

**JICA activities on SDG Indicator 6.3.1**  
**Introduction of Pilot Study on Methodology for SDG**  
**Indicator 6.3.1**

*The First General Meeting*  
*of*  
*Asia Wastewater Partnership (AWAP)*

*25 July 2018, Kitakyusyu*



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**Introduction of Pilot Study on Methodology for SDG Indicator 6.3.1**

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## I. What's SDG (from MDG to SDG)

On September 25th 2015, countries adopted a **set of goals** to end poverty, protect the planet and ensure prosperity for all as part of a new **sustainable development agenda**.

Each goal has specific targets to be achieved over the next 15 years.

**Sustainable Development Goal** relating to water and sanitation is **Goal 6** of SDGs.

Among the targets of Goal 6, **Target 6.2** and **6.3** are crucial for humankind, because

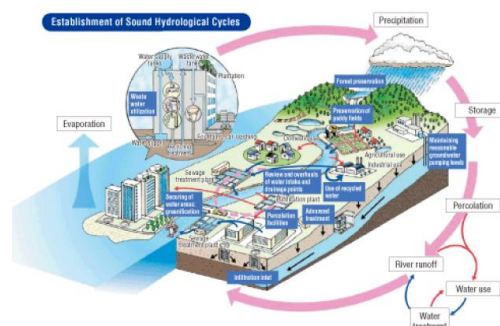


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## I. What's SDG (from MDG to SDG)

**Water** is an indispensable factor for maintaining the lives of humankind.

To maintain healthy and cultural life under sustainable development, it is required **to create and keep sound water cycle by preserving a good ambient water quality (SDG6.3.2)** and **utilizing water appropriately and effectively (SDG6.1.1)** including the provision of the services related to **safely managed sanitation (SDG6.2.1)** and **safely treated wastewater (SDG6.3.1)**.



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## I. What's SDG (from MDG to SDG)

### SDGs: Sustainable Development Goals

Following the Millennium Development Goals (MDGs),  
the new SDGs guide development policy and funding for the next 15 years



**SDG 6.2** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls

**Indicator 6.2.1** Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water

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## I. MDG to SDG

### III-2. SDGs: Sustainable Development Goals

Following the Millennium Development Goals (MDGs),  
the new SDGs guide development policy and funding for the next 15 years



**SDG 6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, **halving the proportion of untreated wastewater** and substantially increasing recycling and safe reuse globally

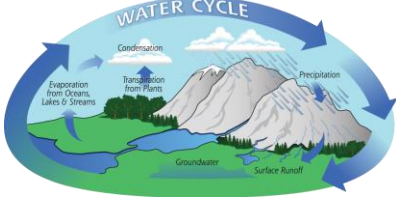
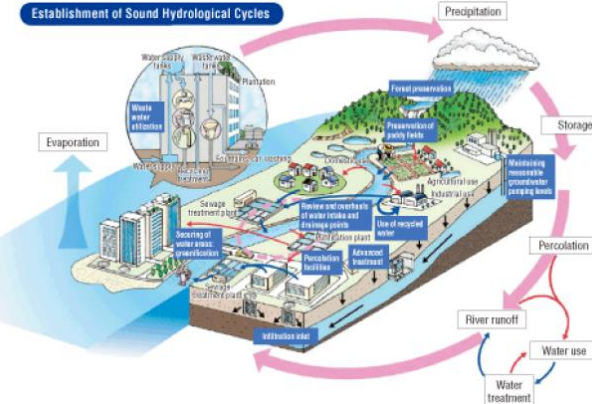
**Indicator 6.3.1** Proportion of wastewater safely treated

**Indicator 6.3.2** Proportion of bodies of water with good ambient water quality

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**Safely treated wastewater (6.3.1)**  
 is required to achieve  
**Good ambient water quality(6.3.2)**  
 for sound ecosystems  
 in a river basin.

**Discharged wastewater** will influence the **ambient water quality.**

**Pollution Source**

- Domestic Wastewater
- Industrial Wastewater
- Nonpoint Source (Fields, Run-off water from roads, etc.)

Source: [https://pmm.nasa.gov/education/sites/default/files/article\\_images/Water-Cycle-Art2A.png](https://pmm.nasa.gov/education/sites/default/files/article_images/Water-Cycle-Art2A.png)  
[http://www.mlit.go.jp/tochimizushigen/mizsei/water\\_resources/contents/responding\\_properly.html](http://www.mlit.go.jp/tochimizushigen/mizsei/water_resources/contents/responding_properly.html)

## I. What's SDG (from MDG to SDG)

While the SDGs are not legally binding, governments are expected to **take ownership** and **establish national frameworks for the achievement of the 17 Goals**.

Countries have the primary responsibility for **follow-up and review of the progress made in implementing the Goals**, which will require quality, accessible and timely data collection.

**Regional follow-up and review** will be based on **national-level analyses** and contribute to follow-up and review at the **global level**.

