CLOSING REGIONAL WORKSHOP FOR THE SEEA PROJECT

Development of Pilot Physical Supply and Use Tables for Water in Malaysia

Mohd Yusof Saari
Universiti Putra Malaysia

Date :

28-30 November 2017

Time :

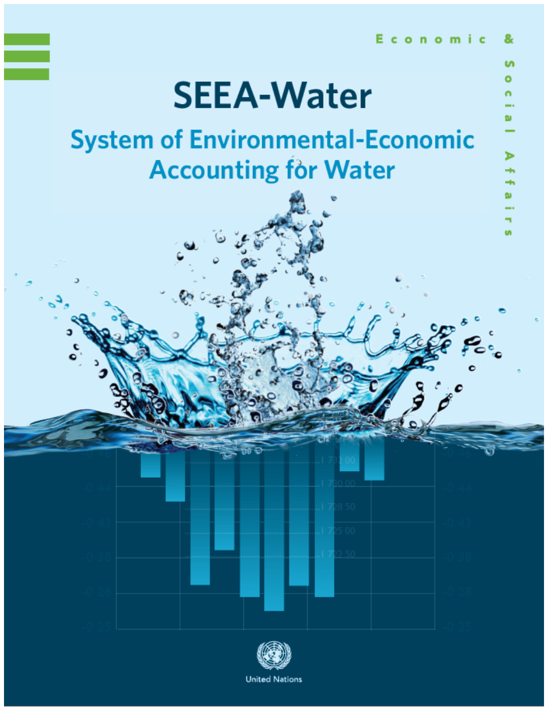
9:30 a.m – 5:00 p.m

Venue :

Hotel Alila, Jakarta, Indonesia

SUSTAINABLE DEVELOPMENT GOALS

Contents



1. Project setting
2. Data compilation and estimation
3. Issues and challenges
4. Way forward

1 Project Setting

- Deliverables

Duration of project– 16 months

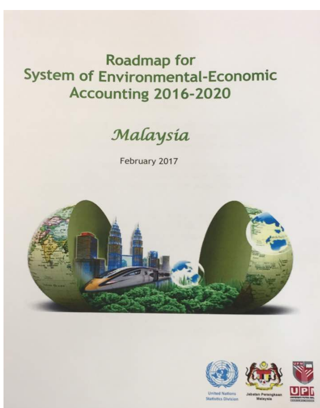
July 2016 ········ Dec/Jan ········ Jun/July ········ Oct 2017

Deliverables

Activity 1

1. **Materials** prepared in support of the assessment and an associated programme of work on environmental-economic accounting in Malaysia.

2. **National Plan** for Advancing Environmental-Economic Accounting in Malaysia



Activity 2(a)

1. Provisional tables and accounts for one selected SEEA module for Malaysia

   - Physical supply and use tables for water

Activity 2(b)

1. A final report that document the data sources, compilation process, findings and suggestions for future improvement on the selected SEEA module for Malaysia

   - Physical supply and use tables for water

1 Project Setting
- Deliverables

Launching Road Map for System of Environmental-Economic Accounting (RM-SEEA), November 27, 2017, Putrajaya

1 Project Setting
- Approach and methodology

Jul 2016 .... Dec 2016

Methodologies/approaches

Main activities/approaches

1. Systematic review of reports/ studies by relevant agencies
2. Research visits to relevant agencies
3. Focus-group discussion with relevant stakeholders
4. Research team review

Deliverables

Output 1a — **Materials** prepared in support of the assessment and an associated programme of work on environmental-economic accounting in Malaysia.

