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Statistics and water accounts in Tunisia

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Introduction

- Tunisia is a water scarce country: the annual average allocation per person per year is less than 500 m^3,
- Pressure on water resources is increasing due to demographic and economic growths,

→ Need for continuous monitoring of the state of the resources and the pressures

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Water Statistics

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Producers of water statistics in Tunisia

Many institutions are producing water statistics:

- The Ministry of Agriculture and Water Resources and its institutions are responsible of water resources: they are many institutions:

➢ The general directorate of the water resources (DG-RE),

➢ The general directorate of the dams (DG-BGTH),

➢ The national company of exploitation and distribution of the water (SONEDE),

➢ The general directorate of genie-rural and water exploitation (DG-GREE),

➢ The general directorate for the Management and Conservation of Agricultural Land (DG-ACTA).

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Producers of water statistics in Tunisia

- Ministry of the Environment and Local Affairs and its institutions are responsible of controlling Pollution and Emissions : They are 2 institutions:

➢ National Agency for the Protection of the Environment (ANPE),

➢ National Office of Sanitation (ONAS),

- The National Institute of Statistics (**INS**): The National Institute of Statistics produces some environmental data, especially those related to the living conditions of families, such as the connection to the sanitation and water network,

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Inter-institutional coordination

- The institutions mentioned before contribute to the production of environmental information and publish data and information in several formats: paper, digital documents ...
- Inter-institutional cooperation is mainly based on the request of the Ministry or institution to be processed by the other, without the adoption of a common information system,
- Many institutions have completed or are in the process of completing information systems.

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Information Systems related to water

There are several **Water Information Systems** in Tunisia:

- The National Water Information System (in the process of completing the legal framework),
- The map of water resources of Tunisia (in progress),
- The agricultural map (being updated).

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The quality of water statistics

The quality of water statistics in Tunisia can be described as follows:

- Existence of a divergence of **terminology**, **methodology** and **nomenclature** between the different partners,
- Each institution, involved in the field, develops its own data and statistics according to its objective, hence the regular and periodic non-availability of reliable data,
- The nomenclatures and standards used to produce water data are not always compatible with international standards,
- Few publications on the data quality aspect.

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The tasks of the National Institute of Statistics (INS)

- **Data collection**: Environmental statistics are collected by the **INS** either by direct contact with the producing institution or by a formal paper request,
- **Data processing**: This is done through a special information system that ensures Quality Control and Consistency,
- **Publication of water statistics**: The **INS** annually publishes an environmental chapter in the Statistical Annual Report of Tunisia. The **INS** also publishes Excel tables on its site that are concerned with water,

→ The **INS** is preparing to produce new environmental figures that take into account new needs in this area,

- **Relationship with users of environmental data**: The **INS** receives many requests for data (Eurostat, UNSD, etc), where it is provided or transmitted to the competent authorities when needed.

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Water accounts

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Water accounts

- Methodology developed by UNSD following the increasing demand from countries for a methodological guide for the compilation of water statistics,
- The SEEAW is a satellite account of the System of National Accounts in that case it expands the scope of the SNA and adds physical data to national accounts,
- SEEAW is a conceptual framework for organizing hydrological and economic information in a consistent manner,
- The SEEAW is intended primarily for planners/decision-makers to identify the best strategies for sustainable development.

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Water accounts in Tunisia

- A pilot study for the Tables of water **supply**, **use** and **storage** was completed.

→ The importance of completing these calculations is confirmed and demonstrated.

- Water accounts have been completed for the years 2010 and 2015 and are in the process of being prepared for publications.