### SUSTAINABLE DEVELOPMENT GOALS 17 GOALS TO TRANSFORM OUR WORLD



Source: <http://www.un.org/sustainabledevelopment/development-agenda/>

## I. What's SDG (from MDG to SDG)

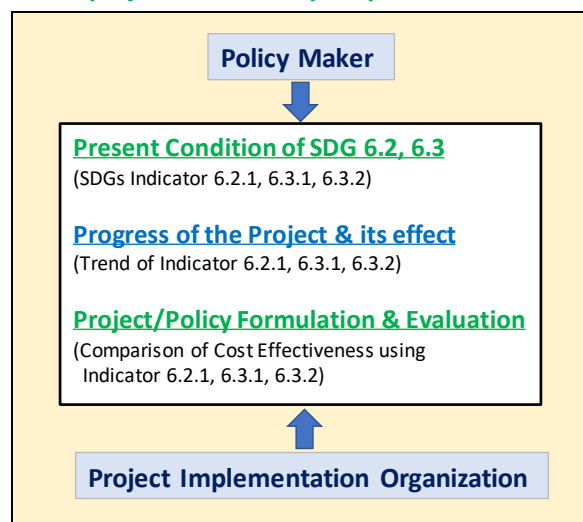
**SDGs:** Following the Millennium Development Goals (MDGs), **the new SDGs guide development policy and funding for the next 15 years**



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## I. What's SDG (from MDG to SDG)

Monitoring of indicator SDG 6.3.1 is useful to **recognize the present situation** and **the progress** regarding safely treated wastewater and to **evaluate the effectiveness of the project and/or the policy** for the achievement of SDG.



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## II-1. Objectives and Contents of the Study

### Objectives

to **propose appropriate and feasible monitoring methodology** and to **identify difficulties, gaps and important issues** to conduct the **monitoring activities** related to SDG 6.3.1 in Vietnam and do **feedback for the refinement of the monitoring** methodology proposed for the indicator of SDG 6.3.1 by WHO.

### Contents

- Proposed Methodology on SDG6.3.1 in Vietnam
- Existing Issues on Methodology on SDG6.3.1 in Vietnam
- Trial Estimation of SDG6.3.1 in Vietnam
- Findings in Vietnam and Recommendations to Other Countries
- **Recommendation for the monitoring of SDG indicator 6.3.1 and the achievement of SDG 6.3**

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## II-2. Recommendation based on the Results of the Study

Recommendation for the monitoring of SDG indicator 6.3.1 and the achievement of SDG 6.3

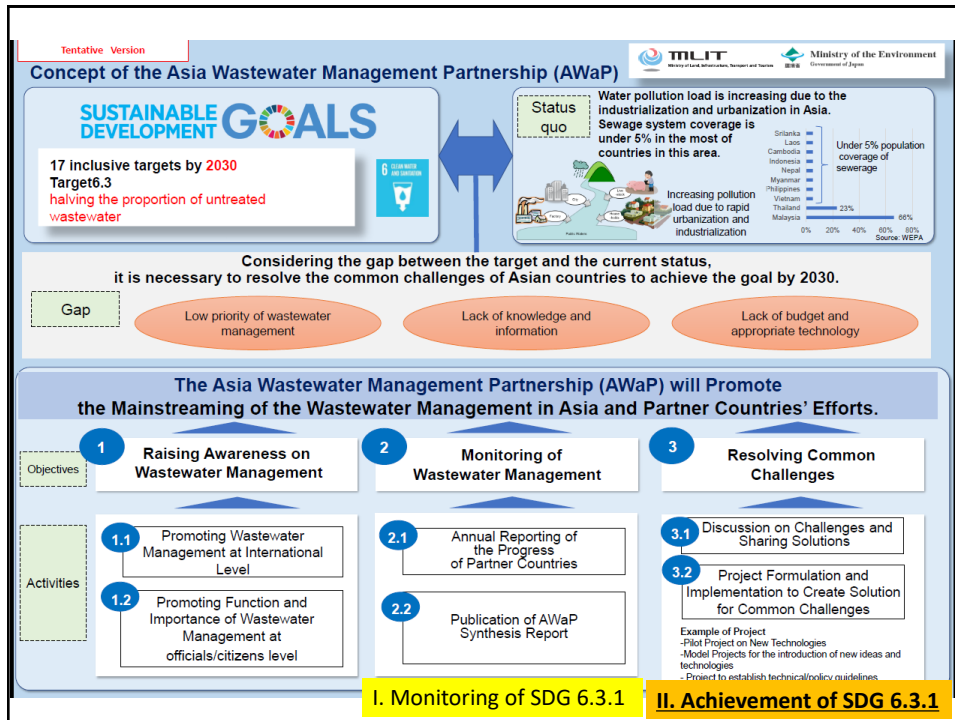
### I. Monitoring of SDG 6.3.1 ➡ **AWaP Objective 2**

Reliable, consistent and, whenever possible, **disaggregated data** are essential to **stimulate political commitment, inform policy-making and decision-making**, and **trigger well-placed investments** towards health, environment and economic gains (SDG 6 Synthesis Report on Water and Sanitation).

