Environmental Statistics

Introduction

Environment is defined as the overall outer conditions affecting life, growth and beings existence. The environmental system is distinguished in the balance among its elements (i.e. water, air and land) and it can adapt, within certain limits, with changes that may occur. But, life development, technological advancement and introduction of machines, chemicals, radio-active items, various sources of power generation, exhaustion of natural resources, occurrence of catastrophes due to human activities such as nuclear explosions in addition to the use of fertilizers and pesticides, all these lead to environmental disequilibrium and many environmental problems.

So, environmental protection must be taken seriously in order to reduce these problems. It should be given top priority by the public and private sectors because each being has the right to live in a balanced, clean and pollution-free environment.

Jordan was one of the pioneer countries to exert extensive efforts in the field of environmental protection. Accordingly, many directorates and divisions dealing with environmental issues were established in various governmental institutions, in addition to the establishment of the Ministry of Environment. Moreover, the Government issued the Environment Protection Law, and continuously supports the non-governmental organizations interested in this subject.

In continuation with the above mentioned, the Department of Statistics established the Environment Statistics Division which is always keen to improve its work to provide comprehensive statistical data in this field. The decision makers, policy makers, planners and researchers can benefit a lot by the comprehensive environmental database available at DoS. Part of this data is published in this report and more will be published in the future.

Objectives of the Environmental Statistics

- Provision of statistical data on various environmental elements and their distribution in Jordan.
- Provision of data on available natural resources, deposits and safe exploitation of these resources.
- Provision of data on environmental pollutants by type, source and their effects on environment.
- Provision of data for various environmental indicators.
- Creating environmental database.
- Provision of information on procedures used to protect the environment.

Sources of Environmental Statistical Data

The required data are collected from the following sources:

1.Administries Registries from Ministries, Governmental Departments, and Public and Private Institutions .

2. Directorates and Divisions Working Within the DoS

These directorates are:

•Directorate of Agricultural and Environmental Statistics.
•Directorate of Economic Statistics.
•Directorate of Population and Social Statistics.

3. Surveys and Studies

For the purpose of this study, many surveys are carried out, these are:

•Hazardous solid and liquid wastes survey in the medical services activity.
•Solid Wastes survey for the Municipalities Activity.
•Non-Hazardous Solid and Liquid Waste survey in the construction activity.

Environmental Accounts

The intergradations of environment within economics, which is the core of sustainability (sustainability billers are: economical, environmental and social welfare), is important to measure the impacts of economic activities on the environment and to measure the benefits that environment provide to economic. Usually, environmental cost considered as externalities of the economic process, therefore achieving green GDP will internalize the environmental cost within economic growth. In order to achieve green GDP.

Environment account must be measured in a scientific approach by considering the below four components:

1.Natural resources asset accounts, which deal mainly with stocks of natural resources and focus on revising the Balance Sheets of the System of National Accounts (SNA). Natural resource asset accounts follow the structure of the asset accounts of the SNA, with data for opening, closing, and changes stocks during the year.

2.Pollutant and material flow accounts (energy and resources), which provide information at the industry level about the use of energy and materials as “inputs to production and final demand”, and “the generation of pollutants and solid waste”. These accounts are linked to the Supply and Use Tables of the SNA, which are used to construct input-output (IO) tables.

3.Environmental protection and resource management expenditures, which identifies expenditures in the conventional SNA incurred by industry, government and households to protect the environment or manage resources.

The three sets of account described above each provide a range of indicators, but, with the exception of the asset accounts, these indicators do not directly affect the conventional macroeconomic indicators such as GDP and NDP. Environmentally-adjusted macroeconomic aggregates include indicators to measure sustainability by revising conventional macroeconomic indicators or by producing alternative macro indicators, such as environmentally adjusted Net Domestic Product (ea.NDP).

Objectives and Intended Results:

1.Obtain water use by ISIC breakdown (physical and monetary units) that is fully consistent with the IO matrix developed by the IO project (81 different industries);

2. Obtain water supplied (from different economic units to sewerage or distributed for re-use) in different ISIC breakdown (physical and monetary units) which can be used to compile the physical supply and use tables for water flows within the economy.

3. Obtain data about environmental protection and management expenditures for water supplied by ISIC 36 as well as sewage services in different ISIC breakdown (main, secondary and ancillary activities) and by households.

