PAWA – Pilot Arno Water Accounts

Final workshop

SEEA-W

System of Environmental-Economic Accounting for Water

Building Water Accounts for Arno sub-basins

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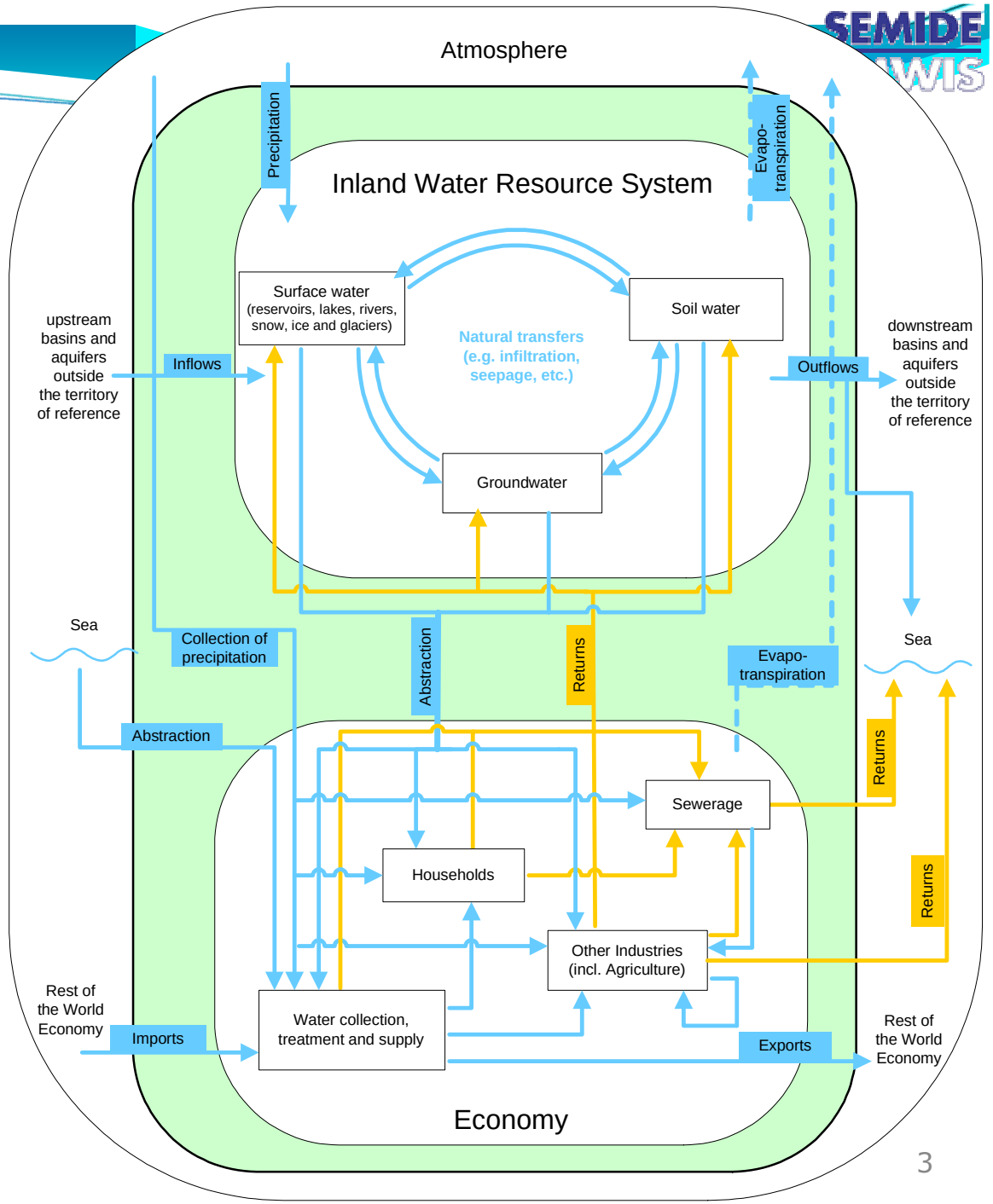
Content of the presentation

- UN and EU water account frameworks
- Building water accounts – PAWA approach
  - Water flow diagrams
  - Data collection
  - Tool for generating water accounts tables
  - Example of results

SEEA-W

- System adopted by UN
- Comprehensive international recommendations for water statistics

- Provides comprehensive, consistent and comparable policy relevant information
- Covers the full water cycle
- Stocks and flows
- linking water information with economic information
- Built on existing capacity and stakeholder owned information



