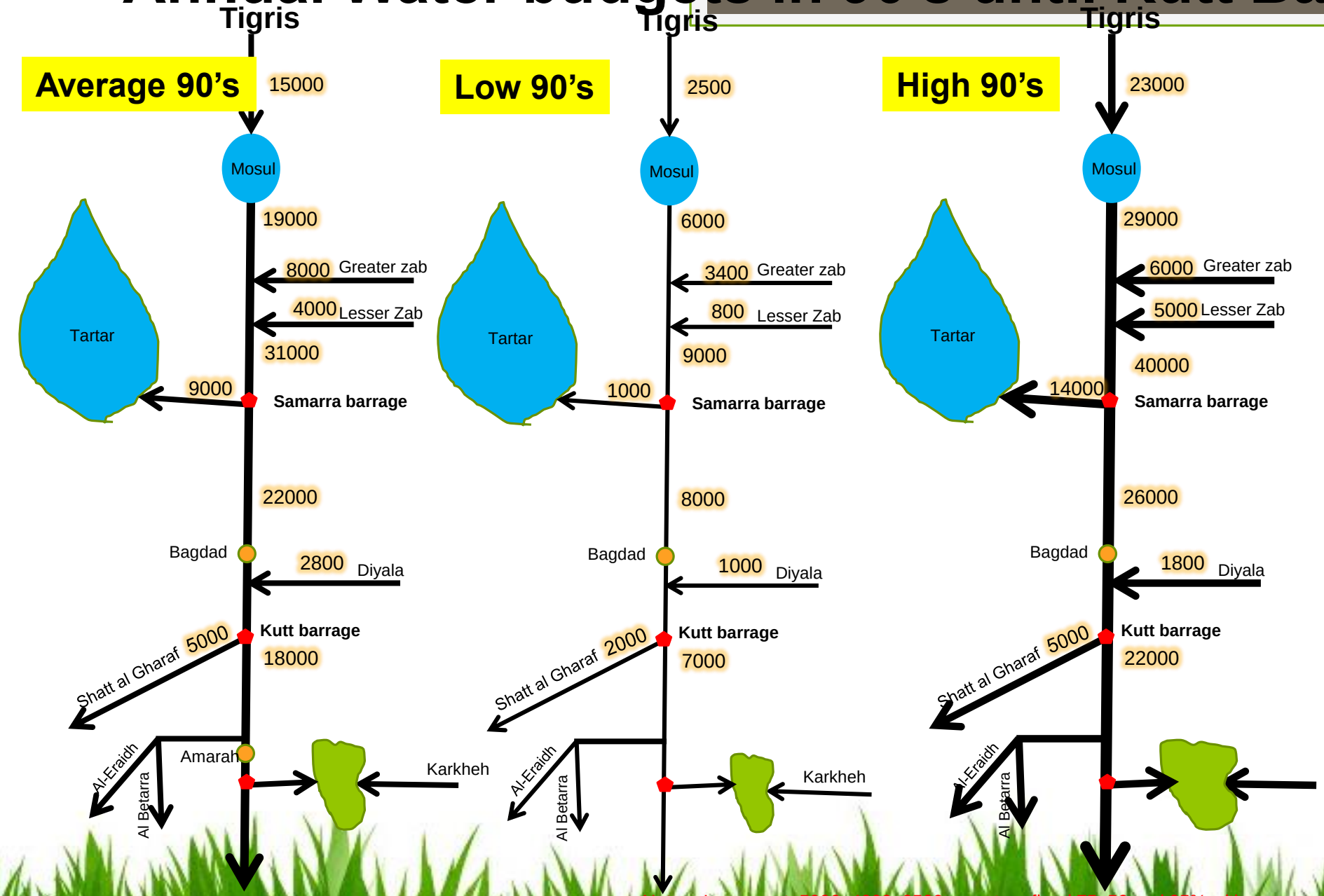
Annual Water budgets in 80's Kutt Barrage



All numbers above are average annual flow volume in mcm

Nature Iraq report: 5000, 4000, 2500 mcm to reflood 75, 50 and 25% with evaporative demand of 3000, 2000, 1500 mcm and with constant outflow of 2000 mcm