Within the above deliverables the following can be achieved:

1.Further disaggregation of the IO table with regard to environment related activities will be made: in particular the water sector will be split into ISIC 36 and ISIC 37; greater detail in agriculture by detailing type of product which is important for water consumption.
2.Using environmentally extended IO analysis (E-IO) it is possible based on the IO table that will become available from the IO project jointly with the physical water use table (or water consumption table) to perform policy relevant analyses such as calculating the indirect water use (e.g. virtual water) by final demand categories (final consumption by households and/or government, exports etc..).
3.Providing database for environmental account (resources and flow).
4.Obtain environmental indicators related to national production cost encompasses the natural resources consumption and pollution.
5.Physical data for flow of water within the economy.

1.The existing available administrative data is not sufficient to compile environmental account; therefore new data from surveys are needed.
2.Conducting multiple surveys are required to assess water use and supply as well as environmental protection expenditure in physical and monetary units in an economic activities classification compatible with National Accounts data and the IO table.
3.The project envisages three new water surveys (industry, agriculture and households). The construction sector is already covered by regular surveys. For government sector (both national and local) administrative data can be used. Services sector might be covered later depending on the provided fund. As a result, all sectors of the Jordan economy would be covered in a comprehensive way.
4.Given the nature of the subject, it's desirable that separate surveys are run better than adding additional questions to the existing surveys, as often the respondent person responsible for inventories and records to answer the existing regular surveys is different from the respondent person responsible for environment surveys. It's recommended that, by taking into consideration the costs, and in terms of priorities, the industry survey has the highest priority, followed by agriculture and households.

Water Statistics

Jordan ranked is one of the world's poorest countries in terms of water availability. In the face of scarcity of water and the opportunities to increase supply are few and very expensive, the government is trying to solve part of the problem through redistributing of the available sources of water to different uses.

Presently, the redistribution of available sources and the usage of sewage treated water for agricultural purposes is enough to meet the demand on water. Population and industries development and increase of demand on food will grow the demand on water. Such increase requires radical and efficient solutions.

The government's planning and future projects take into consideration alternative sources for water supply. Some of these projects depend on dams building, while others depend on the usage of non-traditional sources such as the reuse of treated water and desalinization of sea water.

Water Statistics looking for:

- Water Sources
- Surface water budget
- Water Supply
- Water Supply by Sector
- Water supply per capita
- Press on Water Abstraction
- Water Quality
- Imported and Exported Water
- Water Treatment Plants in Jordan

Water Accounts

- Work started on water account in 2006 and in progress on updating the previous tables 2008
- Work in progress on the tables related to emission account and values and cost of water and sewerage system
- In addition to break down of physical water supply on economic units.

Water Accounts

Water accounts considered one of the important subjects specially for countries with scare sources of water.

Comprehensive water accounts analysis will make possible to figure out the distribution of water among the different sectors in the country.

Detailed information will help decision maker to reallocate the distribution of water uses for sectors with higher production economically.

Allocations for domestic uses will increase over time due to population increase but do the expenses required for these services recovered? Water accounts provide answers for such questions .This is deal with some aspects of water accounts according to the available data.

Collection of data about the available assets for detailed water accounts reports required a complete staff and complete corporation of other governmental institution to available the required information to complete these parts. Moreover, the concentration on the fields included is a cause of enough experience to go deeply in water accounts.

Physical supply and use tables

In general, different economical activities can abstract water for different uses. In this concern the breakdown of the economic activities, classified according to ISIC Rev.4, distinguishes the following groups (UNSD, 2007):

- ISIC 1-3 which includes Agriculture, Forestry and Fishing;
- ISIC 5-33, 41-43 which includes: Mining and quarrying, Manufacturing and Construction;
- ISIC 35 - Electricity, gas, steam and air conditioning supply;
- **ISIC 36 - Water collection, treatment and supply;**
- ISIC 37 - Sewerage;
- ISIC 38, 39, 45-99, which corresponds to the Service industries.

ISIC 35, 36 and 37 have been separately identified because of their importance in the use and supply of water and water-related services. In particular, ISIC 36 and 37 are separately identified as they are key industries for the distribution of water and wastewater. Cost-recovery policies and policies aiming at improving the access to safe drinking water and sanitation are examples of policies involving almost exclusively these two economic activities.

ISIC 35 is a major user of water for hydroelectric power generation and cooling purposes: it abstracts and returns into the environment enormous quantities of water. Aggregating information on water use and supply by ISIC 35 with that of other industries would provide misleading information as the water use (and returns) of ISIC 35 alone may outweigh any other industry's water use (and returns).