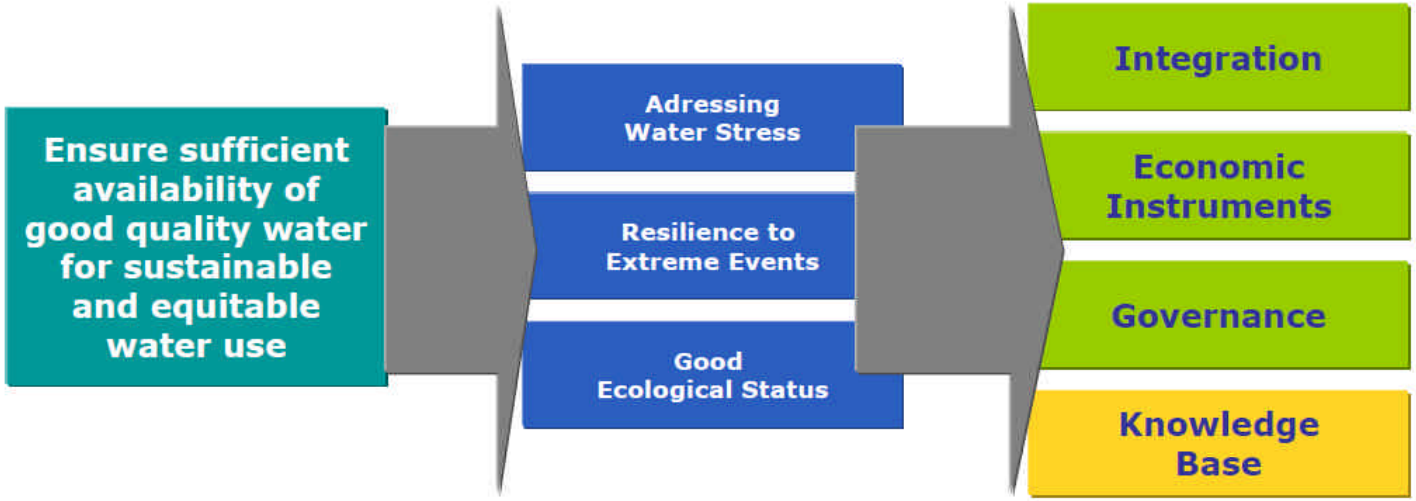
12 Standard Tables of SEEA-Water

1. Physical supply
2. Physical use
3. Gross and net emissions (of pollution)
4. Emissions (of pollution) by Sewerage Industry (ISIC 37)
5. Hybrid (Monetary and Physical) supply
6. Hybrid use
7. Hybrid supply and use
8. Hybrid water supply and sewerage for own use
9. Government accounts for water related collective consumption services (Monetary)
10. National expenditure for waste management (Monetary)
11. Financial accounts for waste water management (Monetary)
12. Asset account (Physical)