Output 1b — **A completed assessment reports** that identify policy priorities, country interests, relevant stakeholders and provide a summary of discussions during the bilateral and stakeholder meetings

Output 1c — **National Plan (draft and final)** for Advancing Environmental-Economic Accounting in Malaysia

1 Project Setting

- Approach and methodology

Jan 2017 .... Oct 2017

Methodologies/approaches

Main activities/approaches

1. Literature review of PSUT framework for the selected module
2. Data gap analysis
3. Data compilation and estimation
4. Internal consistency and calibration (validity and sensitivity analysis)
5. Technical working committee
6. Report documentation
7. Stakeholder training

Deliverables

Output 2a Physical supply and use table (PSUT) for water in Malaysia

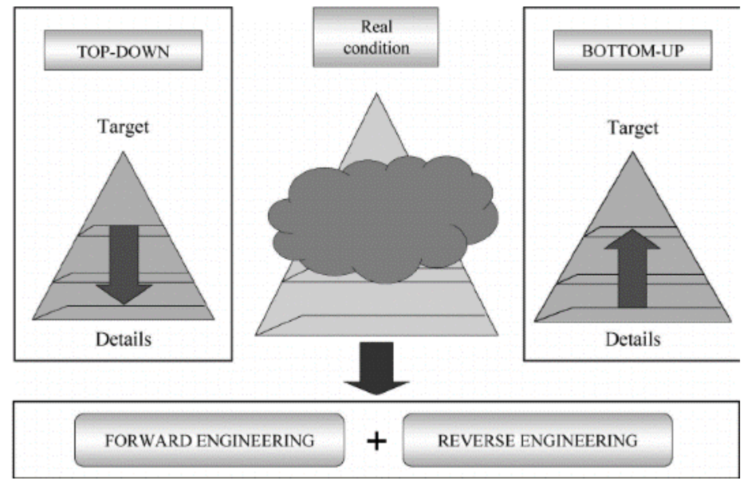
Output 2b **A final report** that document the data sources, compilation process, findings and suggestions for future improvement on the PSUT-water for Malaysia

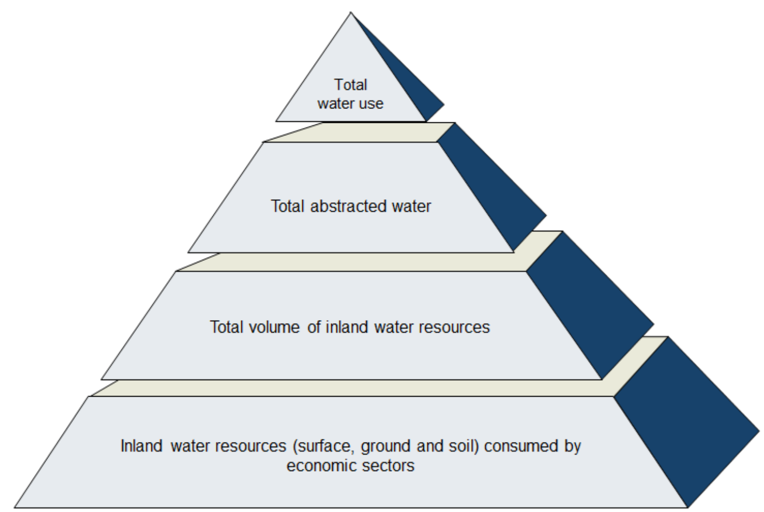
Red font indicates activities that have been completed or almost completed

Black font indicates activities that will be performed

2 Data Compilation and Estimation
- Top-down approach

- The top-down approach starts by building a highly aggregated PSUT, based on available information from the national statistics.
- Then, the data in the aggregate PSUT are used as control values when estimating the details of the separate PSUT accounts.
- Advantages of top-down approach:
  - ✓ Effective approach in dealing with data constraints. For the first time experience in developing PSUT like Malaysia, this approach is the most relevant.
  - ✓ Cost-effective due to the fact that it only requires a relatively short period to construct a balanced PSUT.
  - ✓ It yields a PSUT that is (in its aggregated form) perfectly in line with the official statistics.





