

ENAS ARABYAT short bio



**Water and
Environment Support**
in the ENI Southern Neighbourhood region



- Eng. Enas Mohammad Al-Arabyat is the **Head of Environment statistics within the Department of Statistics, Jordan.**
- Has been working in environment statistics for **13 years**, and I have extensive experience in preparing and analyzing environmental statistics.
- She worked in preparing water, air & waste statistics, and other environmental statistics. Knowing very well the challenges facing preparing such statistics, she always strives to develop her work, adopt all new international methodologies to further advance statistical work.
- Based on her experience, she stresses the importance of **building automated databases for all data-producing agencies to facilitate sharing data** with stakeholders and achieving the success of joint integrative work.



Regional training on Water Accounting / RW-2-REG

Water Account in Jordan
(status and challenges)

19 sept. 2020, Amman, Jordan



Presented by: Enas Arabyat, Head of Environment statistics
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Out line

- General brief introduction about DOS,ESD.
- Water statistics and water information system.
- Jordan experience in water account in.
- Challenges and future plan.





- The Statistics Law No. 12 of 2012 has defined the duties of the Department of Statistics (i.e., to collect, analyze and disseminate data, coordinate and organize the statistical work in partnership and cooperation with various government institutions in order to develop the administrative records in accordance with international techniques and standards).
- Dos act as a central statistical agency for collecting socio-economic and demographic data required by planners and decision – makers.
 - Dos act as a reference for the ministries, public and private sectors in terms of provision of data which reflect the performance of the national economy.



National Statistical Strategy 2017-2022



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The strategy objectives:

- Production of statistical data for the development of the Sustainable Development Indicators, administrative records and the national development uses.
- Enhancing the leadership and development roles of the (DoS) in improving the statistical system.
- Developing the statistical methods and technological means used in data production, dissemination and use.

- **Twelve stakeholders are participating in this strategy,** namely: Ministry of Health, Ministry of Energy and Mineral Resources, Ministry of Transport, Ministry of Education, Ministry of Labor, **Ministry of Environment, Ministry of water and irrigation,** Business Register / Ministry of Industry and Trade, Civil Register/Civil Status and Passports Department, Residence and Borders Directorate/Directorate of Public Security, Central Bank of Jordan, Ministry of Communications and Information Technology.

Each partner institution in the statistical system , has set strategic objectives and derived operational objectives and operational plans that included the activities, expected outputs and financial costs.



Environment Statistics Division (1995-now)



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ESD working in **coordinate, edit, tabulate, analyze and publish environment statistics.**

Objectives of the ESD:

- ✓ Provide statistical data on the various elements of the environment and their distribution in Jordan.
 - ✓ Provide data on available natural resources, inventory and safe extraction of those resources.
 - ✓ Provide data on environmental pollutants according to their types, sources and limits on the environment.
 - ✓ Provide various environmental indicators.
 - ✓ Provide information on actions taken to protect environment.
-
- ESD **carry out special environment surveys**; Survey in the Medical Services ,Environment Survey in the Industrial Activities ,Survey for the Municipalities ,Environment Survey in Hotels and Education Sector , and in Services & Finance and Insurance Sector, finally Environment Survey in Governmental Sector.
 - **Multi purpose designed questioners have been adopted to** Providing of statistical data on solid and liquid wastes (hazardous and non-hazardous).
 - Providing of data on the quantities of used water and sewage, in addition to methods of disposal and treatment.
 - Providing of data on quantity, type and value of consumed energy.
 - Providing of data on the expenditures to protect the environment.



Water statistics



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Water integrated governance

Water and society.

Improving access to drinking water and sanitation services

Water and environment.

Improving the condition and services provided by water related ecosystems

Adapting to extreme events

Water and economic.

Managing water supply and demand

- Population growth.
- Unstable political surrounded.
- Water scarcity.
- Limited Water resources.
- Climate change.
- Pollution.
- Efficiency of water uses.



National Water Strategy 2016–2025



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The strategy key areas are

- (i) integrated water resources management;
- (ii) water, sewage and sanitation services;
- (iii) water for irrigation, energy and other uses;
- (iv) institutional reform;
- (v) sector information management and monitoring.

The strategy also addresses cross-cutting issues of climate change adaptation; trans boundary/shared water resources; humanitarian WASH sector coordination; public-private partnerships; and the economic dimensions of water

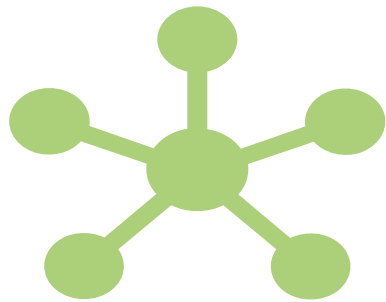


Water statistics and water information system



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Water statistics production and processing, dissemination mechanism:



- **Recently**, the processes of automating databases and building specialized databases in all relevant institutions and ministries are taken place, with the specialization of the Ministry of Water and the Department of Statistics.