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The pilot study of 2009

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The pilot study of 2009

- Some results,
- Objectives,
- Lessons learned,

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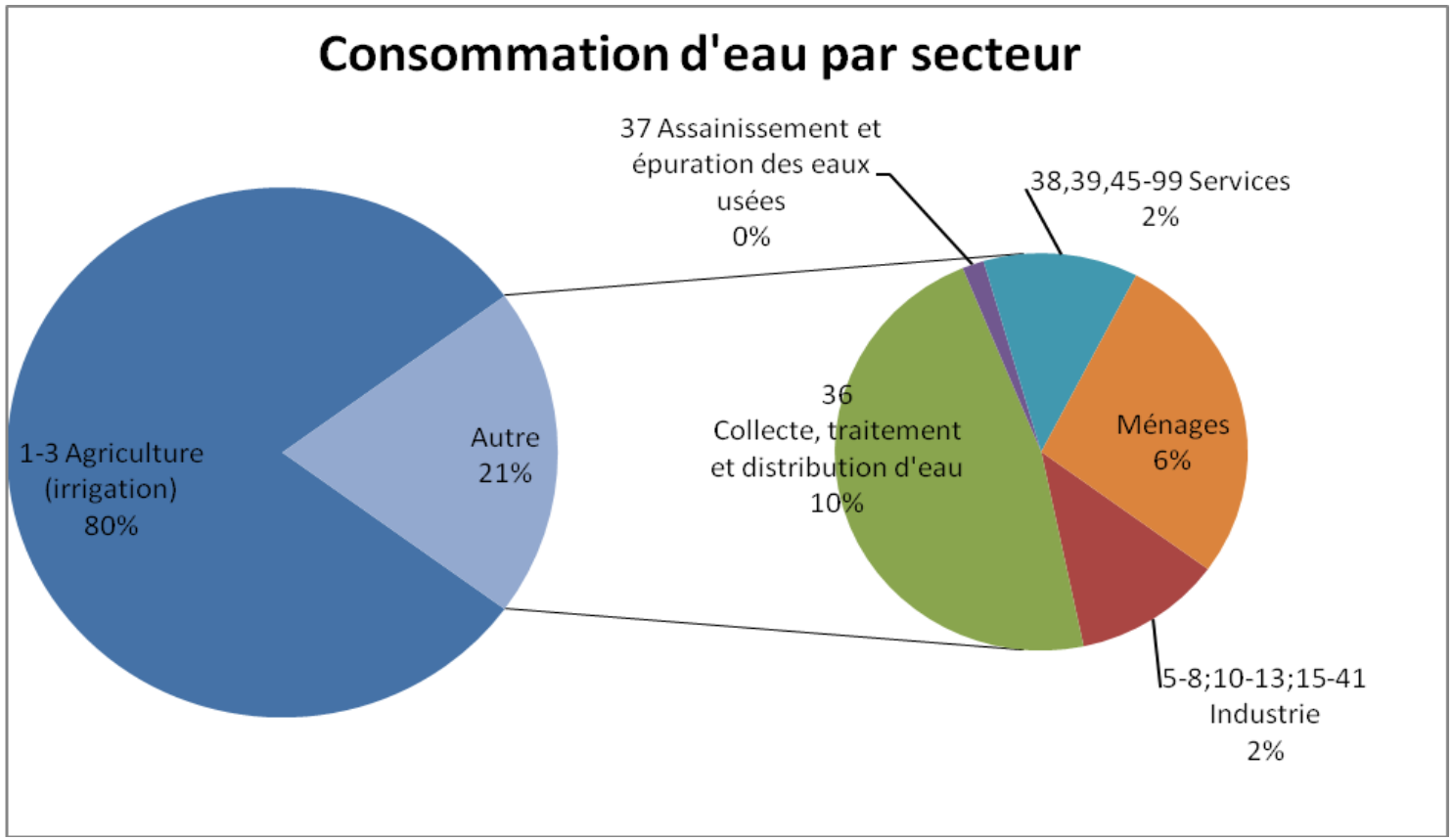
Water consumption by sector



- from a total of 2046 Mm^3 agriculture consumes 80%,
- With a volume of 193.65 Mm^3 the consumption of the activity of collection, treatment and distribution of water is not negligible