2 Data Compilation and Estimation

- List of engaged agencies

In total, 33 agencies were engaged through workshops, meetings and visits

a) Agencies that deals with water management

EPU
ECONOMIC PLANNING UNIT
PRIME MINISTER'S DEPARTMENT, MALAYSIA

NRE

moa INCORPORATED
KEMENTERIAN PERTANIAN DAN INDUSTRI ASAS TANI

Ministry of Plantation Industries & Commodities Malaysia

SPAN
Suruhanjaya Perkhidmatan Air Negara

JMG

JABATAN PERTANIAN

JABATAN TAMAN LAUT MALAYSIA

JABATAN ALAM SEKITAR MALAYSIA

JPP

Jabatan Perikanan Malaysia

JABATAN PENGAIRAN DAN SALIRAN MALAYSIA

NAHRIM

Indah Water

SABAH STATE WATER DEPARTMENT

JKR SABAH

JABATAN BEKALAN AIR LUAR BANDAR JBALB SARAWAK

2 Data Compilation and Estimation

- List of engaged agencies

In total, 33 agencies were engaged through workshops, meetings and visits

b) Agencies that deals with environmental policies

2 Data Compilation and Estimation
- Main data sources

Suruhanjaya Perkhidmatan Air Negara

Jabatan Perangkaan
MALAYSIA

National Water Service Commission (SPAN)

SPAN compiles data for water industry that supplied by state water concessions. The following information obtained from SPAN

- Total abstraction water from surface and ground
- Distributed water
- Total wastewater (sewerage)
- Non-revenue water (loss during distribution)

Department of Statistics Malaysia (DOSM)

Data mainly extracted from Economic Census and Balance of Payment. These two data sources used to estimate following data

- Abstraction for own-use by sectors
- Consumption of distributed water by sectors
- Wastewater (sewerage) by sectors
- Exports and imports of water

Estimated using quantitative techniques

Quantitative techniques are applied to estimate the missing/unavailable data. The following techniques are used

- Residual estimates
- Applying proxy variables
- RAS techniques

The following water flows are estimated by using the quantitative techniques

- Seawater abstraction for aquaculture
- Seawater abstraction for electricity power generation
- Return flows to environment

2 Data Compilation and Estimation

- Physical use table

Physical use table for water (million cubic metre)	Abstraction of water: intermediretute consumption: Return flows						Final consumption	Flows from the rest of the world	Flows to the environment	Total use
					Services					
	Agriculture	Manufacturing	Mining and quarrying	Construction	Water collection	Other services	Households	Exports		
(I) Sources of abstracted water										
Inland water recources										
Surface water	2,044.80	0.11	52.73	0.03	5,463.07	0.05				**7,560.78**
Groundwater					74.34					**74.34**
Total	2,044.80	0.11	52.73	0.03	5,537.41	0.05				**7,635.12**
Other water sources										
Sea water	158.12					12.32				**170.44**
Total use abtracted water	2,202.92	0.11	52.73	0.03	5,537.41	12.37				**7,805.56**
(II) Abstracted water										
Distributed water	22.20	428.14	1.32	24.36		740.32	1,631.12	23.23		**2,870.70**
Own use	2,202.92	0.11	52.73	0.03	387.62	12.37				**2,655.78**
(III) Wastewater (sewerage)										
Wastewater received from other sources					4,394.82					**4,394.82**
(IV) Return flows of water										
Returns of water to the environment									7805.56	**7,805.56**
(V) Losses/trade balance										
Loss during distribution					2,302.32					**2,302.32**
Trade balance								23.15		**23.15**
Total use	**4,428.03**	**428.36**	**106.78**	**24.41**	**12,622.17**	**765.06**	**1,631.12**	**46.39**	**7,805.56**	**27,857.89**

Notes:

The surface water abstracted by each sectors is assumed to be fully consumed.

Groundwater is assumed to be consumed by the water entity.

Water abstracted for power generation (Other services) is assumed for cooling purpose is summed with water withdrawal for marine aquaculture.

Household's distributed water is obtained from SPAN. Balance of the distributed water to each sectors is then estmated using physical use ratio available in economic census 2010.

Household is assumed to have zero abstracted water for own use. The water abstracted for-own-use is exactly the same figures from physical supply table.

Public sewerage plant from SPAN, including all households and factories.

Assume the amount of water abstracted from the environment is fully discharged back to the environment.

This quantity of water loss is borne by the water entity due to leakage during transportation, illegal water tapping and malfunctioning meter.

The difference between water export to and import from singapore is treated as loss to the water concessionaires.