Where many monitoring and control programs are automated, as are all of statistical surveys and censuses that are conducted in the Department of Statistics.

- **The mechanism of data transmission** between the official data-producing and user agencies is still carried out using the old classic methods, through official letters and books, due to the poor connection of databases and the challenges of achieving that.



Water statistics and water information system

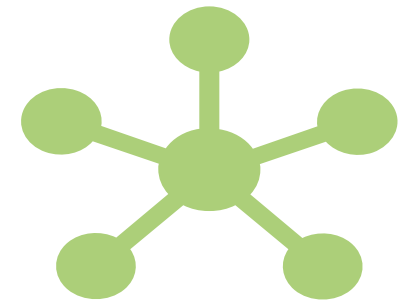


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- **Statistics related to water** are published nationally and internationally through ESD in DOS by many ways ; the annual reports, and through the DOS website, direct contact or by the customer service office,

ESD provides the **environment statistics** at various levels (**national level, region, governorate, or stations**) according to the data type and to its availability. in addition to **maps** or **info graphs**.

- The **Ministry of Water and Irrigation** also prepares **annual reports** related to the water sector and publishes it on the ministry's website or through customer service and upon request some cases by cost.



Shared water data quality



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1. relevance
2. accuracy
3. reliability
4. timeliness
5. punctuality
6. accessibility
7. clarity

8. interpretability
9. coherence
10. comparability
11. credibility
12. integrity
13. methodological soundness
14. and serviceability.





Jordan Water Accounts experience

Stage 1: Data Collection

Stage 2: Data processing

Some parts of data were collected in financial form, the quantities of these data required to be estimated. The produced figures not represented exactly the amounts of water distributed on these ISICs because water prices ranging according to the amount of water used and the type of source used.

More than one ISIC are treated as one activity, but for the purpose of accounts they required to be separated. So, the percentage of consumption for each ISIC specifically be assumed.

Moreover, some parameters such as seepage from the net is not known exactly, the percentage of seepage be assumed for the purpose of calculations.

Stage 3: Starting filling water accounts tables



Jordan Water Accounts experience



**Water and
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Physical use table(mcm),2007

| | | Industries (by ISIC categories) | | | | | Households | Total |
|-----------------------------|--|---------------------------------|----------------------------------|------------|--------|-------|------------|-------|
| | | Agriculture,1 | Water supply (drinking water),36 | Sewage, 37 | others | Total | | |
| From the environment | U1 - Total abstraction | 506 | 294 | 0 | 49 | 849 | 0 | 849 |
| | a.1- Abstraction for own use | 506 | 0 | 0 | 49 | 555 | 0 | 555 |
| | a.2- Abstraction for distribution | 0 | 294 | 0 | 0 | 249 | 0 | 249 |
| | b.1- From water resources: | 506 | 294 | 0 | 49 | 849 | 0 | 849 |
| | * Surface water | 261 | 80 | 0 | 4 | 345 | 0 | 345 |
| | * Groundwater | 245 | 214 | 0 | 45 | 504 | 0 | 504 |
| | * Soil water | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | b.2- From other sources | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | * Collection of precipitation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | * Abstraction from the sea | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Within the economy | U2 - Use of water received from other economic units | 91 | 0 | 113 | 0 | 202 | 147 | 351 |
| | of which: | 91 | 0 | 0 | 0 | 91 | 0 | 91 |
| | Reused water | | | | | | | |
| | Wastewater to sewerage | 0.0 | 0.0 | 113 | 0.0 | 113 | 0.0 | 113 |
| Total use of water = U1+U2= | | 1200 | | | | | | |



Jordan Water Accounts experience



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Physical Supply table(mcm),2007

| | | Industries (by ISIC categories) | | | | | Households | Total |
|---|---|---------------------------------|----------------------------------|------------|--------|-------|------------|-------|
| | | Agriculture,1 | Water supply (drinking water),36 | Sewage, 37 | others | Total | | |
| Within the economy | S1- Supply of water to other economic units | 0 | 147 | 91 | 23 | 271 | 90 | 351 |
| | of which: | 91 | 0 | 0 | 0 | 91 | 0 | 91 |
| | Reused water | | | | | | | |
| | Wastewater to sewerage | 0 | 0 | 0 | 23 | 23 | 90 | 113 |
| To the Environment | S2- total returns= (D1+D2) | 60 | 140 | 6 | 5 | 211 | 0 | 211 |
| | D1- to water resources | 60 | 140 | 6 | 5 | 211 | 0 | 211 |
| | * surface water | 5 | 10 | 6 | 5 | 23 | 0 | 23 |
| | * ground water | 50 | 10 | 0 | 0 | 60 | 0 | 60 |
| | * soil water | 5 | 120 | 0 | 0 | 125 | 0 | 125 |
| | D2- to other sources | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total supply of water = S1+S2= | | 562 | | | | | | |
| Water consumption= total use – total supply | | 638 | | | | | | |