### II. Achievement of SDG 6.3.1 ➡ **AWaP Objective 3**

The **safely treated wastewater** could be obtained by **well-designed facilities** which are **managed properly** with **regular quality monitoring** based on the **appropriate planning** and **legal framework**.

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## II-2. Recommendation based on the Results of the Study

### I. Monitoring of SDG Indicator SDG 6.3.1

1. Institutional and Management Arrangements
2. Capacity Development for SDG indicators monitoring
3. Financial System for monitoring SDG indicator monitoring
4. Analyzing and disaggregating data relating to domestic wastewater
  - Domestic Wastewater (Off-site AND On-site), Industrial Wastewater ([AWaP & WEPA](#))

### II. Achievement of SDG 6.3.1

1. Technology Options
  - Off-site Treatment and On-site Treatment,
  - Technology Evaluation and Establishment of Design and O&M Manuals
2. Institutional Arrangements including Capacity Development
3. Formulation of Legal System:
  - Effluent water quality regulation and monitoring(WEPA)
  - Environmental water quality standard(WEPA)
  - Management of wastewater treatment systems
4. Public Relation and/or Citizen's Participation
5. Financial System for Sanitation and Wastewater Management
6. Planning : Establishment of planning procedure and methods to reflect SDG indicator monitoring result and linkage of SDG indicators and policy

## II-2-I. Recommendation for Monitoring of SDG 6.3.1

### 4) Analyzing and disaggregating data relating to domestic wastewater treated by off-site and on-site systems and industrial wastewater

#### (1) Domestic Wastewater (Off-site)

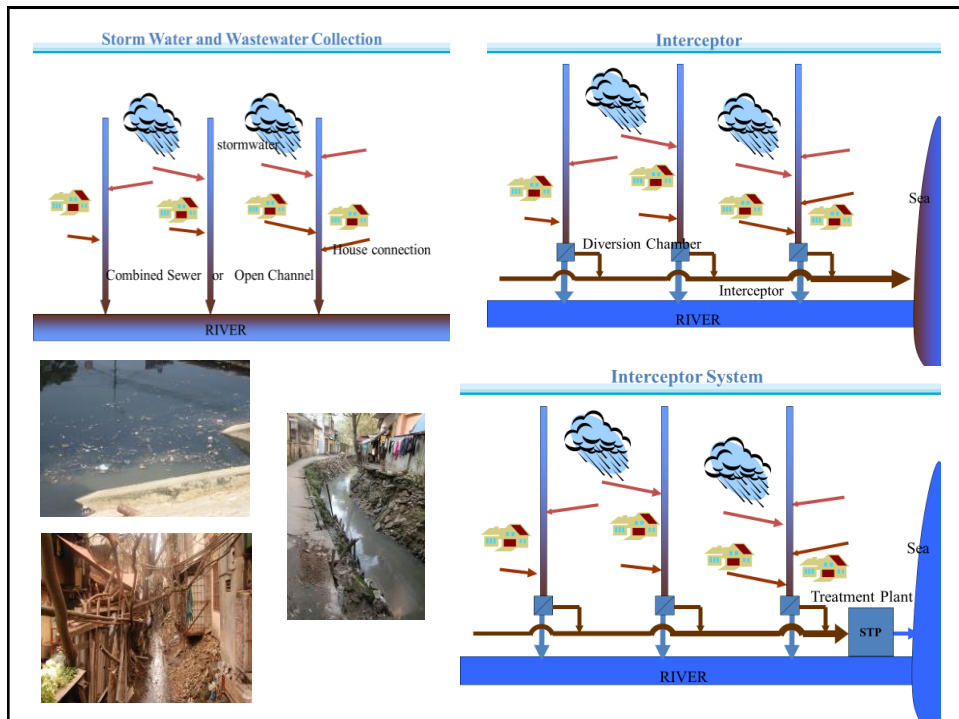
- **Sewer connected system:** Data collection of SDG Indicator 6.2 would be applicable. (Population base)

Progress on Drinking Water, Sanitation and Hygiene Update and SDG Baselines 2017 (WHO/UNICEF)

| REGION | Year | NATIONAL   |                  |                     |                    |                    |              | RURAL  |                |                  |                     |                    |                    | URBAN  |                   |                |                  |                     |                    |                    |              |                   |
|--------|------|--|------------------|---------------------|--------------------|--------------------|--------------|--|----------------|------------------|---------------------|--------------------|--------------------|--|-------------------|----------------|------------------|---------------------|--------------------|--------------------|--------------|-------------------|
|        |      | Proportion of population using improved sanitation facilities (excluding shared) |                  |                     |                    |                    |              | Proportion of population using improved sanitation facilities (excluding shared) |                |                  |                     |                    |                    | Proportion of population using improved sanitation facilities (excluding shared) |                   |                |                  |                     |                    |                    |              |                   |
|        |      | Safely managed   | Disposed in situ | Empiled and treated | Wastewater treated | Latrines and other | Septic tanks | Sewer connections  | Safely managed | Disposed in situ | Empiled and treated | Wastewater treated | Latrines and other | Septic tanks   | Sewer connections | Safely managed | Disposed in situ | Empiled and treated | Wastewater treated | Latrines and other | Septic tanks | Sewer connections |

- Safely treated wastewater collected by **Interceptor System** would be estimated by the different method from that of sewer connected system (Design or actual flow rate of WWTP)
- In case of **interceptor system**, it is necessary to establish the data collection system (MOC, DOC, GSO, PC, Service provider, etc.)