Plus 12 Supplementary tables

EU approach

Blueprint Objectives



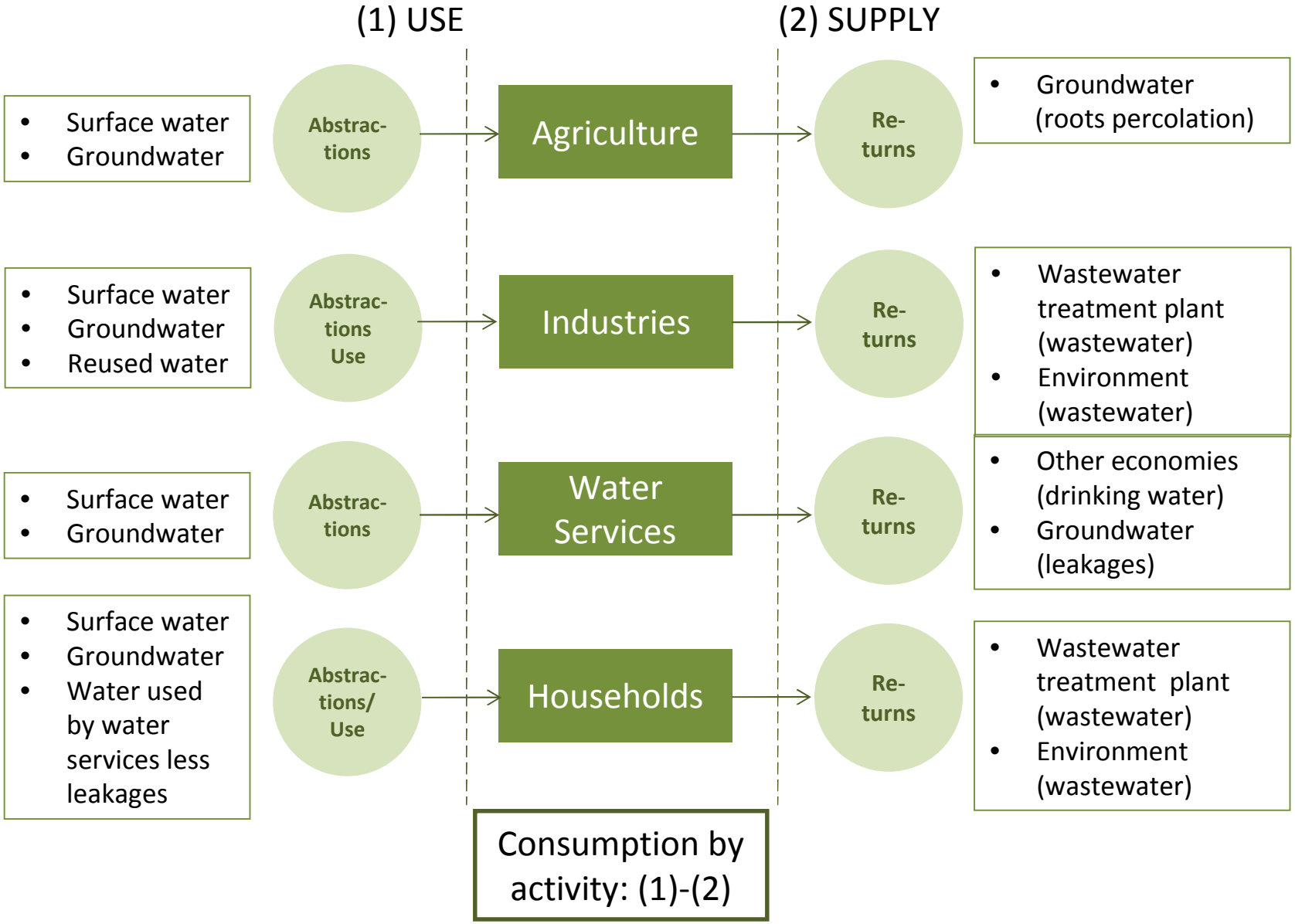
Knowledge-Policy Interface

- EU Water balances as indicator for water scarcity
- Based on UN-SEEA-W methodology (2007)
- Shift from **Year / Country** to **Month / sub-basin**

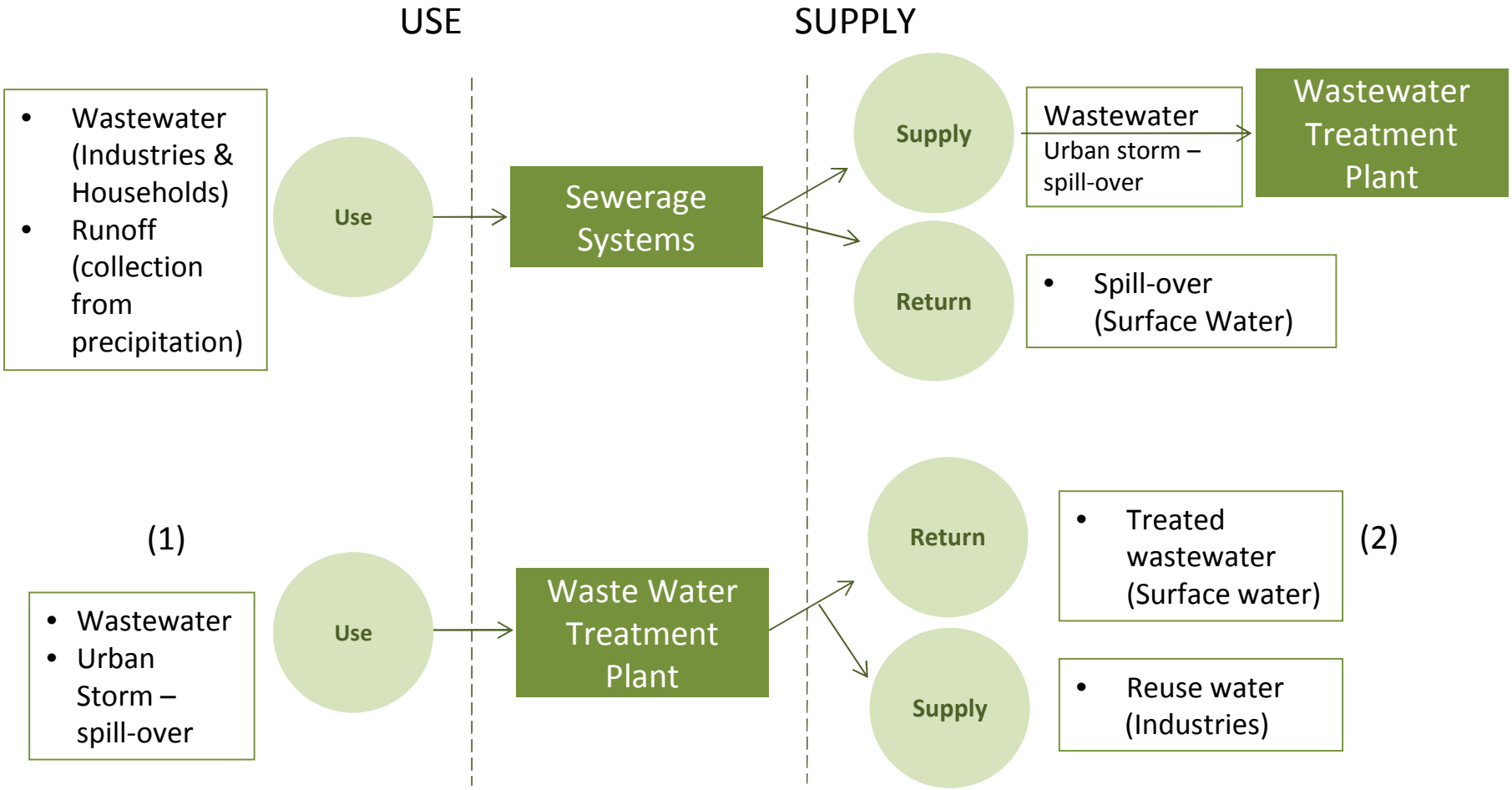
Process used for the PAWA project

- Definition of water flow diagrams
  - Identification of data items necessary
  - Validation with stakeholders
- Data collection
  - Estimation of missing items with stakeholders
- Data structuring and agregation in a database
- Tool for generating water account tables and indicators

Water Flow diagram - Use and supply 1



Water Flow diagram - Use and supply 2



Balance: Sewerage Systems + Waste Water Treatment Plant: (1)-(2)

Water Flow diagram – Asset accounts 1

OPENING STOCKS

The amount of available water at the beginning of the account period

Useful to know how much has the stock depicted.