In Jordan

Some economical activities are concerned concerning water use and supply.

The bolded ISICs is the major interested concerning water supply in use. In Jordan, Ministry of Water and Irrigation (MoW) is considered the main body responsible for water abstraction and supply.

Any water abstraction through the private sector for agricultural, industrial and domestic purposes is supervised by MoW. So, ISIC 36 regarding water collection, treatment and supply is represented by MoW. Non of the other activities abstract water without being reported by MoW.

This justifies the use of ISIC 36 as major and only contributor for water abstraction in Jordan.

Physical Use

•Physical water use table is concerned with water abstraction. The table divided the abstraction of water through two sources; from the environment and within the economy. The following definitions reflect the exact meaning of terms used in physical water use table (UNSD, 2007):

1. Abstraction: is defined as the amount of water that is removed from any source, either permanently or temporarily, in a given period of time for consumption and production activities. Water used for hydroelectric power generation is also considered as abstraction. The purpose is abstraction for own use and for distribution. Type of source is abstraction from water resources –(surface water, groundwater and soil water as in the asset classification)- and from other sources which include (sea water and precipitation.)

a.1 For own use: water is abstracted to be used by the same economic unit which abstracts it.

a.2 For distribution: abstraction to be supplied, possibly after some treatment, to other economic units.

Note: Most of the water is abstracted for distribution by ISIC 36, *Water collection, treatment and supply* -as the case of Jordan- however, there may be other industries which abstract and supply water as a secondary activity.

Water resources:

includes the abstraction of surface water, groundwater and soil water. Soil water can be defines as (UNSD, 2007): "water use in rainfed agriculture**,** this is computed as the amount of precipitation that falls onto agricultural fields". The excess of water, e.g. the part that is not used by the crop, is recorded as a return flow to the environment from rainfed agriculture. More the 60% of all food production in the world is produced under rainfed conditions.

Other resources:

includes the abstraction of sea water and the direct collection of precipitation for production and consumption activities, which is not applied in case of Jordan.

A typical example of collection of precipitation is roof rain harvesting by households.

In Jordan both activities are practiced, collection of precipitation and abstraction from the sea, but there is no available records as these two processes run individually and in minor quantities.

Use of water received from other economic units:
refers to the amount of water that is delivered to an industry, households or the rest of the world by another economic unit. This water is usually delivered through mains (pipes), but other means of transportation are not excluded (such as artificial open channels, etc.).

The use of water received from other economic units by the rest of the world corresponds to the **exports** of water. It is generally the industry, ISIC 36, which exports water.

Total use of water:
Total abstraction + Use of water received from other economic units

Physical supply

The supply of water to other economic units: refers to the amount of water that is supplied by an economic unit to another. It includes the supply by one establishment to another. The supply of water is recorded net of losses in distribution. The supply to other economic units generally occurs through mains, but can also occur through artificial open channels, trucks and other means. Note that the supply of water by the rest of the world corresponds to the **import** of water (UNSD, 2007).

a Reused water: as wastewater supplied to a user for further use with or without prior treatment, excludes recycling within industrial sites. It is also commonly referred to as *reclaimed wastewater*.

.b Wastewater to sewerage: water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. Wastewater can be discharged directly into the environment (in which case it is recorded as a return flow), supplied to a treatment facility (ISIC 37) (recorded as wastewater to Sewerage) or supplied to another industry for further use (reused water). Total wastewater generated by an economic unit is obtained from Table 3.1 as the sum of the supply of reused water, wastewater to sewerage and returns into the environment.

5. Total returns: include water that is returned to the environment. It is the sum of water returned to water resources (surface water, groundwater, and soil water) and other resources (e.g. sea water, water used for cooling, treated water).

6. Total supply of water: is computed as the sum of the amount of water supplied to other economic units and the amount of water returned to the environment.

Table 3.2 represents water supply table in Jordan in 2005. The total amount of water supply is 10303 MCM.

Water Consumption

The concept of water consumption gives an indication of the amount of water that is lost by the economy during use in the sense that it has entered the economy but has not returned either to water resources or to the sea. This happens because during use part of the water is incorporated into products, evaporated, transpired by plants or simply consumed by households or livestock. The difference between the water use (row 3 in Table 3.1) and the water supply (row 6 in Table 3.2) is referred to as water consumption. It can be computed for each economic unit and for the whole economy. The concept of water consumption used in the SEEAW is consistent with the hydrological concept. It differs, however, from the concept of consumption used in the national accounts which instead refers to water use.