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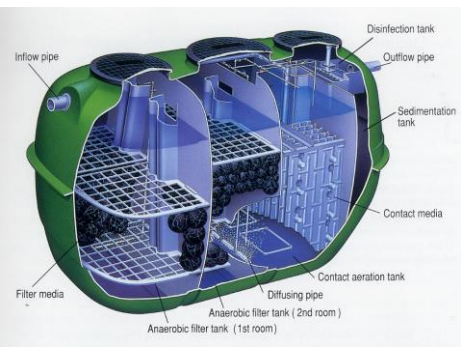


## II-2-1. Recommendation for Monitoring of SDG 6.3.1

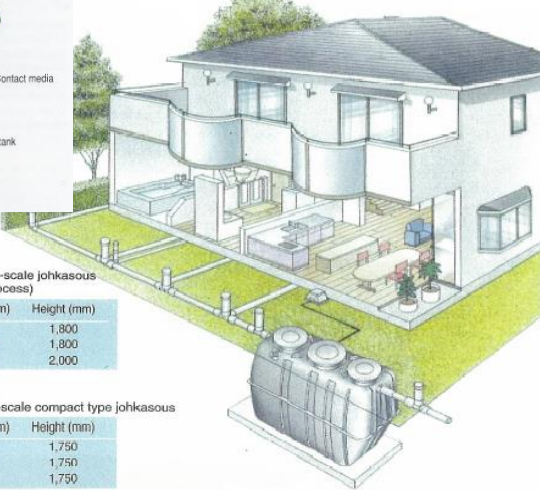
### (2) Domestic Wastewater (On-site)

- **Treatment performance of Septic Tank** would be insufficient even if sludge in the tank would be emptied regularly through pumping and septage would be transferred to a treatment plant (**Necessity of further study**)
- As the data of on-site system such as Johkasou and other type of **decentralized system of which treatment performance meets the standards** has not been collected by JMP, it is necessary to establish **the data collection system** for such kind of on-site system. (MOC, DOC, GSO, PC, Service provider, etc.)
- If the data of Septic Tank collected by JMP would be used in SDG 6.3.1, it's necessary to **evaluate and examine the treatment performance of Septic Tank whether the effluent water quality meets the standards or not.**

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### Johkasou System



**Table 5.1 Dimensions of typical small-scale johkasous (anaerobic filter - contact aeration process)**

| NUD | Width (mm) | Length (mm) | Height (mm) |
|-----|------------|-------------|-------------|
| 5   | 1,200      | 2,400       | 1,800       |
| 7   | 1,500      | 2,700       | 1,800       |
| 10  | 1,700      | 3,200       | 2,000       |

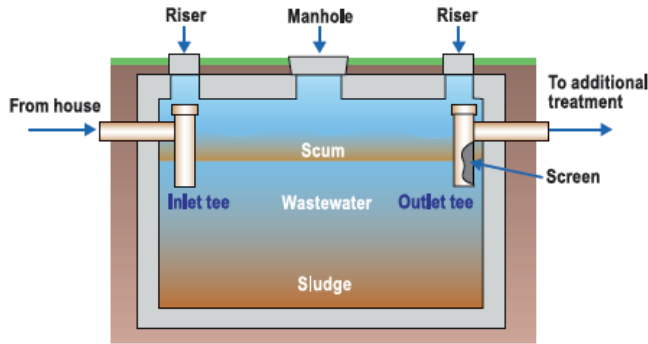
**Table 5.2 Dimensions of typical small-scale compact type johkasous**

| NUD | Width (mm) | Length (mm) | Height (mm) |
|-----|------------|-------------|-------------|
| 5   | 980        | 2,155       | 1,750       |
| 7   | 980        | 2,775       | 1,750       |
| 10  | 1,230      | 3,115       | 1,750       |

[https://www.env.go.jp/recycle/jokaso/pamph/pdf/wts\\_full.pdf](https://www.env.go.jp/recycle/jokaso/pamph/pdf/wts_full.pdf)

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### Structure and Treatment Principal of Septic Tank



### Differences between septic tanks and johkasou

| Septic tank                         | Johkasou                          |
|-------------------------------------|-----------------------------------|
| · anaerobic treatment               | · aerobic treatment               |
| · additional treatment is necessary | · effluent is discharged directly |
| · low treatment performance         | · high treatment performance      |