2 Data Compilation and Estimation

- Physical supply table

Physical supply table for water (million cubic metre)	Abstraction of water: Production of water; Generation of return flows							Flows from the rest of the world	Flows from the environment	Total supply
					Services					
	Agriculture	Manufacturing	Mining and quarrying	Construction	Water collection	Other services	Households	Imports		
(I) Sources of abstracted water										
Inland water recources										
Surface water									7,560.78	**7,560.78**
Groundwater									74.34	**74.34**
Total									7,635.12	**7,635.12**
Other water sources										
Sea water									170.44	**170.44**
Total supply abtracted water									7,805.56	**7,805.56**
(II) Abstracted water										
For distribution					5,149.79			46.39		**5,196.17**
For own-use	2202.92	0.11	52.73	0.03	387.62	12.37				**2,655.78**
(III) Wastewater (sewerage)										
Wastewater to treatment	1159.73	420.30	38.02	23.11	387.62	734.91	1631.12			**4,394.82**
(IV) Return flows of water										
Total return flows	1,065.39	7.95	16.03	1.28	6,697.13	17.78				**7,805.56**
Total supply	**4,428.03**	**428.36**	**106.78**	**24.41**	**12,622.17**	**765.06**	**1,631.12**	**46.39**	**7,805.56**	**27,857.89**

Notes:

- *River extraction & storage dam from SPAN plus output-adjusted water abstracted from DOSM table and data of water imported from Singapore obtained from Water Regulatory Body of Johor*
- *Ground water from SPAN*
- *Seawater withdrawal estimation using UK methodology for power generation, US Methodology for aquaculture*
- *Production of treated water for distribution and import from Singapore*
- *These figure is obtained using following steps. First, deduct the treated water for own use(backwash). The water abstracted for each sectors is then estimated following the output-adjusted structure in DOSM table. Aquaculture water withdrawal is then added into the agriculture sector.*
- *Public sewerage plant from SPAN, including all households and factories. Using control value from use table, since total return flow is known (loss in distribution plus discharge of total wastewater to treatment), the wastewater to treatment for this sector is fixed after the deduction. Then, the figure for households is assumed to be fully discharged from how much is consumed, then the remaining are distributed following the economic structure.*
- *Household is assumed to be generating zero return flow. The figures for remaining sectors using residual, except water entity. Since there is insufficient data and negative value, RAS is employed.*

3 Issues and challenges

- Practical issues related to data

Common issues

Data inconsistencies

- Different data sources apply different classifications
- Data at sectoral levels compiled by agencies are not similar to the aggregations of the common economic sectors (e.g. NWRS)
- Discrepancies between survey and non-survey data

Data missing/unavailable

- Some data are not entirely available and some are partially available
- Estimation for the missing/unavailable data is constrained by resources and time frame
- Statistical techniques are applied for the estimating missing/unavailable data

Derived/estimated data

- When data are missing/unavailable, three approaches are applied
    - Residual estimates (setting equality between use and supply tables
    - Applying proxy variable
    - RAS technique (bi-proportionate row and column iteration)

3 Issues and challenges
- Challenges

Challenges and potential solutions

Unavailable data

Challenges
- Current database does not capture important water flows (e.g. groundwater)
- It is likely our PSUT is underestimated

Potential solutions
- Improving current economic and environmental surveys
- Development of integrated data system.

Data coordination

Challenges
- Data are compiled by various agencies and no single agency is responsible for managing and recording water at national level
- SPAN only responsible for water industry

Potential solutions
- Regular engagement with relevant agencies through training
- Development of integrated data system. Currently Department of Irrigation and Drainage developing so-called *Sistem Maklumat Sumber Air Negara*