Jordan Water Accounts experience



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Matrix of flows within the economy(mcm),2007

| To use | Agriculture,1 | Water supply (drinking water),36 | Sewage,37 | Others | Total | household | Total supply |
|----------------------------------|---------------|----------------------------------|-----------|--------|-------|-----------|--------------|
| From supply | | | | | | | |
| Agriculture,1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Water supply (drinking water),36 | 0 | 0 | 0 | 0 | 0 | 147 | 147 |
| Sewage,37 | 91 | 0 | 0 | 0 | 91 | 0 | 91 |
| Others | 0 | 0 | 23 | 0 | 23 | 0 | 23 |
| Total | 91 | 0 | 23 | 0 | 114 | 147 | 261 |
| Household | 0 | 0 | 90 | 0 | 90 | 0 | 90 |
| Total use | 91 | 0 | 113 | 0 | 204 | 147 | 351 |



Water accounts – Physical water supply



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| Name of flow | Availability of data | Name of flow | Availability of data |
|--------------------------------------|----------------------|---------------------------------|----------------------|
| Precipitation | A | Imported water | A |
| Inflow from other countries | A | Water supplied /received | N |
| Evapotranspiration | A | Reused water | A |
| Returns to inland water resources | NA | Final water use in SEEA or IRWS | A |
| Abstractions of land water recourses | A | Returns to the sea | NA -non R |
| Collection of precipitation | A | Outflows to neighboring | NA -non R |
| Abstractions from the sea | NA -non R | Outflow to the sea | NA -non R |
| losses | A | | |
| Exported water | A | | |

Water accounts – Waterborne Pollution Accounts



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| Name of flow | Availability of data |
|--|----------------------|
| Waterborne releases to other economic activities | A |
| Waterborne emissions to the environment from point sources | A |
| Waterborne emissions to the environment from non-point sources | NA |



Economic Accounts for Drinking Water Supply and Sewerage



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| Name of flow | Availability of data | Name of flow | Availability of data |
|---|----------------------|-------------------------------|----------------------|
| Output (at basic prices) of Drinking Water Supply and Sewerage Activities | A | Other Subsidies on Production | A |
| Intermediate Consumption | A | Property Income | A |
| Compensation of Employees | A | Current Transfers | A |
| Other Taxes on Production | A | Capital Transfers | A |
| | | Gross Fixed Capital Formation | A |



Water resource supply and consumptions



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- **Water resources in Jordan (MWI, 2019)**

Annual water consumption is 1,076 (mcm) in 2018 (MWI, 2019),

- 52 % is used for irrigation.
- Water demand is met mostly from **groundwater** (59 %),
 - ✓ followed by **surface water** (27 %) ,
 - ✓ **treated wastewater** (14 %).



Water balance 2018



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| Source | | Domestic (ISIC36-A) | Industrial (ISIC 05-99 except 36,01-03) | Irrigation (ISIC 36-B) | Total Supply | Share% |
|--------------------------|-----------------------------|---------------------|---|------------------------|---------------|-------------|
| Surface Water | | 131.3 | 2.4 | 154.4 | 288.1 | 27% |
| 1 | Jordan Valley | 109.5 | 2.4 | 114.4 | 226.3 | 21% |
| | Northern Jordan Valley(KAC) | 73.2 | 0 | 53.2 | 126.4 | 12% |
| | Middle Jordan Valley(KAC) | 0 | 0 | 23 | 23 | 2% |
| | Southern Ghors & W Araba | 36.3 | 2.4 | 38.2 | 76.9 | 7% |
| 2 | Highlands | 21.8 | 0 | 35 | 61.8 | 6% |
| | a. Springs | 19.9 | 0 | 10 | 29.9 | 3% |
| | b. Base and Flood Flow | 1.9 | 0 | 25 | 31.9 | 3% |
| 3 | Treated wastewater | 0 | 2.5 | 144.2 | 146.7 | 14% |
| | a. Jordan Valley | 0 | 0 | 116.9 | 116.9 | 11% |
| | b. Highlands | 0 | 2.5 | 27.3 | 29.8 | 3% |
| Groundwater (GW) | | 338.4 | 27.2 | 252.2 | 618.8 | 59% |
| | a. Renewable GW | 222.3 | 22.3 | 222 | 468.7 | 44% |
| | b. Non Renewable GW | 112.5 | 4.9 | 29.1 | 146.5 | 14% |
| | c. Desalinated GW | 3.6 | 0 | 0 | 3.6 | 0% |
| Total Consumption | | 469.7 | 32.1 | 551.8 | 1053.6 | 100% |
| Share % | | 45% | 3% | 53% | 100% | |



municipal water supply and water consumed, billed and non-revenue water in Jordan, 2000–2017