For the whole economy, the balance between water flows can be written as

Total abstraction + Use of water received from other economic units = Supply of water to other economic units + Total returns + Water consumption

Note that since the total water supply to other economic units equals the total water use received from other economic units, the identity can be rewritten as:

Total abstraction = Total returns + Water consumption

Water consumption can include water that is stored, for example, in water towers, but this quantity is usually very small as water is generally stored only for a short period of time.
When water consumption is computed for each industry, it gives an indication of the industry's water use efficiency. Since water supply does not equal water use by industry, water consumption is computed as a difference between the supply and use by industry:
Water consumption by industry i = Total use of water by industry i – Total supply of water by industry i
If we take the perspective of the inland water resource system, the discharges of water into the sea should also be considered as lost water since this water, once in the sea, is not directly available for further use as it would be in the case, for example, of discharges into a river, where discharged water becomes a resource for downstream uses. The concept of inland water consumption is introduced to give an indication of the amount of water that is not returned to the inland water system. Inland water consumption is thus calculated as:
Inland water consumption = Water consumption + Returns to Other sources (e.g. sea water).
In Table 3.3 abstraction for own use is further disaggregated in the following uses:

- Hydroelectric power generation
- Irrigation water
- Mine water
- Urban runoff

Emission Accounts

Emissions to water refer to the direct release of pollutants to water as well as the indirect release by transfer to an off-site wastewater treatment plant (European Commission, 2000). The emission accounts focus only on the release of pollutants into water resources through the (direct and indirect through a wastewater treatment plant) discharge of wastewater into water resources.

Emission accounts record the amount of pollutant added to water by an economic activity during a reference period (generally the accounting year) and are expressed in terms of weight (kilograms or tonnes, depending on the pollutant under consideration). Emission accounts cover:

(a)pollutants added to wastewater and collected in the sewerage network;

(b)pollutants added to wastewater discharged directly to water bodies

(c)selected non-point sources emissions, namely emissions from urban runoff and from agriculture.

Point source emissions are those emissions for which the geographical location of the discharge of the wastewater is clearly identified. They include, for example, emissions from wastewater treatment plants, power plants, other industrial establishments.

Non-point (or diffuse) sources of pollution are sources without a single point of origin or a specific outlet into a receiving water body.

Pollutants are generally carried off the land by storm-water runoff or may be the result of a collection of individual and small scale polluting activities which for practical reasons cannot be treated as point sources of pollution. The commonly used categories for non-point sources include agriculture and urban areas.

The emission accounts record the pollution added to water by an economic unit and not the total pollution discharged with wastewater. This implies that, if an industry abstracts (or receives) 1 cubic meter of water which already contains x kg of a pollutant and returns to a river 1 cubic meter of wastewater containing y kg of the same pollutant, even though the total discharge of the pollutant to the river is y kg, only (y-x) kg is recorded as it represents the pollution generated by the industry. This has several implications for the measurement of emissions: the level of emissions is not given by the pollutants content of outgoing flows of water, but by the difference between the pollutants content of incoming and outgoing flows. While for drinking water the pollutant content should normally be negligible, for some other uses (e.g. cooling or process water) the pollutant content of the incoming water can be significant.

Gross and net emissions

1. **Gross emission:**
   The total amount of a pollutant generated by an economic unit measured at the point of discharge.

1**.a. Direct emission to water:** The amount of pollutant that is released directly into water (that is, it is contained in the direct discharge of wastewater into the environment).

1.a.1 Without treatment:

1.a.2 After on-site treatment:

1.a.i To water resources

1.a.ii To the sea

1.b. To Sewerage: The amount of pollutant that is released into the sewer system. The pollutant content of the urban runoff collected by ISIC 37 is included.

2. Reallocation of emission by ISIC 37:

3. Net emission: the sum of direct and indirect emission.

Water use of different economical sectors

High variations in the amount of water existed among different economical sectors. The services sector is the highest consuming of water and The lowest amount of consumed water registered in insurance.

The highest value of water consumed does not reflect necessarily, the highest contribution of activity in economy.
The contribution of each sector to gross domestic product can be used as a guide to reallocate the amounts of distributed water in Jordan.
.Manufacturing sectors shows high consumption of water qualities and the highest contribution of GDP.

For the other sectors, the contribution to GDP exceeded the value of the amount of used water.