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## Technical Standards for Wastewater Treatment Processes (On-site: Johkasou)

| Class | Type of treatment                                       | Treatment process   | Number of users for design                       |               |                  |             |  |      |      | BOD removal rate | Treatment performance   |            |            |           |
|-------|---|---|--|---------------|------------------|-------------|--|------|------|------------------|-------------------------|------------|------------|-----------|
|       |   |   | 5  | 50            | 100              | 200         | 500  | 2000 | 5000 |                  | Effluent quality (mg/l) |            |            |           |
|       |   |   |  |               |                  |             |  |      |      |                  | BOD                     | COD        | T-N        | T-P       |
| 1     | Combined domestic wastewater treatment                  | Separation-contact aeration process                               | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | 90% or more      | 20 or less              | —          | —          | —         |
|       |   | Anaerobic filter-contact aeration process                         | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
|       |   | Denitrification type anaerobic filter-contact aeration process    | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
| 4     | Flush toilet wastewater treatment                       | Septic tank process   | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | 55% or more      | 120 or less             | —          | —          | —         |
| 5     | Wastewater treatment                                    | Land infiltration process   | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | SS: 55% or more  | SS: 250 or less         | —          | —          | —         |
| 6     | Combined domestic wastewater treatment                  | Rotating biological contactor process                             | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | 90% or more      | 20 or less              | 30 or less | —          | —         |
|       |   | Contact aeration process  | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
|       |   | Trickling filter process  | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
|       |   | Extended aeration process   | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
|       |   | Conventional activated sludge process                             | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
| 7     | Combined domestic wastewater treatment                  | Contact aeration and trickling filter process                     | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | —                | 10 or less              | 15 or less | —          | —         |
|       |   | Coagulation separation process                                    | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
| 8     | Combined domestic wastewater treatment                  | Contact aeration and activated carbon absorption process          | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | —                | 10 or less              | 10 or less | —          | —         |
|       |   | Coagulation separation and activated carbon absorption process    | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
| 9     | Combined domestic wastewater treatment                  | Nitrified water recirculation type activated sludge process       | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | —                | 10 or less              | 15 or less | 20 or less | 1 or less |
|       |   | Tertiary treatment type denitrification dephosphorization process | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
| 10    | Combined domestic wastewater treatment                  | Nitrified water recirculation type activated sludge process       | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | 10 or less       | 15 or less              | 15 or less | 1 or less  | —         |
|       |   | Tertiary treatment type denitrification dephosphorization process | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
| 11    | Combined domestic wastewater treatment                  | Nitrified water recirculation type activated sludge process       | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      | 10 or less       | 15 or less              | 10 or less | —          | —         |
|       |   | Tertiary treatment type denitrification dephosphorization process | [Bar chart showing performance for 5-5000 users] |               |                  |             |  |      |      |                  |                         |            |            |           |
| 12    | Emission standard under the Water Pollution Control Law | Class: 6-11   | COO (mg/l): 60                                   | SS (mg/l): 70 | n-Hex (mg/l): 20 | pH: 5.8-8.6 | Total coliforms (N/m <sup>3</sup> ): 3,000 or less |      |      |                  |                         |            |            |           |
|       |   | 6-11  | 45   | 60            | 20               | 5.8-8.6     | 3,000 or less                                      |      |      |                  |                         |            |            |           |
|       |   | 6-11  | 30   | 50            | 20               | 5.8-8.6     | 3,000 or less                                      |      |      |                  |                         |            |            |           |
|       |   | 7-11  | 15   | 15            | 20               | 5.8-8.6     | 3,000 or less                                      |      |      |                  |                         |            |            |           |
|       |   | 8   | 10   | 15            | 20               | 5.8-8.6     | 3,000 or less                                      |      |      |                  |                         |            |            |           |

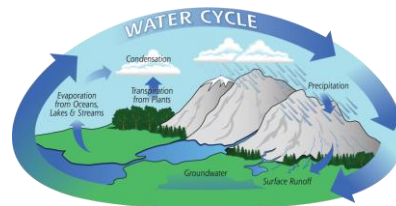
### Technology Evaluation and Design and O&M Manual

## II-2-I. Recommendation for Monitoring of SDG 6.3.1

### (1), (2) Domestic Wastewater (Off-site and On-site)

- Safely treated wastewater could be calculated by **combination of performance base and technology base**. (In case of **performance base**, specific treatment process (technology) to satisfy the performance is needed, and in case of **technology base**, the performance of specific treatment process (technology) should be evaluated and examined.)
- **Necessary level of safely treated wastewater** would be decided based on **the condition of receiving water body** related with SDG 6.3.1 (Good Ambient Water Quality)

**Safely treated wastewater (6.3.1)** is required to achieve **Good ambient water quality(6.3.2)** for sound ecosystems in a river basin.