Reliability of estimation

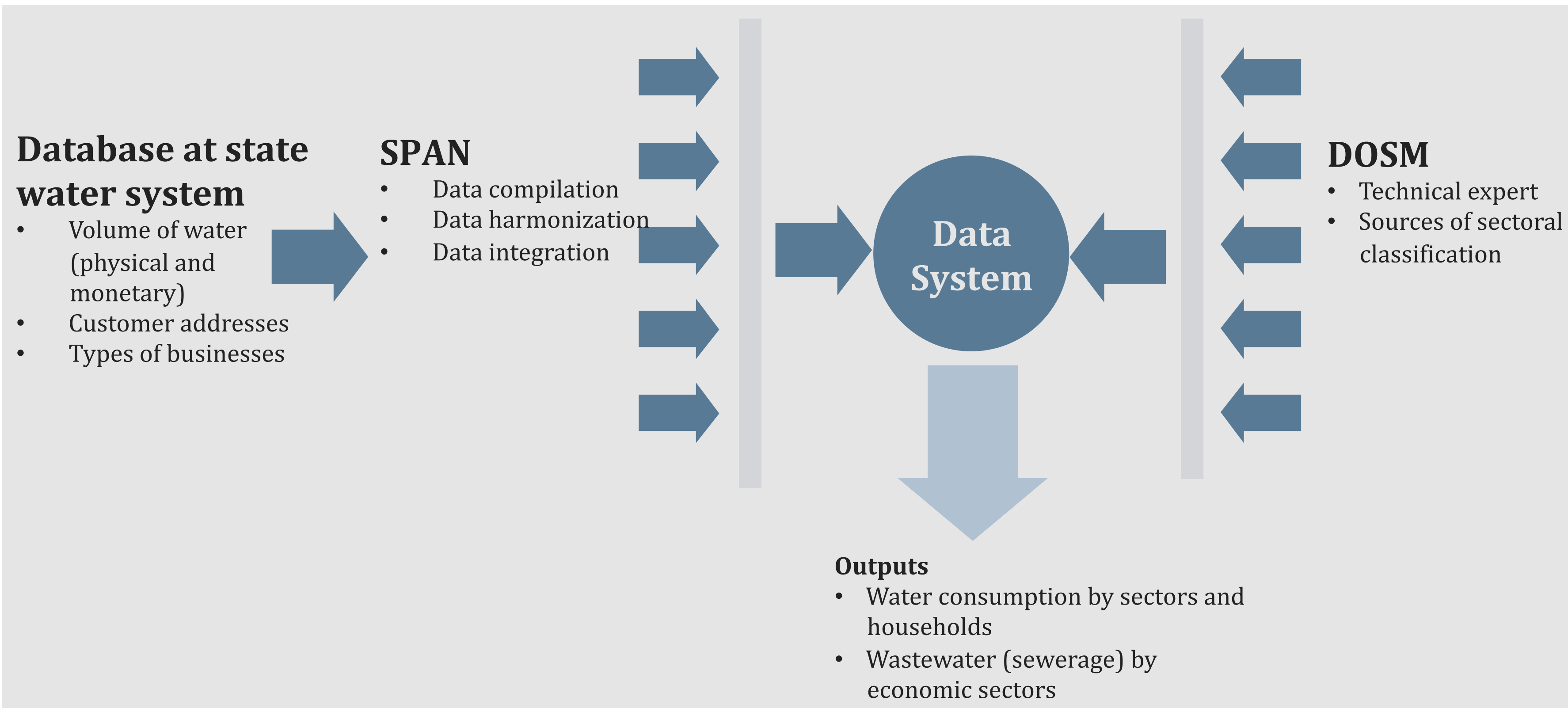
Challenges
- Validation of estimated data using statistical approaches is constrained by the availability of data
- In this pilot PSUT, we mostly rely on expert judgment

Potential solutions
- Site visit of representative firms for a particular sector
- Structural analysis of PSUTs for other countries (data sharing)

3 Issues and challenges

- Challenges

Example – proposed integrated data system that provides data for *distributed water* and *wastewater (sewerage)*



4 Way forward
- Future works to be considered

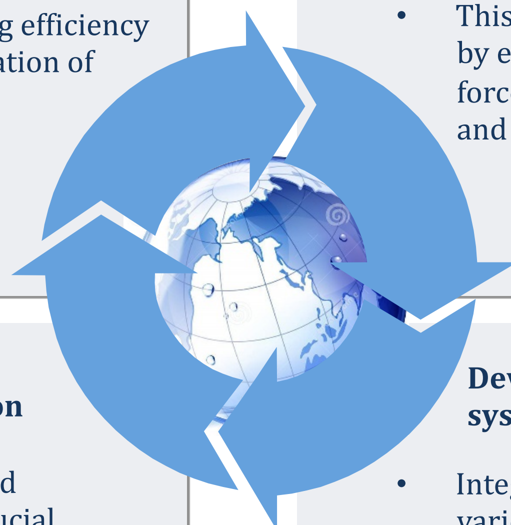
Potential activities for improving PSUT

Valuation in monetary term

- This is important for assessing efficiency in the development and allocation of water resources