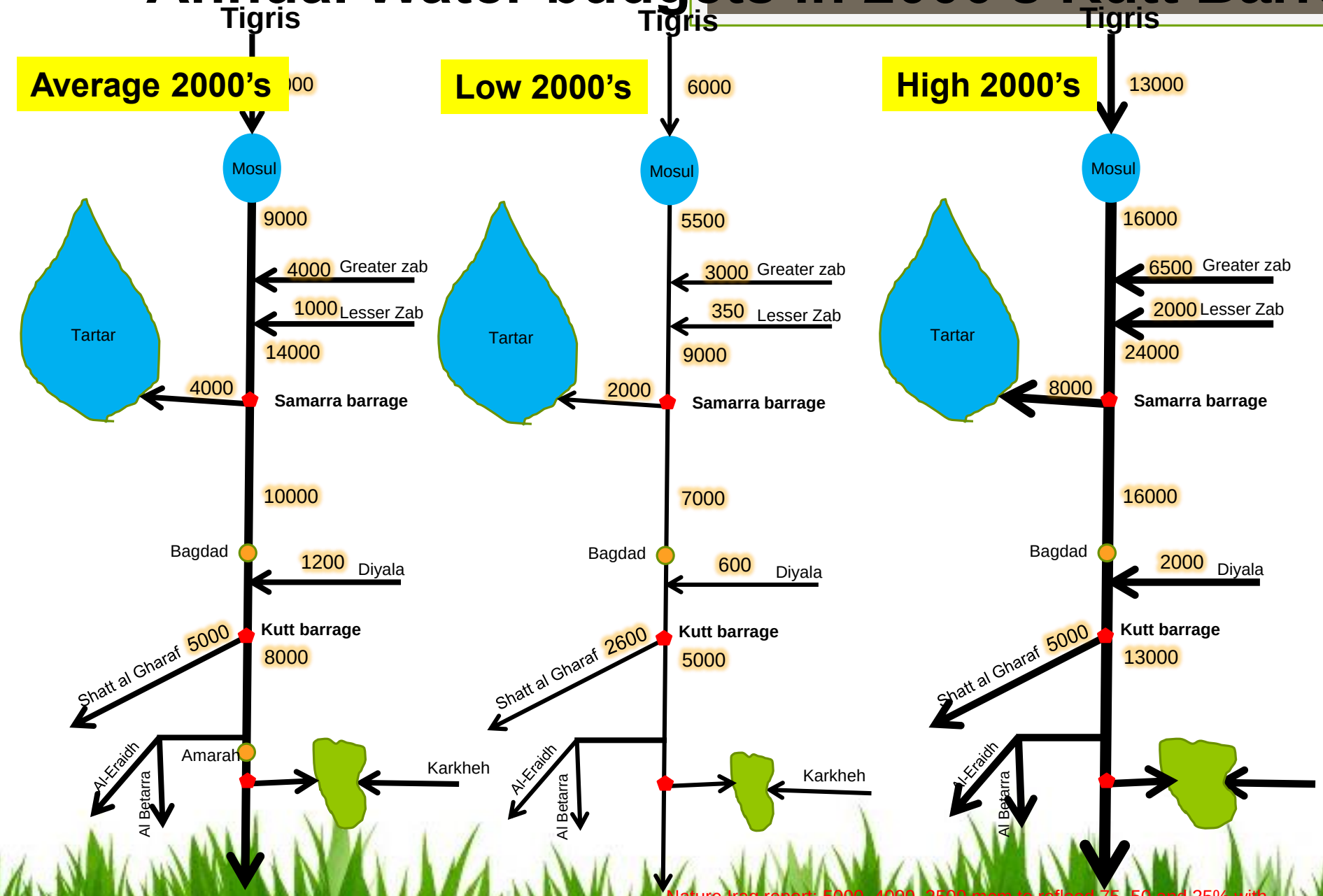
Annual Water budgets in 90's until Kutt Barrage



All numbers above are average annual flow volume in mcm

Nature Iraq report: 5000, 4000, 2500 mcm to reflood 75, 50 and 25% with evaporative demand of 3000, 2000, 1500 mcm and with constant outflow of 2000 mcm