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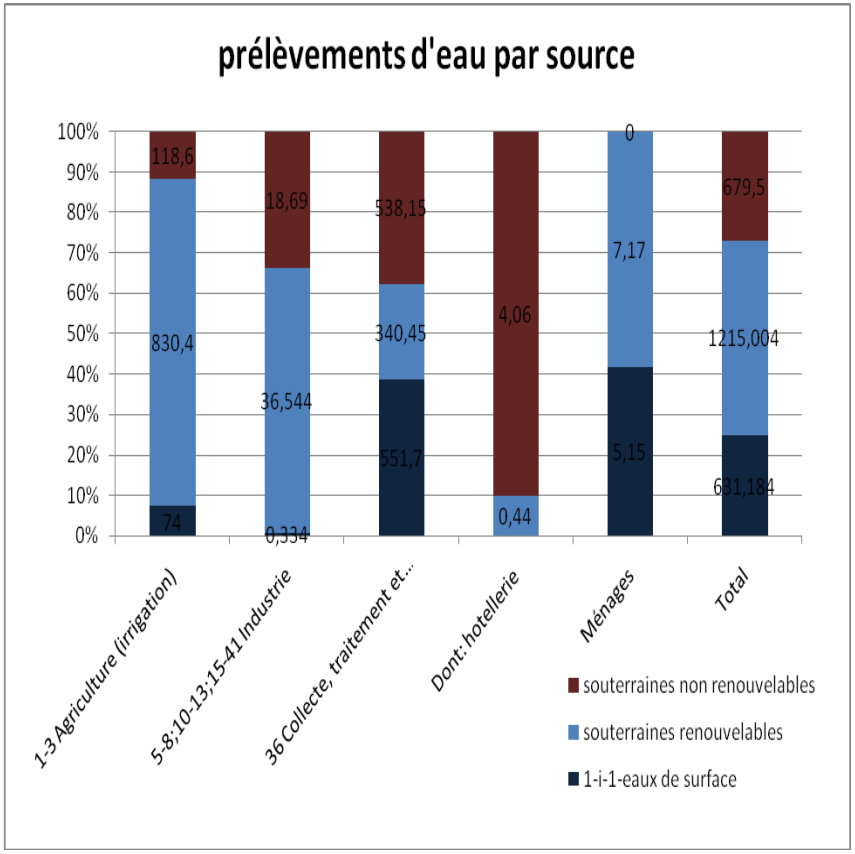
Water withdrawal by source



- 75% of the total withdrawals in conventional resources come from groundwater of which more than a third are non-renewable,
- In terms of volume, the greatest pressure exerted on non-renewable resources is made by the activity of collection, treatment and distribution of water, which represents 79% of the withdrawals.

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Objectives

- Test the feasibility of water accounts,
- Study the informational power of water accounts,
- Making recommendations and guidelines on environmental accounts.

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Lessons learned

- Despite the complexity, water accounts are feasible for Tunisia given the existing data,
- However, some improvements are needed,
- Also we should think about **efficient** sustainable implementation of water accounts,

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The accounts of 2010 and 2015

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The accounts of 2010 and 2015

- Objectives,
- Data sources,
- Results obtained,
- Data quality,

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Objectives

- Promote the work of the **INS** and other public statistical structures in the field of water statistics,
- Improve the quality of water statistics (accessibility for example),
- Follow public policies on water,

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Data sources

- Statistical report of the years 2010 and 2015 of the national company of exploitation and distribution of the water,
- Database of environmental statistics, which uses the Eurostat / OECD Questionnaire as an information medium: used by the INS,
- Annual Statistical Report of Tunisia 2015 of the INS,
- Annual Report of the deep water exploitation of Tunisia 2010 and 2015 of the general directorate of the water resources,
- Annual Report of the ground water exploitation 2010 and 2015 of the general directorate of the water resources,
- Annual Report of artificial recharge of groundwater 2010 and 2015 of the general directorate of the water resources,
- Official data request to the DG-BGTH on the operation of dams,
- Employment survey 2010 and 2015,

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Obtained Results

Physical use Table 2015

		activités selon les catégories CITI									ménages	reste du monde	total
		1-3	5-8	10-33, 41-43	35	36 SONEDE+SECADENORD	36 autres	37	38,39,45-99	dont:hotellerie	Total			
	1-total des prélèvements	1161.0612	46.29			2142.1978			2.41	2.41	3351.959	10.9437775		3362.90278
	1-a-prélèvement pour autoapprovisionnement	1161.0612	46.29			11.7			2.41	2.41	1221.4612			1221.4612
	1-b-prélèvement pour distribution	0				2130.4978					2130.4978			2130.4978
depuis l'environnement	1-i- A partir des ressources en eau	1161.0612	46.29			2142.1978			2.41	2.41	3351.959			3351.959
	1-i-1-eaux de surface					785.629					785.629			785.629
	1-i-2-eaux souterraines	1161.0612	46.29			1356.5688			2.41	2.41	2566.33			2566.33
	renouvelables	997.7912	39.19			603.3888			0.44	0.44	1640.81	10.9437775		1651.75378
	non renouvelables	163.27	7.1			753.18			1.97	1.97	925.52			925.52
	1-i-3-eau du sol													
	1-ii- A partir d'autres sources													
	1-ii-1- collecte des eaux de pluie													
	1-ii-2- prélèvements d'eau de mer													
	2-emplois d'eau recue d'autres unités économiques	1009.57516	28.2					248	102.8	12.3	1388.57516	394.1		1782.67516
au sein de l'économie	eau potable		28.2						62.8	12.3	91	394.1		485.1
	eau d'irrigation	989.57516									989.57516			989.57516
	eau réutilisée	20							40		60			60
	eau usée							248			248			248
3- total des emplois d'eau (=1+2)		2170.63636	74.49			2142.1978		248	105.21	14.71	4740.53416	405.043777		5145.57794