Reservoirs	No use
Lakes	Only one in Chiana
Rivers	Not easy to use in the accounts
Surface Water	Addition of Reservoirs, Lakes & Rivers
Groundwater	Known & use
Soil Water	Not easy to use in the accounts

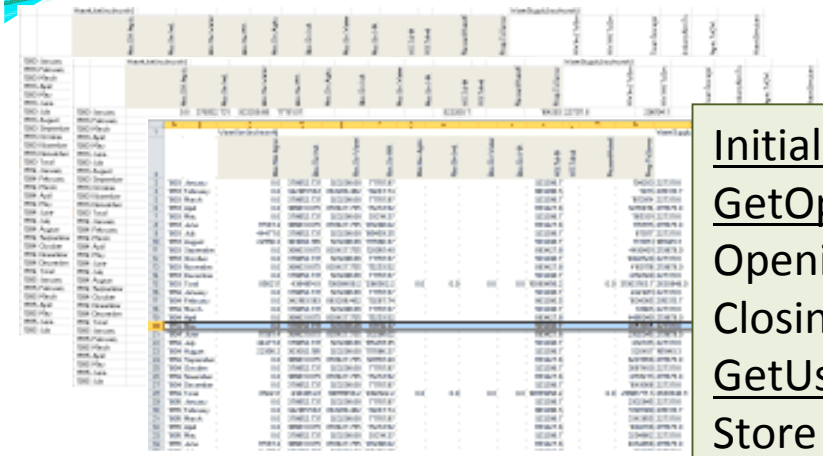
Water Flow diagram – Asset accounts 2

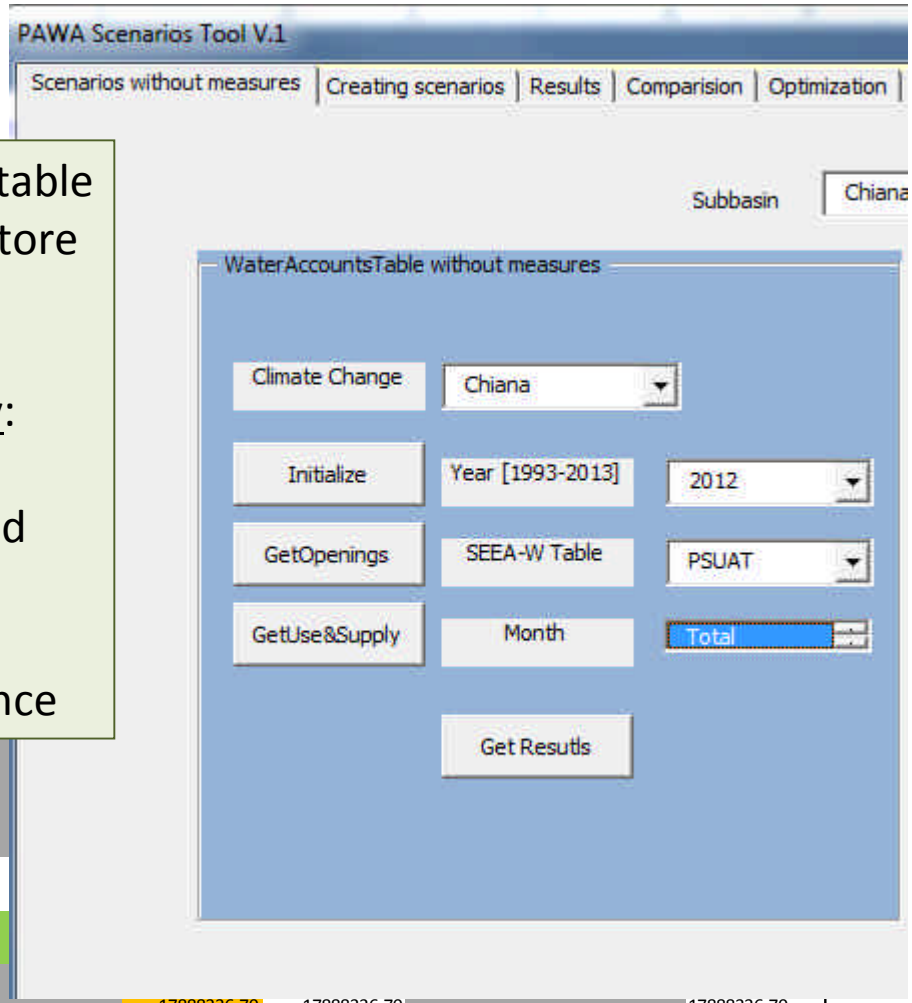
(1) Increasing stocks		(2) Decreasing stocks
• Returns from economy (treated water) plus spill-over • Other resources (Groundwater to Surface water)	Surface Water	• Abstractions • To other resources (Surface to Ground water)
• Returns from economy (Loses in distribution and agriculture) • From upstream territories • Other resources (Surface water to Groundwater) • Soil percolation	Ground Water	• Abstractions • To other resources (Groundwater to Surface water)
• Precipitation	Soil Water	• Evaporation • To other resources (To Groundwater)