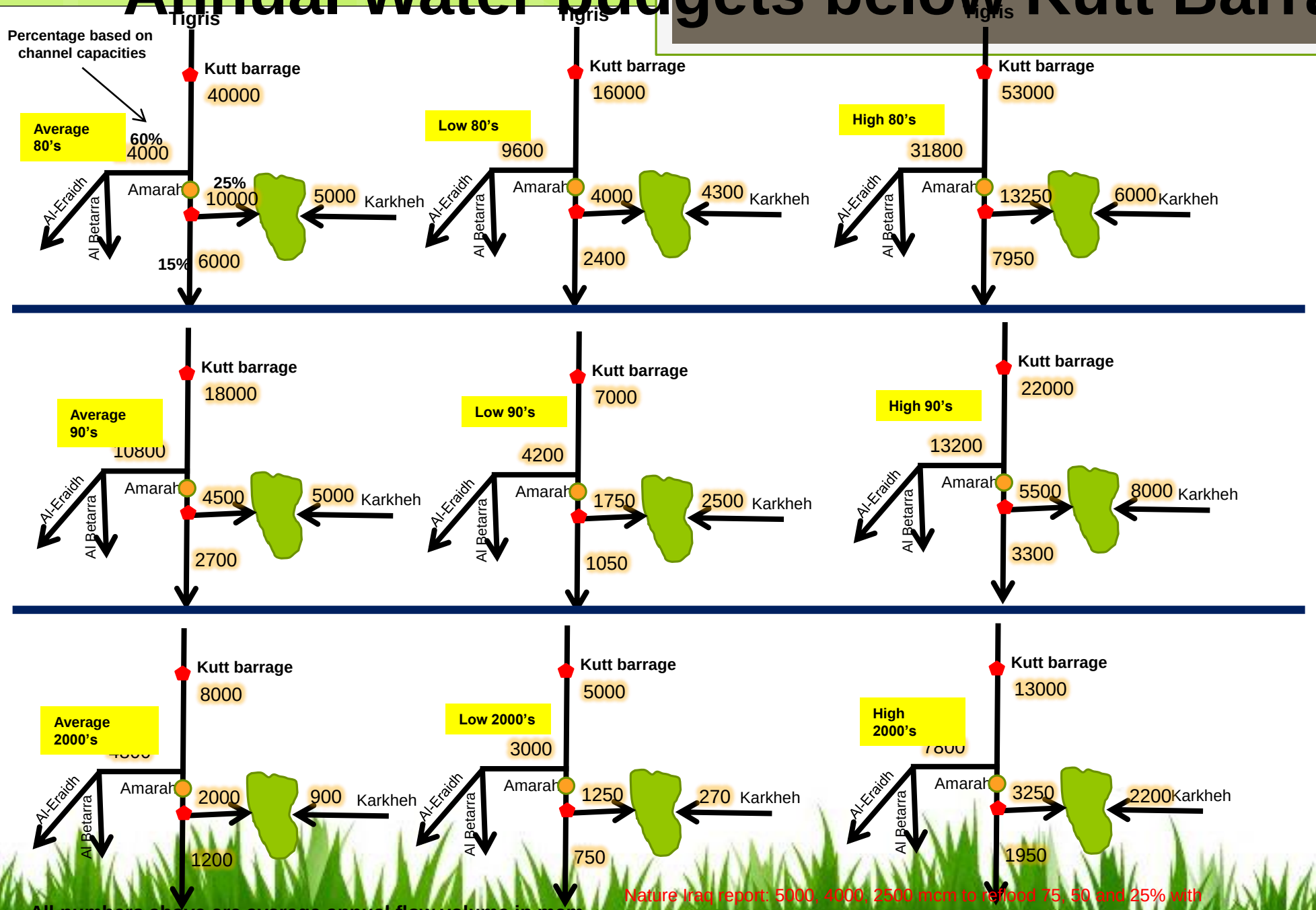
Annual Water budgets in 2000's Kutt Barrage



All numbers above are average annual flow volume in mcm

Nature Iraq report: 5000, 4000, 2500 mcm to reflood 75, 50 and 25% with evaporative demand of 3000, 2000, 1500 mcm and with constant outflow of 2000 mcm