In general, some sectors in Jordan such as mining and querying has effective use of water, because in this sector most of used water is treated and used once more for other purposes.

Progress and Plan Report of Water Accounts

Working plan

The major contributor difficulty for water accounts is the collection of data. In Jordan the different source of information makes a little bit difficult to run water accounts smoothly. The lack of availability of some data creates the need to estimate this data to be able to forward water accounts calculations.
Working in water accounts will be followed according to the following stages.

Stage 1: Data Collection

This stage will include water data collection. The collection of data will include:

1. Fresh water:
2. Surface water: supply and use for the different ISIC categories
3. Ground water: Supply and use for different ISIC categories
4.Treated water: supply and use
5.Water assets: including supply and sewage water treatment plants and transportation of fresh water and sewage water.
6.The expenditure of government sector for water use

Stage 2: Data manipulation

Some parts of data are collected in financial form, the quantities of these data required to be estimated. The produced figures will not represent 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. The purpose of the establishment of water accounts databases, the estimated amount of water for each ISIC is assumed to represent that ISIC in real.

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

Stage 3: Starting water accounts calculations

For the purpose of running water accounts, the UN guide tables will be used to found calculation tables for water accounts in Jordan. So, this stage requires the production of 11 tables including the following:

1.Physical use table
2.Emission accounts
3.Hybrid supply table
4.Hybrid accounts
5.Hybrid account for secondary and ancillary activities of sewerage
6.Economic accounts for collective consumption of government
7.National expenditure on sewerage services and related products
8.Financing of sewerage services and related products
9.Asset accounts
10.Economic accounts and supplementary information
11.Quality accounts
12.Detailed physical water supply and use tables
13.Matrix of transfers within the economy
14.Matrix of flows within the environment

Status of National Accounts and Water statistics in Jordan

- Data available on: Quantities of surface, ground water and treated waste water
- Quantities of water supply for municipal and industrial uses
- Detail information on water basins distributed by usage
- Waste water treatment plants on design and operation capacity,
- Detailed and specialized results on microbial and chemical tests and physical analysis on drinking water
- Quantity of water supply by source
- Water used for production and waste water generated by certain sectors depending on specialized surveys
- Cost of water consumed as a commodity in some sectors
- Cost of infra structure projects for water sectors.

Water sector challenges Water sector challenges

- Scarcity of renewable water resources
- Depletion of ground water
- High losses during distribution and weakness in delivery
- Limited waste water plants efficiency
- High population number and forced immigration

Difficulties in Environmental Statistic Division

1. Deficiency in detailed data related to natural resources ex. Water asset account describe stock at resources the beginning and end of an accounting
which is not available

2. Need of specialized studies related to degradation and pollution of resources which is expensive (effect of air pollution on health and valuation of water in agriculture depending on change in productivity approach)

3. Fear of under or over estimating of a resource

4. Training on calculation methodologies

The potential implementation of the SEEAW

The implementation of the SEEAW will take place in the the planned situation if the stuff given adequate training in the account methodologies, decide tow
employees to work full time for this topic and has enough money for the working group

The priority in environment division is for sustainable indicators in water, energy, air pollution and biodiversity statistic

Water Account Tables

- Stock Assets for water resources (Natural resources, surface water, groundwater, export and import)
- Physical data for flows of water within the economy and from economy to environment
- Data on flows of waterborne emissions from the economy to the environment
- Values and cost of water and sewerage in addition to assets and investment

Availability of data

- Inland water resources
- Physical data items for environment flow into and out of territory (Country)
- Natural transfer of water between inland water resources
- Flow of water from environment to economy
- Physical data for flow of water within economy

PSUT and Input-Output

- Consumption(water, energy, Natural resources)
- Emissions(Impact)