Closing stocks=Opening stocks + (1)-(2)

Balance: Closing stocks-Opening stocks

Water accounts computing tool





Initialize: Clear table
GetOpenings: Store Opening and Closing stocks
GetUse&Supply: Store use and supply items and balance.
GetResults: Computes balance

A. Physical water use table (Table III.3) [m3]		Activities 1-3							
From the environment	1.a Abstraction for own use	145712							
	(Type of use) Hydroelectric power generation								
	Irrigation water	14571235.27							
	Mine water								
	Urban run-off (urban storm water)								
	Cooling water								
	Other								
	1.b Abstraction for distribution								
	1.i From inland water resources	14571235.27	2050027.69						
	Surface water	901235.27	50027.69						
	Groundwater	13670000.00	2000000.00						
	Soil water								
	1.ii Collection of precipitation					17888336.70	17888336.70		17888336.70
	1.iii Abstraction from the sea								
	1. Total abstraction (1.a+1.b(=1.i+1.ii+1.iii))	14571235.27	2050027.69		5165184.84		21786447.80	4229733.59	26016181.39
Within the economy	2. From other economic units		0.00			2718050.88	2718050.88	4235451.57	6953502.44
	Water services							4235451.57	4235451.57
	Reused water						0.00		0.00
	Wastewater to sewerage					2718050.88			2718050.88
	Desalinated water								
	3. TotalA (1+2)	14571235.27	2050027.69		5165184.839	11662219.23	33448667.03	8465185.16	41913852.18

Example of results: Use Chiana 2012

A. Physical water use table (Table III.9 in SEIS)		Activities						Households	Rest of the world (exports water)	Total
		Agric	Industry	Water Service	Sew	WWTP	Total			
From the environment	1.a Abstraction for own use	18 539 762	3 728 788				22 268 550	4 229 734		26 498 284
(Type of use)	Hydroelectric power generation									
	Irrigation water	18 539 762					18 539 762			18 539 762
	Mine water									
	Urban run-off (urban storm water)				25 278 831	15 167 299	25 278 831			25 278 831
	Cooling water									
	Other									
	1.b Abstraction for distribution			5 165 185			5 165 185			5 165 185
	1.i From inland water resources	18 539 762	3 728 788	5 165 185			27 433 735	4 229 734		31 663 468
	Surface water	4 869 762	1 728 788	1 895 185			8 493 735	309 734		8 803 468
	Groundwater	13 670 000	2 000 000	3 270 000			18 940 000	3 920 000		22 860 000
	Soil water									
	1.ii Collection of precipitation				25 278 831	15 167 299	25 278 831			25 278 831
	1.iii Abstraction from the sea									
	1. Total abstraction (1.a+1.b+1.i+1.ii+1.iii)	18 539 762	3 728 788	5 165 185			27 433 735	4 229 734		31 663 468
Within the economy	2. From other economic units	-	-	-	6 945 792	6 945 792	13 891 585	4 235 452		18 127 036
	Water services		-					4 235 452		4 235 452
	Recycle/Reused water		-				-			-
	Wastewater to sewerage				6 945 792	6 945 792	6 945 792			6 945 792
	Desalinated water						-			-
	3. Total A (1+2)	18 539 762	3 728 788	5 165 185	32 224 623.1	22 113 090.8	49 546 826	8 465 185		55 776 559

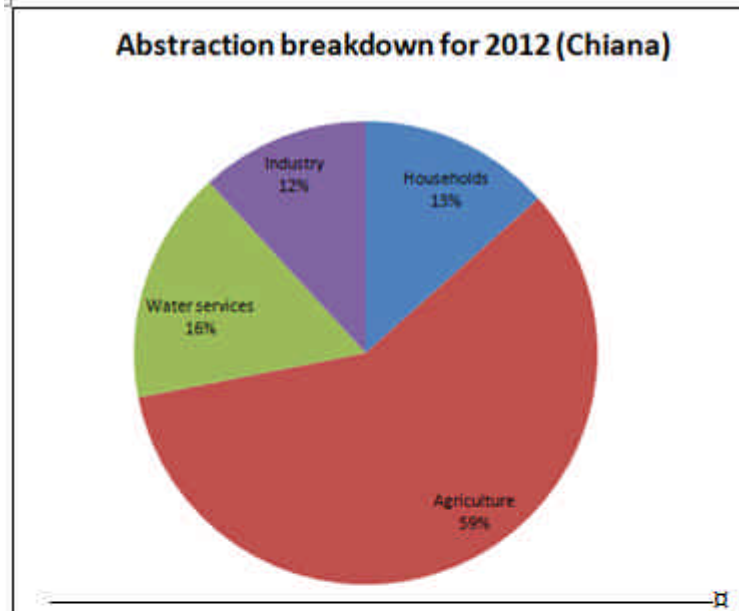
- grey cells for not applicable items;
- red for missing existing items (data not available);
- orange for estimations;
- green for real measurements; and
- pink for data items generated as a result scenario processing.