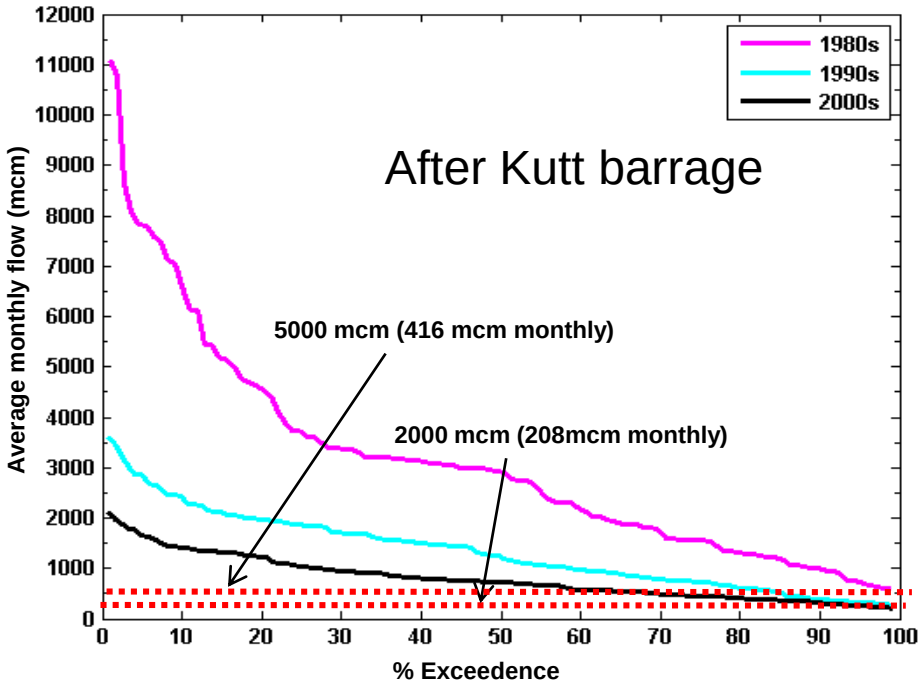
Annual Water budgets below Kutt Barrage

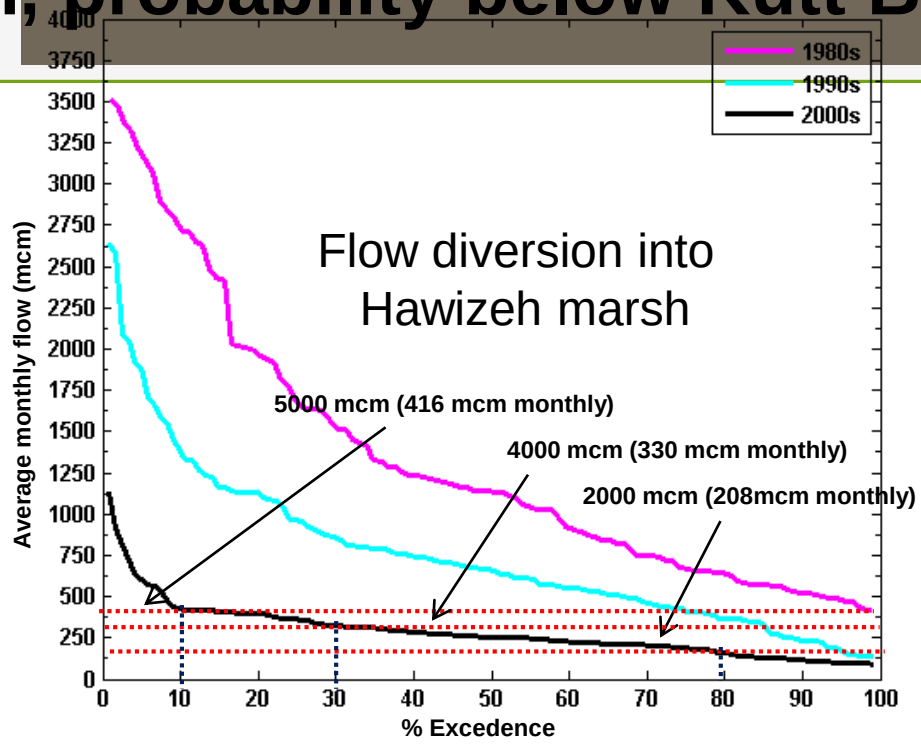


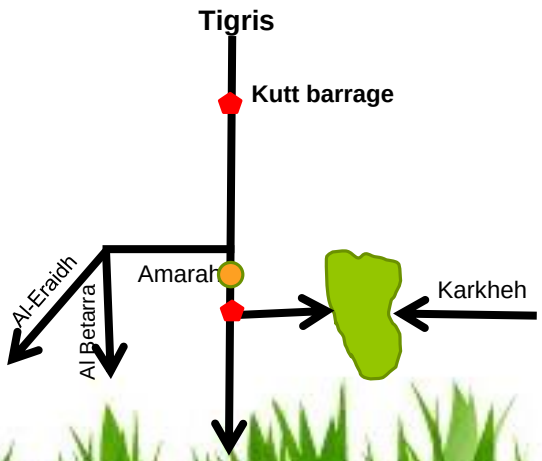
All numbers above are average annual flow volume in mcm

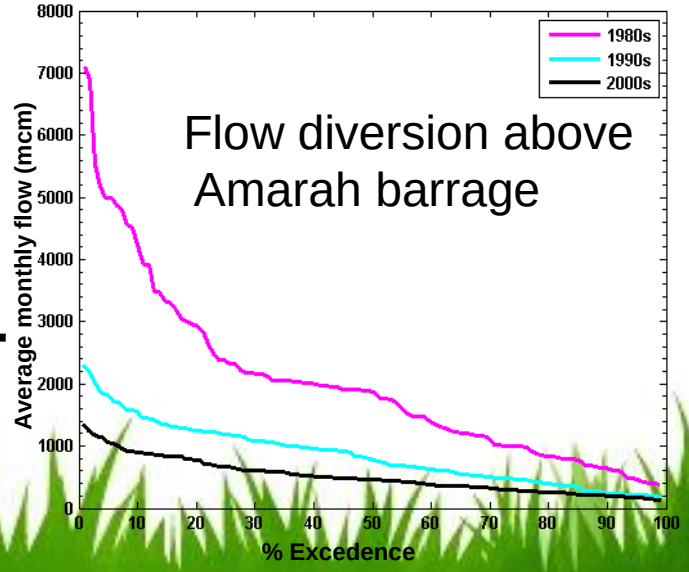