**Discharged wastewater** will influence the **ambient water quality**.

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## Technical Standards for Wastewater Treatment Processes (Off-site)

Planning Final Effluent Water Quality should be defined considering the condition of public water bodies in which treated effluent water is discharged (Sewerage Law).

| Item | Planning Final Effluent Water Quality(mg/l) |       |   | Typical Wastewater Treatment Process             | Additional Treatment                    |                       |                            |  |
|------|---|-------|---|--|---|-----------------------|----------------------------|--|
|      | BOD   | T-N   | T-P                                     |  | Rapid Filtration                        | Addition of Caogulant | Addition of Organic Matter |  |
| 1    | >10   | >10   | >0.5                                    | Anaerobic-Anoxic-Oxic Process                    | ○                                       | ○                     | ○                          |  |
| 2    |   |       | 0.5-1                                   | Recycled Nitrification / Denitrification Process | ○                                       | ○                     | ○                          |  |
| 3    |   |       | 1-3                                     | Anaerobic-Anoxic-Oxic Process                    | ○                                       |                       | ○                          |  |
| 4    |   |       | -                                       | Recycled Nitrification / Denitrification Process | ○                                       |                       | ○                          |  |
| 5    |   | 10-20 | >1                                      | Recycled Nitrification / Denitrification Process | ○                                       | ○                     |                            |  |
| 6    |   |       | 1-3                                     | Anaerobic-Anoxic-Oxic Process                    | ○                                       |                       |                            |  |
| 7    |   |       | -                                       | Recycled Nitrification / Denitrification Process | ○                                       |                       |                            |  |
| 8    |   |       | -                                       | >1   | Anaerobic-Oxic Activated Sludge Process | ○                     | ○                          |  |
| 9    |   |       | -                                       | 1-3  | Anaerobic-Oxic Activated Sludge Process | ○                     |                            |  |
| 10   |   |       | -                                       | -  | Conventional Activated Sludge Process   | ○                     |                            |  |
| 11   | 10-15                                       | >20   | >3                                      | Anaerobic-Anoxic-Oxic Process                    |   |                       |                            |  |
| 12   |   |       | -                                       | Recycled Nitrification / Denitrification Process |   |                       |                            |  |
| 13   |   | >3    | Anaerobic-Oxic Activated Sludge Process |  |   |                       |                            |  |
| 14   |   | -     | -                                       | Conventional Activated Sludge Process            |   |                       |                            |  |

Same Level of Conventional Activated Sludge Process: OD, SBR, BAF, etc

[http://www.sbmc.or.jp/english/200407/Partial\\_amendment\\_of\\_Enforcement\\_Order\\_of\\_the\\_Sewerage\\_Law.htm](http://www.sbmc.or.jp/english/200407/Partial_amendment_of_Enforcement_Order_of_the_Sewerage_Law.htm)

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## II-2-I. Recommendation for Monitoring of SDG 6.3.1

### (3) Industrial Wastewater

- Not enough data concerning total generated wastewater and safely treated wastewater
- Producing of **consistent industrial wastewater inventories**
- Institutional arrangement and capacity development for **monitoring of effluent water quality (Inspection)**
- Creating the **database relating to EIA, Inventory, Monitoring (Inspection), Penal Provision**, etc.
- It is necessary to establish the **data collection system** (MONRE, DONRE)
- **In case of Industrial Wastewater connected to public WTPP** (MONRE/DONRE, or MOC/, DOC, GSO, PC, WTPP O&M Service provider, etc.)

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## II-2-II. Recommendation for Achievement of SDG 6.3.1

### 1) Technology Options: Wastewater treatment process, Reliable facilities and equipment, O&M measures

- For safely treated wastewater, **specific treatment process (technology) to meet the effluent water quality standards is requested, and the performance of specific treatment process (technology) should be evaluated and examined.**
- Based on the evaluation of the treatment process (technology), formulation of design and O&M manual would be requested to treat wastewater safely and steadily.
- **Innovation of technology will accelerate the efficiency of wastewater treatment and management and have an impact on existing systems**

National Government develops **Technology Standards** in collaboration with local governments, Japan Sewage Works Association and Japan Sewage Works Agency

**Technology Standards** helps local governments to conduct sewage works properly.

Design guideline



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## II-2-II. Recommendation for Achievement of SDG 6.3.1

### 5) Financial System and Mechanism for Sanitation and wastewater management: Construction and O&M Cost for sanitation and domestic, commercial and industrial wastewater

“The efficiency of existing financial resources and mobilizing additional and innovative forms of domestic and international finance must be increased.” (SDG 6 Synthesis Report on Water and Sanitation)

- Establishment of construction and O&M cost sharing principles (3T: Tariff, Tax, Transfer)
- Increase of the awareness and understanding of citizens as tax payers and users
- Necessity of asset management by taking the following aspects into consideration
  - Long-term basis forecast of income and expenditures considering the lifespan of the facilities and the increased numbers of users
  - Appropriate economic management based on tangible business objectives, precise business analysis and future business prospects
  - Accountability and disclosure of management information to the citizens, tax payers and users who bear user charge

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## II-2-II. Recommendation for Achievement of SDG 6.3.1

### 6) Planning: Establishment of planning procedure and methods to reflect SDG indicator monitoring result and linkage of SDG indicators and