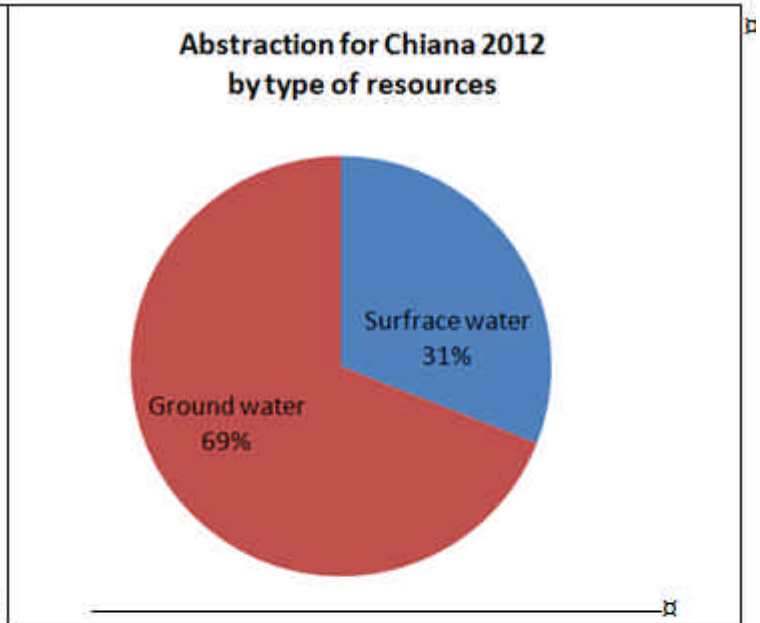
Example of results: Supply Chiana 2012

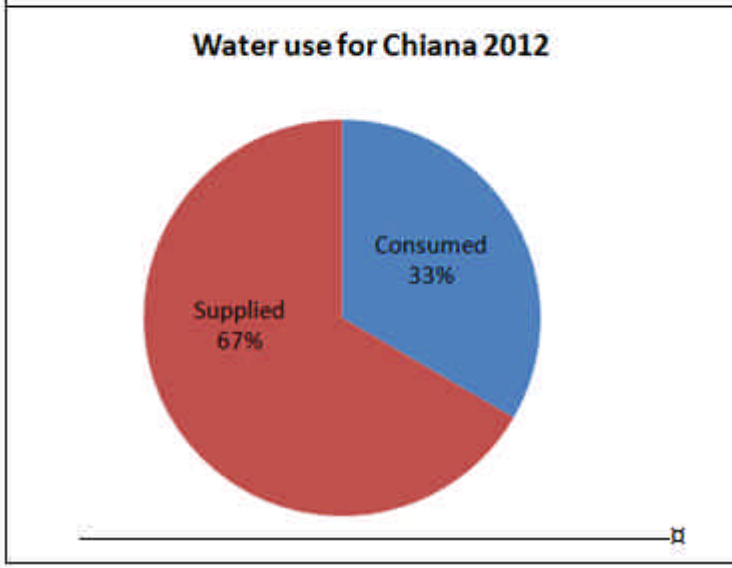
6. Physical supply table (Table 3.1) (m3)		Activities						Households	Rest of the world (Imports water)	Total
		Agric	Industry	Water Service	Sew	WWTP	Total			
Within the economy	4. To other economic units		1 864 394	4 235 452	22 113 091	-	6 099 846	5 081 398		11 181 244
	4.a Reused water					-	-			-
	4.b Wastewater to sewerage		1 864 394		22 113 091		1 864 394	5 081 398		6 945 792
	4.c Desalinated water									
Into the environment	5. Total returns (=5a+5b)	3 707 952	745 758	929 733	10 111 532	17 411 318	22 794 761	3 172 300		25 967 061
	Hydroelectric power generation									
	Irrigation water	3 707 952					3 707 952			3 707 952
	Mine water									
	Urban run-off (storm water)				10 111 532	15 167 299	25 278 831			25 278 831
	Cooling water									
	Losses in distribution because of leakages			929 733			929 733			929 733
	Non treated wastewater		745 758		10 111 532		10 857 290	3 172 300		14 029 590
	Treated wastewater					17 411 318	17 411 318		-	17 411 318
	Other									
	5.a To inland water resources (=5a.1+5a.2+5a.3)	3 707 952	745 758	929 733	10 111 532	17 411 318	32 906 294	3 172 300		36 078 594
	5a.1 Surface water				10 111 532	17 411 318	27 522 850			27 522 850
	5a.2 Groundwater	3 707 952		929 733			4 637 686			4 637 686
	5a.3 Soil water									
	5b To other resources									
	6. Total (=4+5)	3 707 952	2 610 152	5 165 185	32 224 623	17 411 318	28 894 607	8 253 698	-	37 148 305
	7. Consumption	14 831 810	1 118 636	-	-	4 701 773	20 652 219	211 487	-	16 628 254
	7a Losses in distribution (incl. Or malfunctioning meters)	12 050 845								12 050 845