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| Year | Population (DOS data) | Total water use (mcm) | Municipal water supplied (mcm) | Municipal billed water | Non-revenue water (mcm) | Non-revenue water consumed (mcm) | Physical loss in network (mcm) | Total municipal consumed Water | Per capita water uses, all purposes (m³/capita/yr) | Per capita domestic water supply (l/c/d) | Per capita billed water (l/c/d) | Per capita domestic water consumption (l/c/d) |
|------|-----------------------|-----------------------|--------------------------------|------------------------|-------------------------|----------------------------------|--------------------------------|--------------------------------|--|--|---------------------------------|---|
| 2000 | 4,857,000 | 817 | 235.4 | 112.9 | 122.5 | 67.4 | 55.1 | 180.2 | 461 | 133 | 64 | 102 |
| 2001 | 4,978,000 | 764 | 239.0 | 117.6 | 121.4 | 66.8 | 54.6 | 184.4 | 421 | 132 | 65 | 101 |
| 2002 | 5,098,000 | 810 | 245.6 | 125.1 | 120.5 | 66.3 | 54.2 | 191.3 | 435 | 132 | 67 | 103 |
| 2003 | 5,230,000 | 810 | 258.7 | 130.9 | 127.8 | 70.3 | 57.5 | 201.2 | 424 | 136 | 69 | 105 |
| 2004 | 5,597,000 | 866 | 275.8 | 147.6 | 128.2 | 70.5 | 57.7 | 218.1 | 424 | 135 | 72 | 107 |
| 2005 | 5,758,000 | 933 | 282.0 | 153.7 | 128.3 | 70.5 | 57.7 | 224.3 | 444 | 134 | 73 | 107 |
| 2006 | 5,928,000 | 915 | 286.3 | 163.2 | 123.1 | 67.7 | 55.4 | 230.9 | 423 | 132 | 75 | 107 |
| 2007 | 6,106,000 | 929 | 300.9 | 171.5 | 129.4 | 71.2 | 58.2 | 242.7 | 417 | 135 | 77 | 109 |
| 2008 | 6,293,000 | 924 | 310.4 | 173.8 | 136.6 | 75.1 | 61.5 | 249.0 | 402 | 135 | 76 | 108 |
| 2009 | 6,490,000 | 941 | 313.4 | 175.5 | 137.9 | 75.8 | 62.1 | 251.4 | 397 | 132 | 74 | 106 |
| 2010 | 6,698,000 | 886 | 327.7 | 186.8 | 140.9 | 77.5 | 63.4 | 264.3 | 362 | 134 | 76 | 108 |
| 2011 | 6,993,000 | 892 | 330.0 | 191.4 | 138.6 | 76.2 | 62.4 | 267.6 | 350 | 129 | 75 | 105 |
| 2012 | 7,427,000 | 836 | 339.6 | 180.0 | 159.6 | 87.8 | 71.8 | 267.8 | 308 | 125 | 66 | 99 |
| 2013 | 8,114,000 | 890 | 369.0 | 191.9 | 177.1 | 97.4 | 79.7 | 289.3 | 300 | 125 | 65 | 98 |
| 2014 | 8,804,000 | 962 | 428.0 | 205.4 | 222.6 | 122.4 | 100.2 | 327.8 | 299 | 133 | 64 | 102 |
| 2015 | 9,559,000 | 1,004 | 439.0 | 213.8 | 225.2 | 123.9 | 101.3 | 337.6 | 288 | 126 | 61 | 97 |
| 2016 | 9,798,000 | 1,042 | 449.5 | 224.8 | 224.8 | 123.6 | 101.1 | 348.4 | 291 | 126 | 63 | 97 |
| 2017 | 10,013,556 | 1,068 | 460.8 | 230.4 | 230.4 | 126.7 | 103.7 | 357.1 | 292 | 126 | 63 | 98 |



Challenges of Water Account and lessons learned



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1. Lack of institutionalization of the work;
2. Wide change in workers in the last ten years and appoint the new workers; who need training and building capacity.
3. Skilled migration and retirement among employees; the needs to increase the incentives and
4. the need to build teamwork.



challenges of Water Account



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5. Lack of use of the concept of environmental accounts in plans and strategies.
6. The limited application of the international standards in some of the production of statistical figures.
 - ✓ The need to develop a work program for preparing and updating data according to a joint work plan between the concerned parties
 - ✓ Statistical Capacity Building.
 - ✓ Create an action plan for lack of data.
 - ✓ Merging and standardizing concepts between partners.



For further information



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Department of statistics

✉ Visit our website: Dos.gov.jo

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Thank you for your attention!
Enas Al Arabyat