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Obtained Results

Physical supply Table 2015

		activités selon les catégories CITI										ménages	reste du monde	total
		1-3	5-8	10-33, 41-43	35	36 SONEDE+SECADENORD	36 autres	37	38,39,45-99	hotellerie	Total			
au sein de l'économie	4-ressources d'eau fournies aux autres unités économiques	0	62.63		1474.67516		60	12.52	12.52		1609.82516	172.85		1782.67516
	dont:										0			0
	eau potable				485.1						485.1			485.1
	eau d'irrigation				989.57516						989.57516			989.57516
	eaux recyclées						60				60			60
	eaux usées au reseau des égouts		62.63					12.52	12.52		75.15	172.85		248
vers l'environnement	5-total des retours	260.476363			190.71		188				639.186363			639.186363
	5-a-vers les ressources d'eau										0			0
	5-a-1 eaux de surface										0			0
	5-a-2 eaux souterraines										0			0
	5-a-3 eau du sol										0			0
	5-b-vers d'autres sources(mer)										0			0
6- total des ressources en eau (=4+5)		260.476363	62.63		1665.38516		248	12.52	12.52		2249.01152	172.85		2421.86152
7-consommation		1910.16	11.86		476.81264		0	92.69	2.19		2491.52264	232.193777		2723.71641

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Obtained Results

Physical use Table 2010

		activités selon les catégories CITI												
		1-3	5-8	10-33, 41-43	35	36 SONEDE+SECADENORD	36 autres	37	38,39,45-99	dont:hotellerie	Total	ménages	reste du monde	total
	1-total des prélèvements	1134.029	41.44			1714.361			4.13	4.13	2893.96	12.5		2906.46
	1-a-prélèvement pour autoapprovisionnement	1134.029	41.44			6.5			4.13	4.13	1186.099			1186.099
	1-b-prélèvement pour distribution	0				1707.861					1707.861			1707.861
depuis l'environnement	1-i- A partir des ressources en eau	1134.029	41.44			1714.361			4.13	4.13	2893.96			2893.96
	1-i-1-eaux de surface					670.33					670.33			670.33
	1-i-2-eaux souterraines	1134.029	41.44			1044.031			4.13	4.13	2223.63			2223.63
	renouvelables	1006.761	29.92			446.499			0.37	0.37	1483.55	12.5		1496.05
	non renouvelables	127.268	11.52			597.532			3.76	3.76	740.08			740.08
	1-i-3-eau du sol													
	1-ii- A partir d'autres sources													
	1-ii-1- collecte des eaux de pluie													
	1-ii-2- prélèvements d'eau de mer													
	2-emplois d'eau recue d'autres unités économiques	862.218	32.9					246	106.2	17.9	1247.318	324.5		1571.818
au sein de l'économie	eau potable		32.9						65.9	17.9	98.8	324.5		423.3
	eau d'irrigation	834.218									834.218			834.218
	eau réutilisée	28							40.3		68.3			68.3
	eau usée							246			246			246
3- total des emplois d'eau (=1+2)		1996.247	74.34			1714.361		246	110.33	22.03	4141.278	337		4478.278