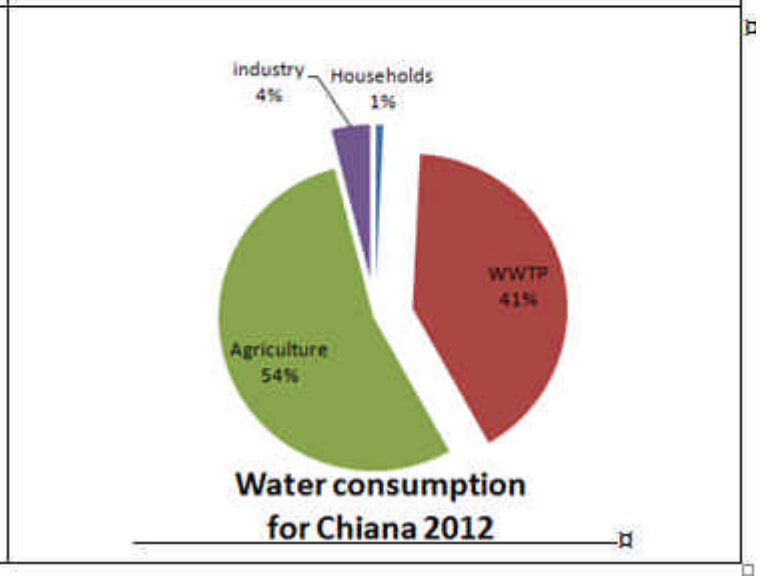
Visualisation of results:

