

Self-Sustaining Resource Circulated Sanitation

A Nature-Based Sanitation Solution toward Leaving No One Behind



My Sanitation Practice

NBS? **LNOB?** Or **NOT?**

Shervin Hashemi, Ph.D.

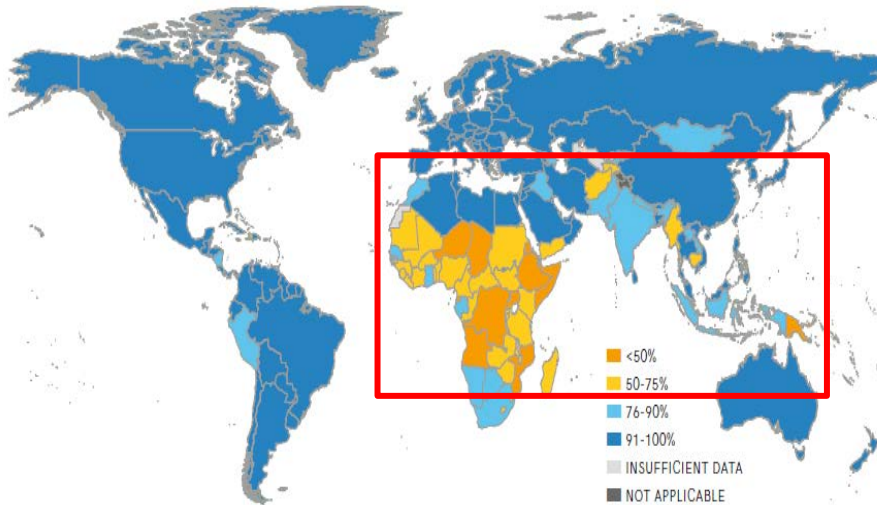
Seoul National University, Department of Civil & Environmental Engineering

Email: shervincee@snu.ac.kr

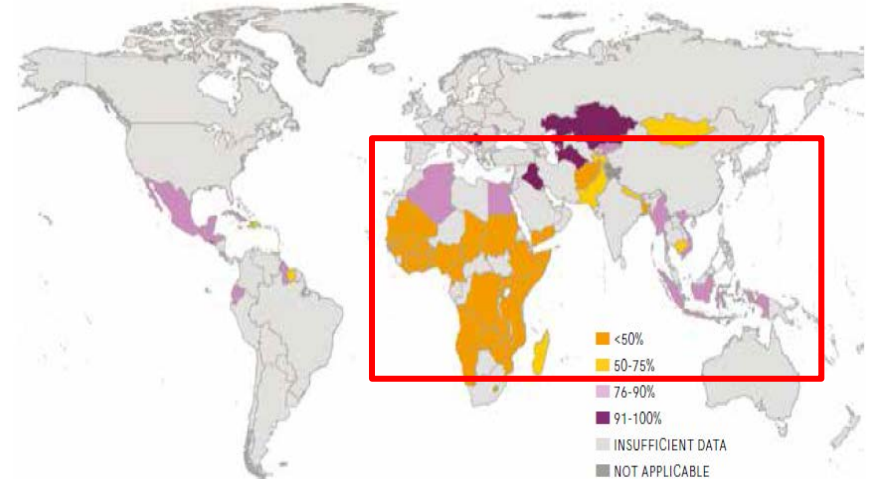
March 22, 2019

Water & Sanitation Sacristy: Global or Local?