- **Stepwise approach**: Example of Haiphong: Promotion of septage management (SDG 6.2) and sewage works (SDG 6.3)
- **Basin-wide planning** can be developed by “pollution load analysis”. By pollution load analysis, based on the coordination of stakeholders effective treatment systems planned for the river basin to meet the environmental water quality standards. For the analysis, the generated and discharged load (pollution load of human excreta and grey water, performance of treatment process) and the run-off ratio in the river basin is needed.
- Formulation of **short, middle and long term planning reflecting the indicator to achieve SDG 6.3** based on the effective strategy and policy relating to above mentioned aspects

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## II-2-II. Recommendation for Achievement of SDG 6.3.1

### 7) Linking and disseminating national, regional and global information and knowledge

#### ➤ WEPA: Water Environment Partnership in Asia

WEPA is a knowledge network programme established in 2004, with 13 countries in Asia. This program aims to **improve the water environment in Asia** by providing partner countries with necessary, relevant information and knowledge to strengthen water environmental governance.

#### ➤ AWaP: Asia Wastewater Management Partnership

AWaP was proposed at The Third Asia-Pacific Water Summit (11th - 12th December, 2017 in Myanmar). This partnership will organize a regular meeting to share good practices and technologies, **provide knowledge and know-how and tackle with common issues for wastewater management in collaborative projects of partner countries.** Establishment of AWaP is scheduled for July 2018.

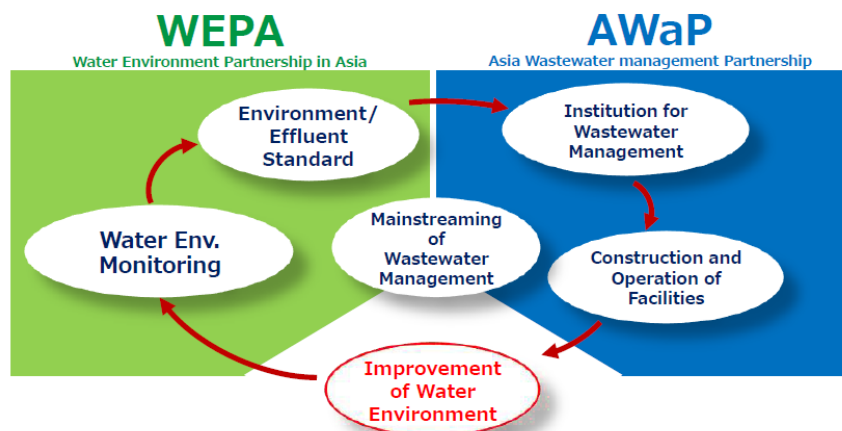
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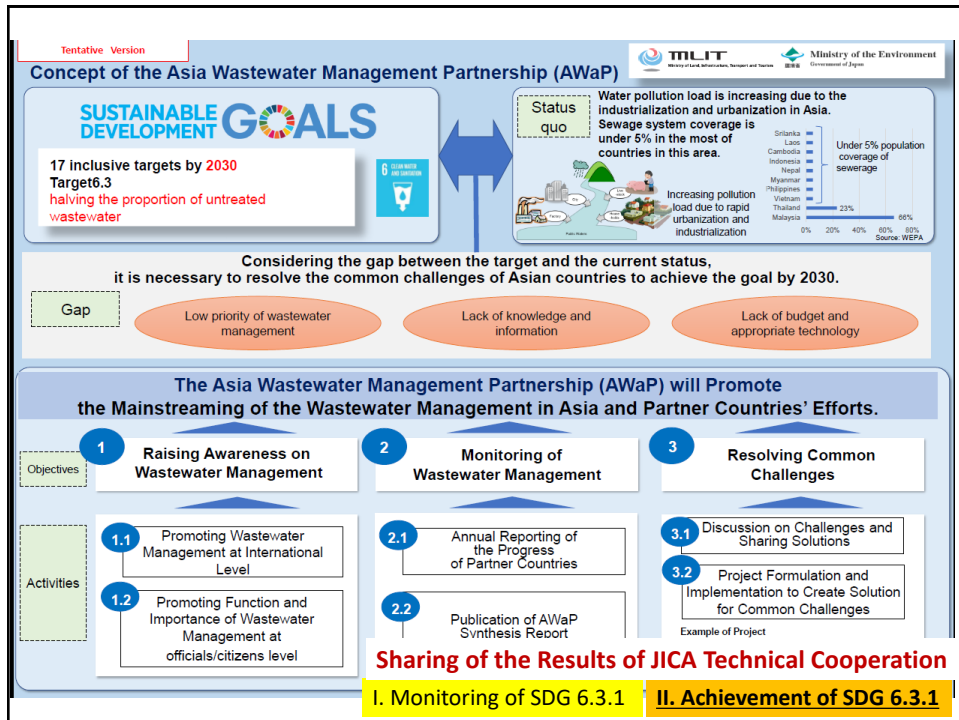
### 7) Linking and disseminating national, regional and global information and knowledge