1. Wastewater
2. CO2
3. Waste

- Sustainability

ESCWA Adaptation of SEEAW Standard Table I: Physical use table

Physical units

		Industries (by ISIC categories)						Households	Rest of the world	Total
		1-3	Industry	35	36	37	Total			
From the environment	**1 - Total abstraction** (=1.a+1.b = 1.i+1.ii)	77.5	0.0	0.0	757.5	0.0	835.0	0.0		835.0
	1.a Abstraction for own use	77.5	0.0	0.0	0.0	0.0	77.5	0.0		77.5
	1.b Abstraction for distribution (=1.b.1+1.b.2+1.b.3)				757.5		757.5			757.5
	1.b.1 Freshwater resources				757.5					
	1.c.2 Desalinised groundwater				0.0					
	1.c.3 Desalinised sea water				0.0					
	1.i From water resources (=1.i.1+1.i.2+1.i.3)	77.5			757.5		835.0			835.0
	1.i.1 Surface water	77.5			258.4		335.9			335.9
	1.i.2 Groundwater (=1.i.2.1+1.i.2.2)				499.1		499.1			499.1
	1.i.2.1 Saline groundwater	0.0			0.0		0.0			0.0
	1.i.2.2 Fresh groundwater	0.0			499.1		499.1			499.1
	1.i.3 Soil water						0.0			0.0
	1.ii From other sources (=1.ii.1+1.ii.2)				0.0		0.0			0.0
	1.ii.1 Collection of precipitation						0.0			0.0
	1.ii.2 Abstraction from the sea				0.0		0.0			0.0
Within the economy	**2. Use of water received from other economic units** (=2.a+2.b +2.c)	503.9	23.0	0.0	0.0	130.9	657.7	179.6	0.0	837.3
	2.a Reused water	99.8	1.2	0.0	0.0		101.0	0.0		101.0
	2.b Wastewater to sewerage					130.9	130.9			130.9
	2.c Distributed water	404.1	21.8	0.0	0.0	0.0	425.9	179.6	0.0	605.5
3. **Total use of water** (=1+2)		581.4	23.0	0.0	757.5	130.9	1492.7	179.6	0.0	1672.3

Note: grey cells indicate zero entries by definition.

ESCWA Adaptation of SEEAW Standard Table II: Physical supply table

		Industries (by ISIC categories)						Households	Rest of the world	Total
		1-3	Industry	35	36	37	Total			
Within the economy	**4. Supply of water to other economic units**	0.0	14.2	0.0	605.5	101.0	720.6	116.7	0.0	837.3
	4.a Reused water					101.0	101.0			101.0
	4.b Wastewater to sewerage	0.0	14.2	0.0	0.0		14.2	116.7		130.9
	4.c Distributed water				605.5		605.5		0.0	605.5
To the environment	**5. Total returns** (=5.a+5.b)	0.0	0.0	0.0	0.0	29.9	0.0	0.0		29.9
	5.a To water resources	0.0	0.0	0.0	0.0	29.9	0.0	0.0		29.9
	5.a.1 Surface water	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
	5.a.2 Groundwater					29.9	0.0			29.9
	5.a.3 Soil water						0.0			0.0
	5.b To other sources (e.g. sea water)					0.0	0.0			0.0
6. Total supply of water (=4+5)		0.0	14.2	0.0	605.5	130.9	720.6	116.7		867.2
7. Consumption (3-6)		581.4	8.8	0.0	152.0	0.0	772.1	62.9		805.1

Note: grey cells indicate zero entries by definition.

Emission accounts

SEEAW Standard Table III: Gross and net emissions

Physical units

Pollutant	Industries (by ISIC categories)						Households	Rest of the world	Total
	1	2-33, 41-43	35	36	38,39, 45-99	Total			
1. Gross emissions (= a + b)									
1.a. Direct emissions to water (= 1.a.1 + 1.a.2 = 1.a.i + 1.a.ii)									
1.a.1. Without treatment									
1.a.2. After on-site treatment									
1.a.i. To water resources									
1.a.ii. To the sea									
1.b. To Sewerage (ISIC 37)									
2. Reallocation of emission by ISIC 37									
3. Net emissions (= 1.a + 2)									

SEEAW Standard Table IV: Emissions to water by ISIC 37

Physical units

Pollutant	ISIC 37
4. Emissions to water (=4.a+4.b)	
4.a. After treatment	
To water resources	
To the sea	
4.b.. Without treatment	
To water resources	
To the sea	

SEEAW Standard Table V: Hybrid supply table

Physical and monetary units

	Output of industries (by ISIC categories)							Imports	Taxes on products	Subsidies on products	Trade and transport margins	Total supply at purchaser's price
	1	2-33, 41-43	35		36	37	38,39, 45-99	Total output, at basic prices					
			Total	*of which:* Hydro								
1. Total output and supply (monetary units)												
of which:												
1.a Natural water (CPC 1800)												
1.b Sewerage services (CPC 941)												
2. Total supply of water (physical units)												
2.a - Supply of water to other economic units												
2.b - Total returns												
3. Total (gross) emissions (physical units)												
By Pollutants, 1, 2, ... n												

Note: Grey cells indicate zero entries by definition.