Nature Iraq report: 5000, 4000, 2500 mcm to reflood 75, 50 and 25% with evaporative demand of 3000, 2000, 1500 mcm and with constant outflow of 2000 mcm

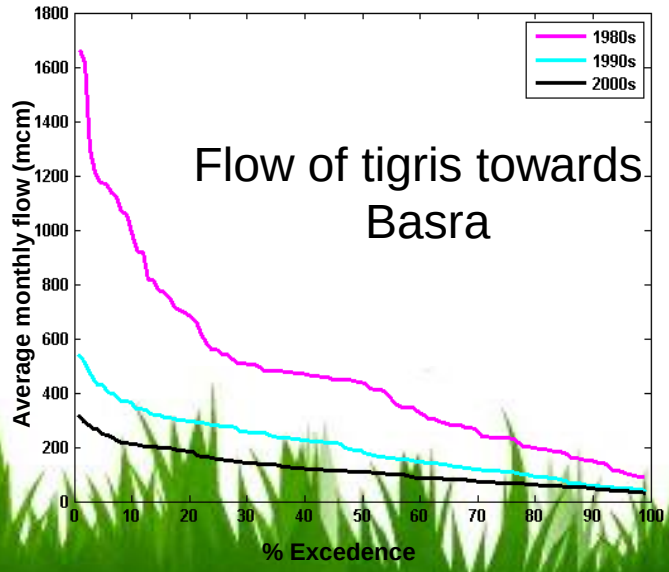
Flow intensity, duration, probability below Kutt Barrage