#### Ref: Collaboration of WEPA and AWaP



- Collaboration of WEPA and AWaP is essential to achieve the common goal





## AWaP: SUPPOSED AND POSSIBLE ISSUES (DRAFT)

### I. Monitoring of SDG Indicator SDG 6.3.1

1. Institutional and Management Arrangements
2. Capacity Development for SDG indicators monitoring
3. Financial System for monitoring SDG indicator monitoring
4. Analyzing and disaggregating data relating to domestic wastewater

Domestic Wastewater (Off-site AND On-site), Industrial Wastewater ([AWaP & WEPA](#))

### II. Achievement of SDG 6.3.1

#### 1. Technology Options

Off-site Treatment and On-site Treatment,  
Technology Evaluation and Establishment of Design and O&M Manuals

#### 2. Institutional Arrangements including Capacity Development

#### 3. Formulation of Legal System:

Effluent water quality regulation and monitoring(WEPA)  
Environmental water quality standard(WEPA)  
Management of wastewater treatment systems

#### 4. Public Relation and/or Citizen's Participation

#### 5. Financial System for Sanitation and Wastewater Management

6. **Planning** : Establishment of planning procedure and methods to reflect SDG indicator monitoring result and linkage of SDG indicators and policy

## JICA's Major Projects for Wastewater Treatment from 2000 (2000-2017)

### EUROPE

**TURKEY**

- Municipal Sewerage and Wastewater Treatment Improvement Project (2011)

**UKRAINE**

- Detritus Sewage Treatment Plant Modernization Project (2010)

### MIDDLE EAST

**IRAQ**

- Upgraded Sewerage Facilities Improvement Project (Engineering Service) (CS) (2009)
- Sewerage Construction Project in Kurdistan Region (I) (2010)

**PALESTINE**

- Jericho Wastewater Collection, Treatment System and Reuse Project (2011)

### LATIN AMERICA

**BRAZIL**

- Project for Improvement of Operation and Maintenance of Water Supply and Sewerage Systems in Paraná States (2012-2015)
- Project of Training in Operation and Maintenance of Sewerage System (2014-2017)
- Sanitation Improvement Project for Curitiba, Curitiba Metro-RCD, (I), (II) (2004-2010)
- Sanitation Improvement Project for Santa Catarina Coastal Region (2010)
- Environmental Improvement Project in the Dean Lake (2010)

**PANAMA**

- Panama Metropolitan Area Wastewater Management Improvement Project (2010-2018)
- Panama City and Panama Day Sanitation Project (2007)

### OCEANIA

**PAPUA NEW GUINEA**

- Project for Improvement of Management Capacity for Port Moresby Sewerage System (2017-2020)
- Port Moresby Sewerage System Upgrading Project (2010)

### AFRICA

**MAURITIUS**

- Grand Dam Sewerage Project (2010)

**SENEGAL**

- Project for Treatment of Sewage, Rainwater and Wastes in Kaolack City (2011-2014)

### SOUTH ASIA

**INDIA**

- The Study for Formulation and Revision of Manuals of Sewerage and Sewage Treatment (2010-2011)
- Namma Action Plan Project (I), (II) (2000, 2011)
- Ganga Action Plan Project (renewed) (2000)
- Durgam Cheruvu Water Supply and Sewerage Project (I-II) (I-II) (2000, 2006)
- Class Integrated Sanitation Improvement Project (I), (II) (2007, 2016)
- Groundwater Sewerage Project (2010)

**PAKISTAN**

- Project for Upgrading of Mechanical System for Sewerage and Drainage Services in Islamabad (2011)

**SRI LANKA**

- Project for the Strategic Master Plan under Sewerage Sector (2010-2017)
- Kandy City Wastewater Management Project (2010)

### SOUTHEAST ASIA

**CAMBODIA**

- The Study on Drainage and Sewerage Improvement Project in Phnom Penh Metropolitan Area (2014-2016)

**INDONESIA**

- Advisor for Sewerage Management (2012)
- Project for Improving Planning Capacity for Sewerage System in DKI Jakarta (2015-2017)
- Developer Sewerage Development Project (I) (2008)
- Metropolitan Sanitation Management Investment Program: Engineering Service (ES) for Sewerage System Development in DKI Jakarta (2014)

**VIETNAM**

- Project for Water Quality Improvement for Japanese Bridge Area in Ho Chi Minh City (2010)
- Project for Capacity Development on Sewerage Management in Ho Chi Minh City (Phase I and Phase II) (2008-2014)
- Advisor for Urban Environment (Sewerage Policy) (2010-2011, 2015-2018)
- Technical Assistance Project for Enhancing Management Capacity of Sewerage Works (2016-2019)
- Ho Chi Minh City Water Environment Improvement Project (I-IV) (2001, 2008, 2010)
- Hai Phong City Environment Improvement Project (2008)
- Old Hanoi City Water Environment Improvement Project (I) (2006, 2008, 2016)
- Southern Binh Duong Province Water Environment Improvement Project (I), (II) (2007, 2012)
- Hanoi City Yen Tu Sewerage System Project (I) (2018)

### Asia Wastewater Partnership (AWaP)

■ Grant  
● Technical Cooperation  
▲ Loan

## Thank you for your attention.