SEEAW Standard VI: Hybrid use table

Physical and monetary units

	Intermediate consumption of industries (by ISIC categories)							Actual final consumption				Capital formation	Exports	Total uses at purchaser's price
	1	2-33, 41-43	35		36	37	38,39, 45-99	Total industry	Households			Government			
			Total	*of which:* Hydro					Final consumption expenditure	Social transfers in kind from Government and NPISHs	Total				
1. Total intermediate consumption and use (monetary units)															
of which: Natural water (CPC 1800)															
Sewerage services (CPC 941)															
2. Total value added (monetary units)															
3. Total use of water (physical units)															
3.a Total Abstraction															
of which: 3.a.1- Abstraction for own use															
3.b Use of water received from other economic units															

Note: Grey cells indicate zero entries by definition.

SEEA W standard Table VII: Hybrid account for supply and use of water

Physical and monetary units

	Industries (by ISIC categories)							Rest of the world	Taxes less subsidies on products, trade and transport margins	Actual final consumption		Capital formation	Total
	1	2-33, 41-43	35		36	37	38,39, 45-99	Total industry				Households	Government		
			Total	of which: Hydro											
1. Total output and supply (Monetary units)															
of which for:															
1.a Natural water (CPC 1800)															
1.b Sewerage services (CPC 941)															
2. Total intermediate consumption and use (Monetary units)															
of which for:															
2.a Natural water (CPC 1800)															
2.b Sewerage services (CPC 941)															
3. Total value added (gross) (=1-2) (Monetary units)															
of which for:															
3.a Natural water (CPC 1800)															
3.b Sewerage services (CPC 941)															
4. Gross fixed capital formation (Monetary units)															
of which for:															
4.a Water supply															
4.b Water sanitation															
5. Closing stocks of fixed assets for water supply (Monetary units)															
6. Closing stocks of fixed assets for sanitation (Monetary units)															
7. Total use of water (Physical units)															
7.a Total Abstraction															
of which: 7.a.i- Abstraction for own use															
7.b Use of water received from other economic units															
8. Total supply of water (Physical units)															
8.a Supply of water to other economic units															
of which: 8.a.i- Wastewater to sewerage															
8.b Total returns															
9. Total (gross) emissions (Physical units)															
Pollutant 1															
Pollutant 2															
Pollutant ....n															

Note: Grey cells indicate zero entries by definition.

SEEAW Standard Table I: Physical use table

Physical units

		Industries (by ISIC categories)							Households	Rest of the world	Total
		1	2-33, 41-43	35	36	37	38,39, 45-99	Total			
From the environment	**1 - Total abstraction** (=1.a+1.b = 1.i+1.ii) 1.a Abstraction for own use 1.b Abstraction for distribution 1.i From water resources: 1.i.1 Surface water 1.i.2 Groundwater 1.i.3 Soil water 1.ii From other sources 1.ii.1 Collection of precipitation 1.ii.2 Abstraction from the sea										
Within the economy	**2. Use of water received from other economic units**										
3. **Total use of water** (=1+2)											

Note: grey cells indicate zero entries by definition.

SEEAW Standard Table II: Physical supply table

Physical units

		Industries (by ISIC categories)							Households	Rest of the world	Total
		1	2-33, 41-43	35	36	37	38,39, 45-99	Total			
Within the economy	**4. Supply of water to other economic units** *of which:* 4.a Reused water 4.b Wastewater to sewerage										
To the environment	**5. Total returns** (= 5.a+5.b) 5.a To water resources 5.a.1 Surface water 5.a.2 Groundwater 5.a.3 Soil water 5.b To other sources (e.g. sea water)										
6. Total supply of water (= 4+5)											
7. Consumption (3-6)											

Note: grey cells indicate zero entries by definition.

SEEAW Standard Table V: Hybrid supply table 2008

Physical and monetary units

	Output of industries (by ISIC categories)											
			35									
	1	2-33, 41-43	Total	*of which*: Hydro	36	37	38,39, 45-99	Total output, at basic prices	Imports	Taxes on products	Subsidies on products	Trade and transport margins	Total supply at purchaser's price
1. Total output and supply (monetary units)					51.1	15.4		66.5					72.1
of which:						0							
1.a Natural water (CPC 1800)					51.1			51.1					51.1
1.b Sewerage services (CPC 941)						15.4		15.4		5.6			21
2. Total supply of water (physical units)		20.7			349.3	119.5		489.5					
2.a - Supply of water to other economic units		20.7			349.3	101		471					
2.b - Total returns						18.5		18.5					
3. Total (gross) emissions (physical units)													
Pollutants													

Note: Grey cells indicate zero entries by definition.