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Obtained Results

Physical supply Table 2010

		activités selon les catégories CITI										ménages	reste du monde	total
		1-3	5-8	10-33, 41-43	35	36 SONEDE+SECADENORD	36 autres	37	38,39,45-99	hotellerie	Total			
au sein de l'économie	4-ressources d'eau fournies aux autres unités économiques	0	63.57			1257.518		68.3	17.5	17.5	1406.888	164.93		1571.818
	dont:										0			0
	eau potable					423.3					423.3			423.3
	eau d'irrigation					834.218					834.218			834.218
	eaux recyclées							68.3			68.3			68.3
	eaux usées au reseau des égouts		63.57						17.5	17.5	81.07	164.93		246
vers l'environnement	5-total des retours	239.54964				127.89		177.7			545.13964			545.13964
	5-a-vers les ressources d'eau										0			0
	5-a-1 eaux de surface										0			0
	5-a-2 eaux souterraines										0			0
	5-a-3 eau du sol										0			0
	5-b-vers d'autres sources(mer)										0			0
6- total des ressources en eau (=4+5)		239.54964	63.57			1385.408		246	17.5	17.5	1952.02764	164.93		2116.95764
7-consommation		1756.69736	10.77			328.953		0	92.83	4.53	2189.25036	172.07		2361.32036

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Obtained Results

Water storage Table 2015

	reservoirs artificiels				eaux souterraines			
	grands barrages	rages collina	acs collinaire	rivières	souterraines renouvelables	souterraines non renouvelables	eau du sol	total
1- stock d'ouverture	1239.803				1494.66	701.84		3436.303
augmentations du stock								
2-retours	3							
3-précipitation								
4-flux entrants	2082.077							
4-a-des autres territoires								
Algerie								
Libye								
4-b-des autres ressources du territoire					30.52	0		
diminution du stock								
5-prélèvements	785.629				1682.81	925.52	6000	3393.959
6-evaporation/evapotranspiration réelle	181.683							
7-flux sortants								
7-a-vers les autrres terrritoires								
Algerie								
Libye								
7-b-vers la mer								
7-c-vers les autres ressources du territoire								
8-autres changements de volume					0	0		
9-stock de ferrmeture	1184.75				1494.66	701.84		3381.25

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Obtained Results

Water storage Table 2010

	reservoirs artificiels				eaux souterraines			
	grands barrages	rages collina	acs collinaire	rivières	souterraines renouvelables	souterraines non renouvelables	eau du sol	total
1- stock d'ouverture	1497.55				1465.9	701.7		3665.15
augmentations du stock								
2-retours								
3-précipitation								
4-flux entrants	985.024							
4-a-des autres territoires								
Algerie								
Libye								
4-b-des autres ressources du territoire					42.85	0		
diminution du stock								
5-prélèvements	670.33				1434.55	740.08	6000	2844.96
6-evaporation/evapotranspiration réelle	151.875							
7-flux sortants								
7-a-vers les autrres terrritoires								
Algerie								
Libye								
7-b-vers la mer								
7-c-vers les autres ressources du territoire								
8-autres changements de volume					0	0		
9-stock de ferrmeture	1163.8				1465.9	701.7		3331.4

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Examples of results

- Between 2010 and 2015 the total water withdrawal is increased from 2906 Mm^3 to 3363Mm^3, which is equivalent to an average annual increase of about 91 Mm^3,
- Agriculture consumes about 75% of the total water resource in Tunisia,

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Data quality

- **Missing data**

→ use estimates as far as possible,

- **Unpublished internal data**

→ try to have the data unofficially if possible, if not use the estimate,

- **Non-conformity of definitions and/or nomenclatures**

→ investigative reconciliation of sub-definitions and nomenclatures,

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Data quality: Tracks to better quality

→ Minimize the use of estimates, so favoring the production of data,

→ Ensure continuous production of data (periodicity of data production),

→ Harmonize the definitions and nomenclatures of the input data,

→ Promote the circulation and dissemination of data,

→ Highlight the reliability of the data,

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Conclusions and future work

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Conclusions

- The water accounts is feasible and very beneficial despite its complexity,
- Better coordination = better quality of data,

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Future work

- The ultimate goal of any statistical work is the dissemination. So we will work on publishing the results before the end of this year,

After we will:

- Organize specific meetings with producers (example: use of water in agriculture),
- Improve the used assumptions and approximations.

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Thank you for your attention

- Our thanks go to our partners, producers of data, and to our international partners (Eurostat, EEA, UNSD, ESCWA, …) for their help by providing training and assistance.

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