Estimation of precipitation

- This water flow can be achieved by establishing a special task force between DOSM, NAHRIM and rain harvesting supplies



Expanding sectoral aggregation

- Expansion of Agriculture and Manufacturing sectors is crucial

Development of integrated data system

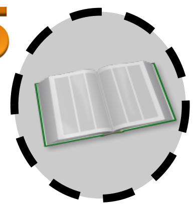
- Integrates and harmonizes various datasets from different agencies

4 Way forward

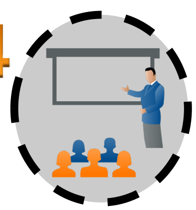
- Critical success factors

6 

Data dissemination
"Merakyatkan statistik"
Promote & advocate thru:
- Media – press release, launching by ministry via visualisation/social media
- Journals – collaboration with academia/organisation
- Roadshow

5 

Manual & reference for compiler
- Specific subsystem
- Simple explanation by modules
- Examples
- Presentation in simple table

4 

Capacity building
- Courses & training
- Workshop
- Assessment
- Attachment
- Meeting with experts
- Technical assistance
- Valuation

Critical success factor

1 

Commitment from management

2 

Commitment & collaboration from agencies/other parties
- Stakeholders
- Data provider
- Academia/Researcher
- International organisation

3 

Official agreement
- Access data
- Data verification

4 Way forward

- Public education/awareness

PRODUCTION

Using forensic economics to determine sustainability measures

THERE is growing concern about the impact of each country's economic activity on local and global environments.

Environmental problems that are caused by economic activities have led to the establishment of rules that seek to prevent environmental degradation and to make economic development compatible with the viability of natural resources.

This, for example, leads to the establishment of Sustainable Development Goals (SDGs), which contain an international agreement for actions to protect environments.

Production sectors in an economy are inter-related. For example, production of product sector A demands raw materials that are produced by sectors B and C.

Production of product sectors B and C also requires raw materials that are produced by other sectors.

Based on this illustration of economic interdependencies, there might be a case of emission released by the production of sector A, but which is contributed by other sectors.

In another case, if sector A is dependent on imported raw materials, then is it likely that other countries are exporting waste to our country.

The above examples illustrate the application of forensic economics to measure the contribution of each sector in production chains. Some applications of forensic economics fall under competition-law enforcement and legal review.

This letter explains the economy-wide accepted approach of how forensic economics is applied in the context of sustainability measures.

Water footprint, carbon footprint and material footprint are sustainability measures that are used in the application of forensic economics.

The water footprint measures the amount of water used to produce each of the goods and services we use.

It can measure a single process, such as growing rice; for a product, such as a pair of jeans or the fuel we put in cars; or for many products.

It also can also tell us how much water is being consumed by an economic sector in a certain region on a river basin located in other regions.

In addition footprints, gl (GVCs) are rel demands th forensic econo

GVCs break cesses into d can be carrie countries.

For example designed in th the inputs, su tors and p produced in S wan.

They are as and marketed United States.

Application for analysis of forensic economics for sustainability measures requires the development of system of environmental-economic accounting (SEEA). Where are we now in developing SEEA for Malaysia?

In the past few years, the Department of Statistics Malaysia had started to compile a SEEA database. Once SEEA is completed, policy makers can use it to analyse sustainability issues.

If SEEA integrates GVCs, then we can determine industries in countries that export products with high emission intensity.

DR MOHD YUSOF SAARI
Institute of Agricultural and Food Policy Studies, Universiti Putra Malaysia

Sources: https://www.nst.com.my/opinion/letters/2017/08/272830/using-forensic-economics-identify-sustainability-measures

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