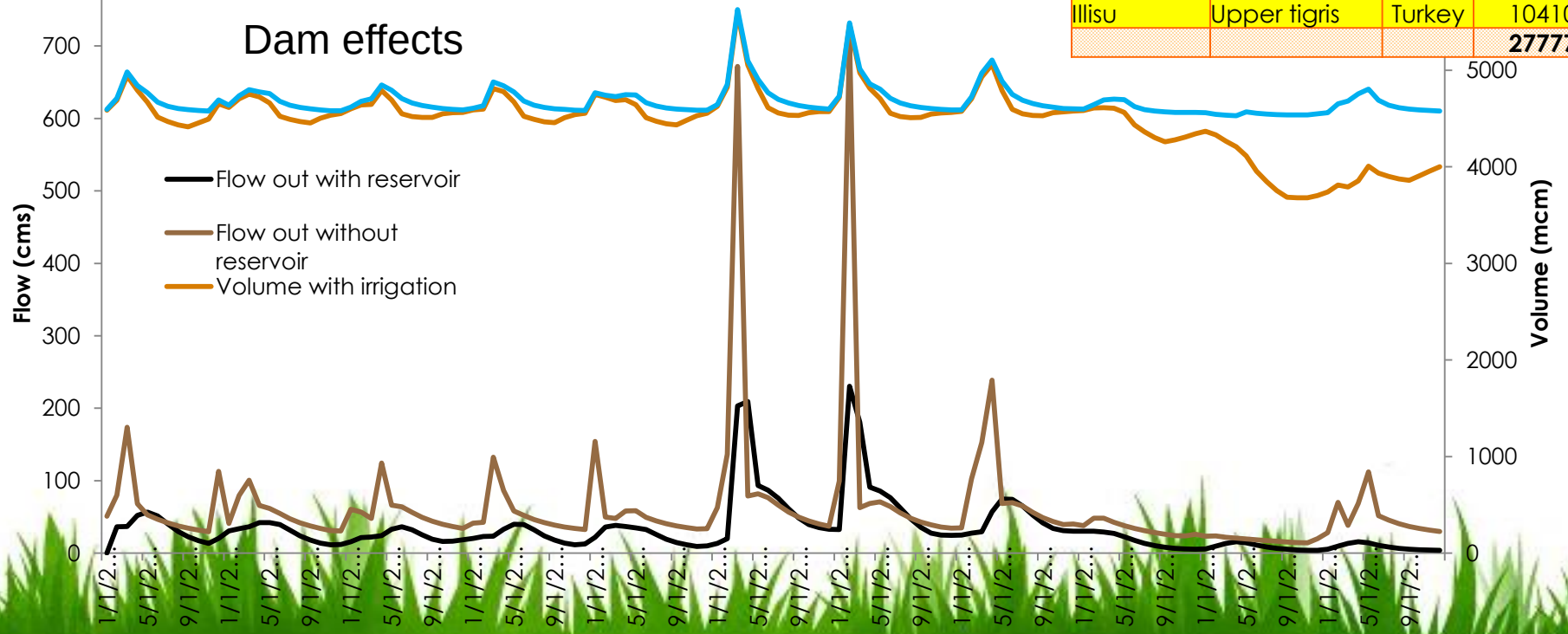




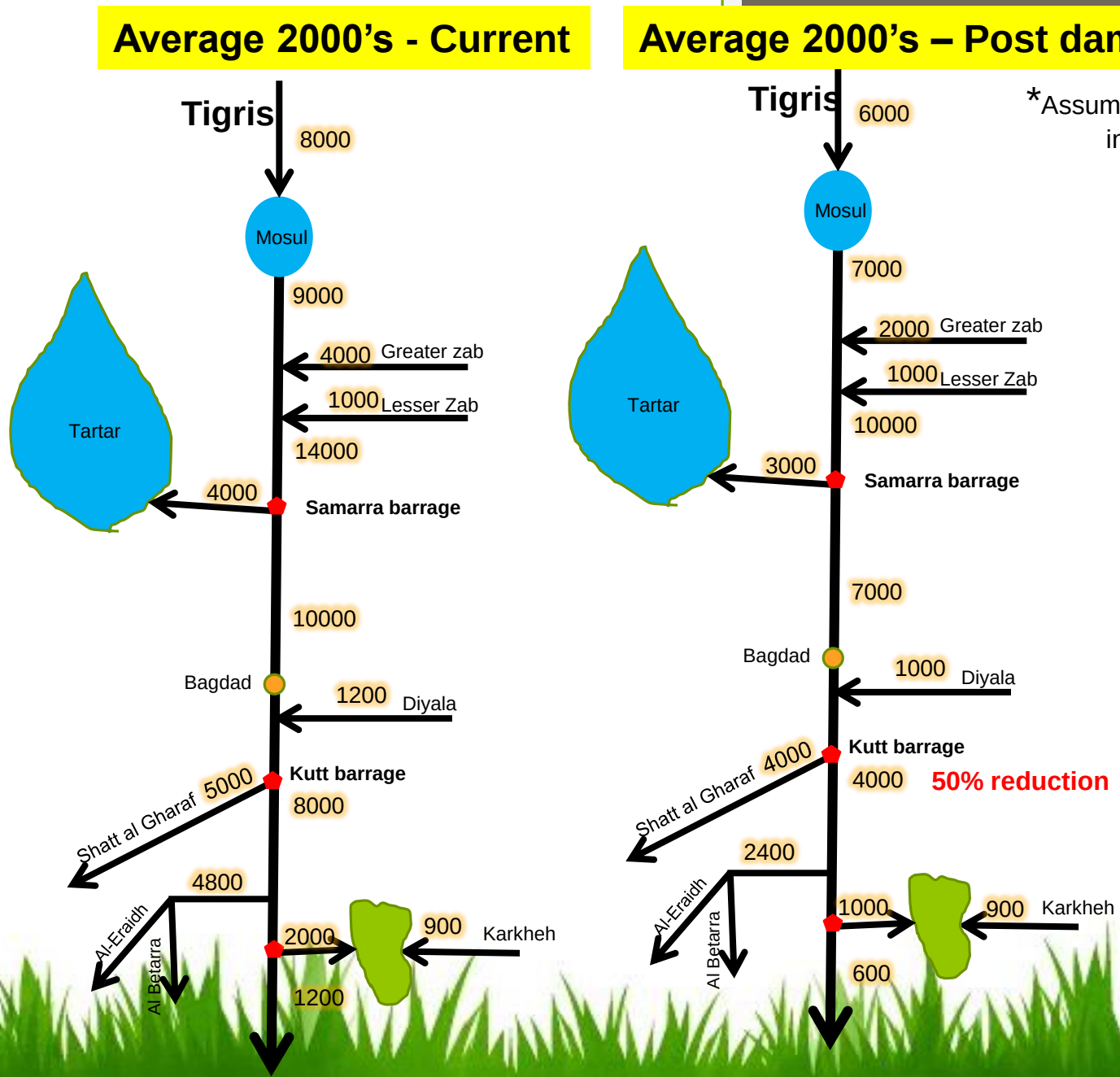
Dams

Current Dam	Volume (mcm)	Inflow (mcm)	Outflow (mcm)	% reduction	Evaporation (mcm)	evap/vol
Batman	1100	1105	874	21%	50	5%
Dicile	580	674	659	2%	24	4%
Kralkize	1920	342	305	11%	54	3%
Mosul	11110	18799	17972	4%	416	4%
Dokan	6800	5799	4587	21%	309	5%
Dibbis	4000	4953	3932	21%	154	4%
Hemrin	2500	3318	2670	20%	78	3%
Derbinkhan	3000	3250	2866	12%	142	5%
Karkheh	5900	1978	1086	**45%**	40	1%
Tartar	11000	9000	-	-	**2260**	**21%**
Total	**47910**	49219	35519		**3529**	

Future Dams	River	Country	Volume
Taqtaq	Lesser Zab	Iraq	2858
Bekhme	Greater zab	Iraq	8300
Bakeerman	Greater zab	Iraq	500
Mandava	Greater zab	Iraq	2000
Hakkari	Greater zab	Turkey	2000
Garzan	Trib upper tigris	Turkey	145
Kayser	Trib upper tigris	Turkey	1970
Dilini	Trib upper tigris	Turkey	200
Silvan	Trin upper tigris	Turkey	1175
Cizie	Upper tigris	Turkey	200
Illisu	Upper tigris	Turkey	10410
			27777



Current and Post Dams



*Assumptions based on current dam sizes, inflow and outflow calculations

Conclusions

- Open source of knowledge about water is key to avoid conflicts
- Open source models and data availability publically is very important
- Mekong river basin is a good example
- The water conflicts are well known in other river basins such as Ganges, Nile, Amazonia, Danube, Colorado and other major rivers around the world.
- As SWAT modelers we could model these basins and publish the information in a peer review process to bring focus to the problem and contribute to the awareness to countries that have no or poor information.


Thank you