2012 Chiana: 53.78 Hm3

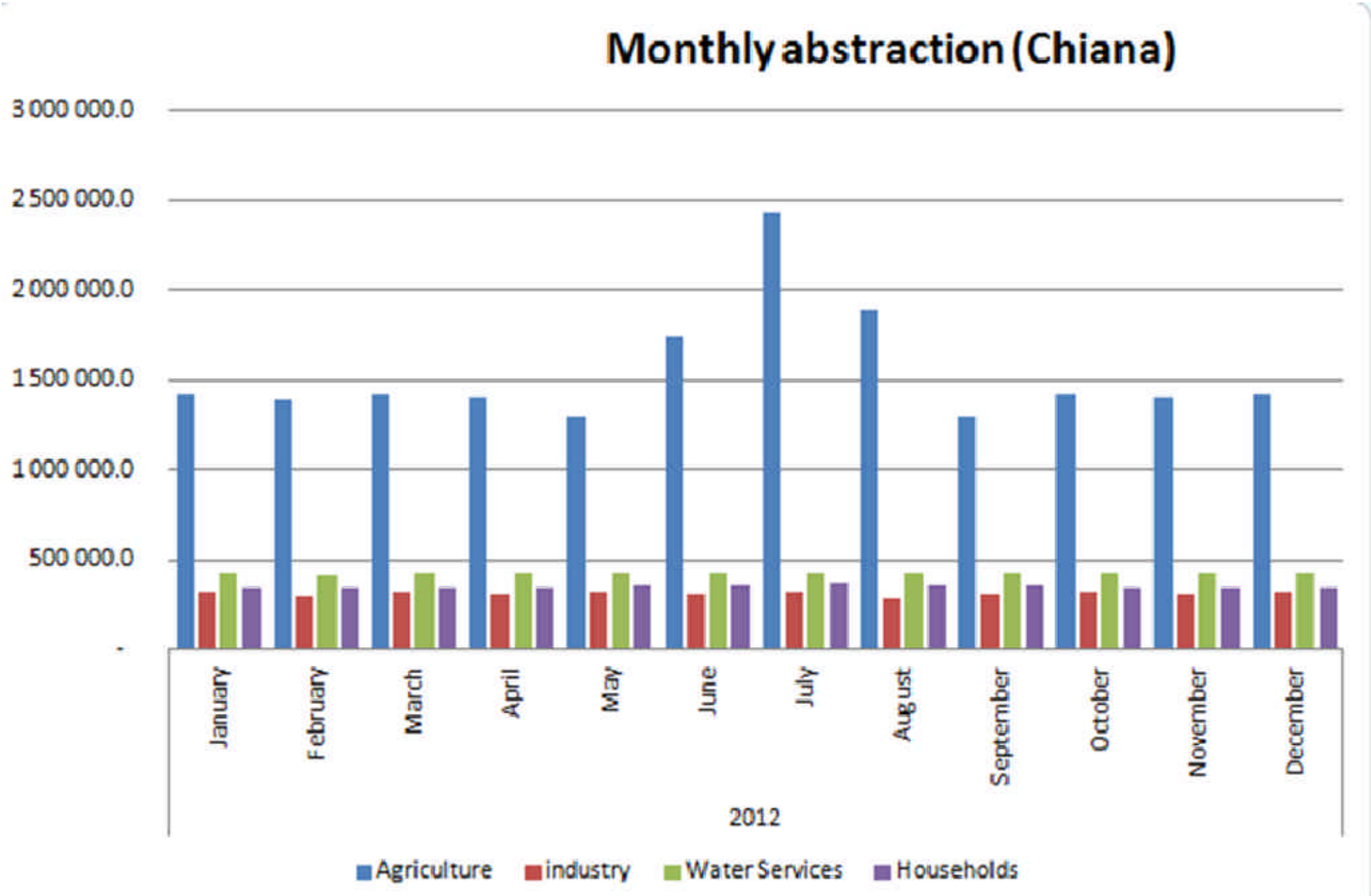






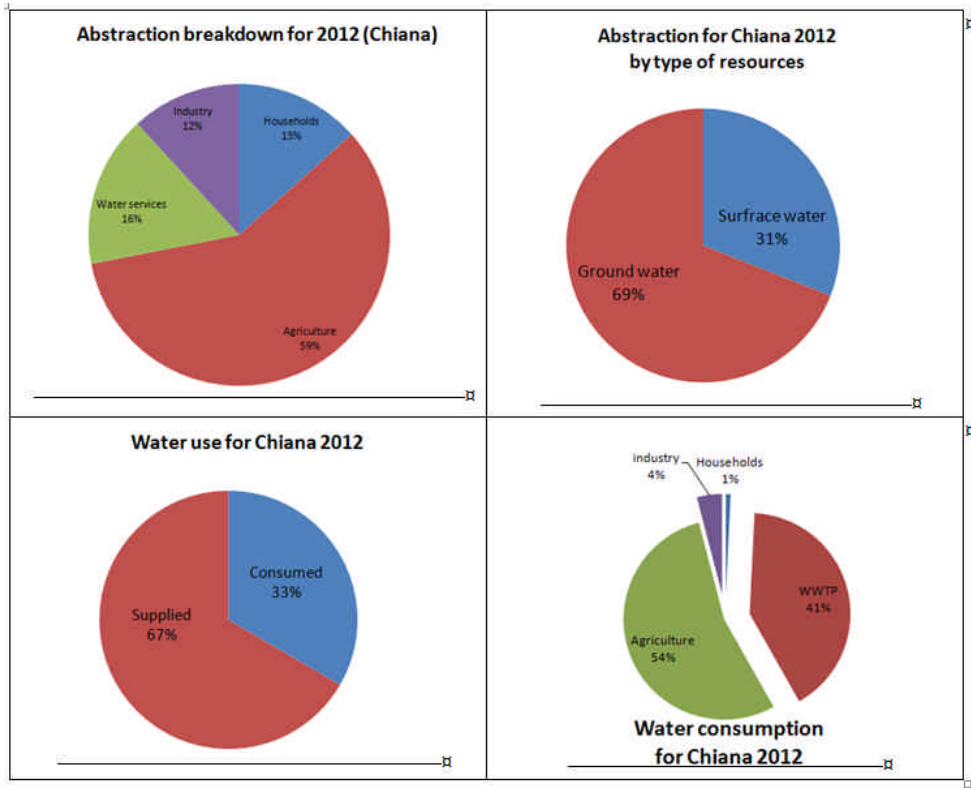


Visualisation of results: monthly

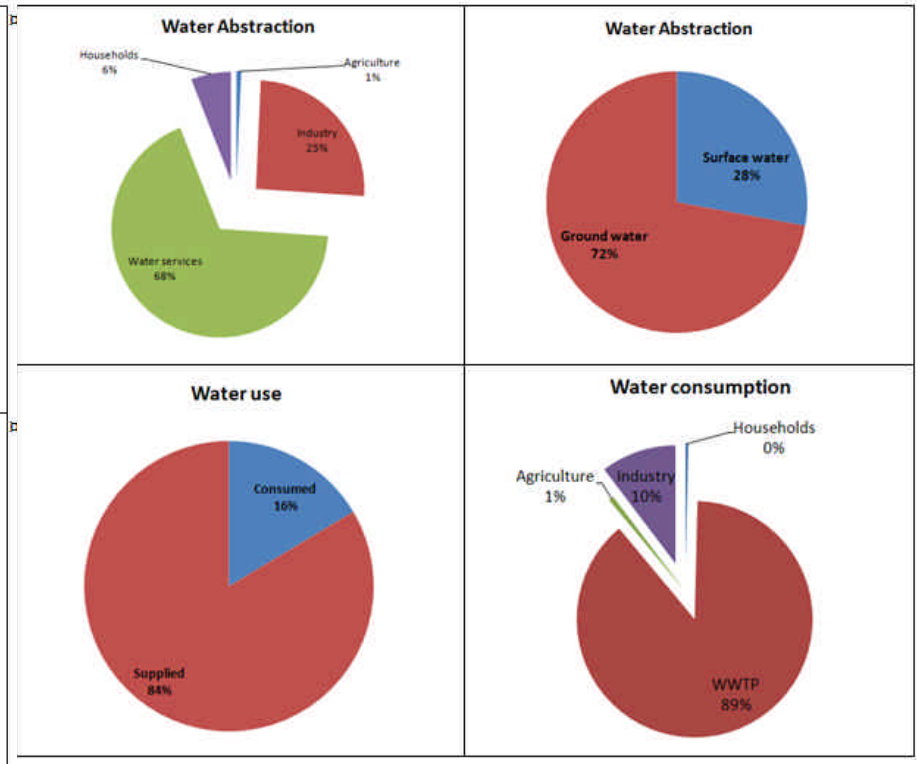


Comparing territories

CHIANA



BISENZIO



Thank you for your kind attention!

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