SEEAW Standard VI: Hybrid use table 2008

Physical and monetary units

	Intermediate consumption of industries (by ISIC categories)								Actual final consumption						
			35						Households						
	1	2-33, 41-43	Total	*of which:* Hydro	36	37	38,39, 45-99	Total industry	Final consumption expenditures	Social transfers in kind from Government and NPISHs	Total	Government	Capital formation	Exports	Total uses at purchaser's price
1. Total intermediate consumption and use (monetary units)					32.9	14.1		47.0	0			7.7			54.7
of which: Natural water (CPC 1800)					32.9	0.0		32.9				5.4	97.8		136.1
Sewerage services (CPC 941)					0.0	14.1		14.1				2.3	41.9		58.3
2. Total value added (monetary units)					18.2	1.3		19.5							19.5
3. Total use of water (physical units)	581.5	37.7			486.6	119.5		1225.2							
3.a Total Abstraction	314.1	34.3			486.6	0.0		835.0							
of which: 3.a.1- Abstraction for own use	314.1	34.3			0.0	0.0		348.4							
3.b Use of water received from other economic units	267.3	3.4			0.0	119.5		390.2							

Note: Grey cells indicate zero entries by definition.

SEEAW Standard Table VII: Hybrid account for supply and use of water 2008

Physical and monetary units

	Intermediate consumption of industries (by ISIC categories)						Rest of the world	Tax es less subsidies on products, trade and transport margins	Actual final consumption		Capital formation	Total
	1	2-33, 41-43	36	37	38,39, 45-99	Total industry			Households	Government		
1. Total output and supply (Monetary units)			51.1	15.4		66.5		5.6				72.1
of which:						0						0
1.a Natural water (CPC 1800)			51.1			51.1						51.1
1.b Sewerage services (CPC 941)				15.4		15.4		5.6				21
2. Total intermediate consumption and use (Monetary units)			32.9	14.1		47				7.7		54.7
of which:				0		0					17.4	0
2.a Natural water (CPC 1800)			32.9			32.9				5.4		38.3
2.b Sewerage services (CPC 941)			0	14.1		14.1				2.3		16.4
3. Total value added (gross) (=1-2) (Monetary units)			18.2	1.3		19.5						17.4
4. Gross fixed capital formation (Monetary units)			97.8	41.9		139.7						139.7
of which:						0						0
4.a For water supply			97.8			97.8						97.8
4.b For water sanitation				41.9		41.9						41.9
5. Closing stocks of fixed assets for water supply (Monetary units)			1029.4			1029.4						1029.4
6. Closing stocks of fixed assets for sanitation (Monetary units)				441.2		441.2						441.2
7. Total use of water (Physical units)	**581.45**	**37.65**	486.61	119.5		1225.21			179.6			1404.81
7.a Total Abstraction	314.13	34.27	486.61	0		835.01			0			835.01
of which: 7.a.1- Abstraction for own use	314.13	34.27				348.4			0			348.4
7.b Use of water received from other economic units	267.32	3.38	0	119.5		390.2			179.6			569.8
8. Total supply of water (Physical units)		**20.7**	349.3	119.5		489.5			98.8			588.3
8.a Supply of water to other economic units		20.7	349.3	101		471			98.8			569.8
of which: 8.a.1- Wastewater to sewerage		20.7				20.7			98.8			119.5
8.b Total returns				18.5		18.5						18.5
9. Total (gross) emissions (Physical units)												
Pollutant 1												
Pollutant 2												
Pollutant ….n												

Note: Grey cells indicate zero entries by definition.

Data shortages

The calculation of the above tables will face many difficulties.
The difficulties will be resulted of the lack of the information required for the analysis specially those related to assets evaluation and the national expenditures on sewerage services and related products. Such information will be estimated as it is difficult to be calculated.

Advantages

- Input-Output analysis with integral part (environment) will be comparable with international analysis (MRIO multi regional input output)
- MRIO model asses whether the country's consumption and production system is improving its resources productivity or substituting by the import resources (estimate indirect material flow of the traded product)
- The main objective in establishment of environmental account is green-GDP and this will put Jordan in advance level in the middle east