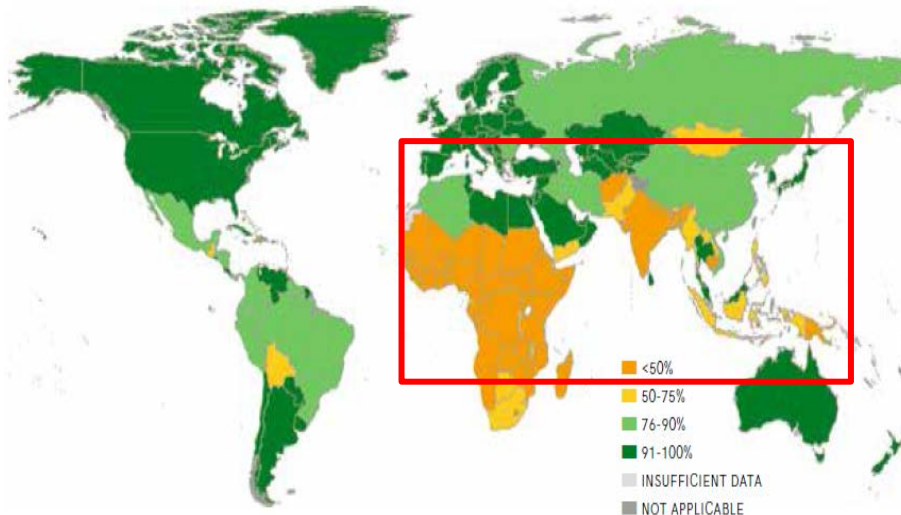
Access to Basic or Better Drinking Water Services, 2015



Access to Handwashing Facilities, 2015



Access to Basic or Better Sanitation Services, 2015



Who is Left Behind?

- Sub-Saharan Africa
- South East Asia
- Remote & Rural Areas
- Indigenous People
- Women & Children
- Refugees & Disables



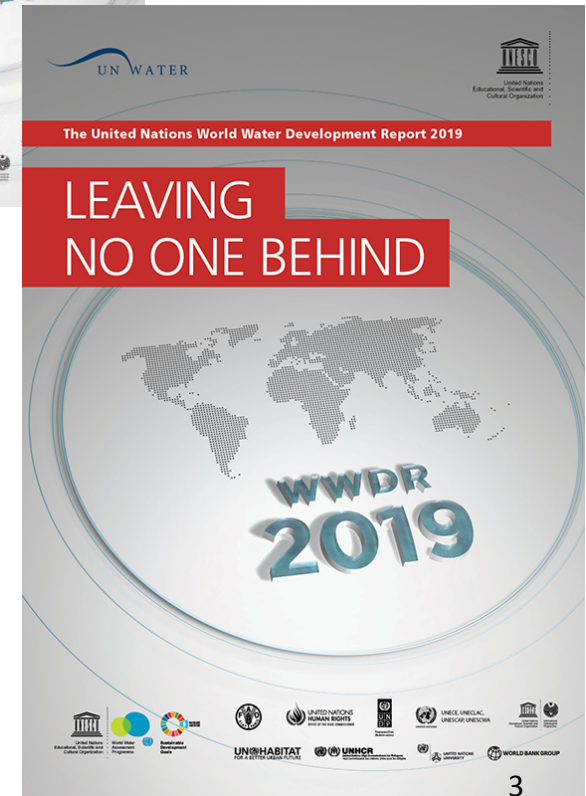
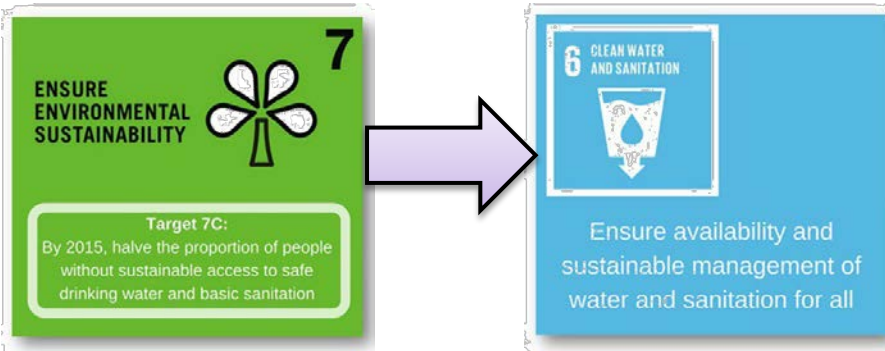
Guidelines for Solutions



MILLENNIUM DEVELOPMENT GOALS

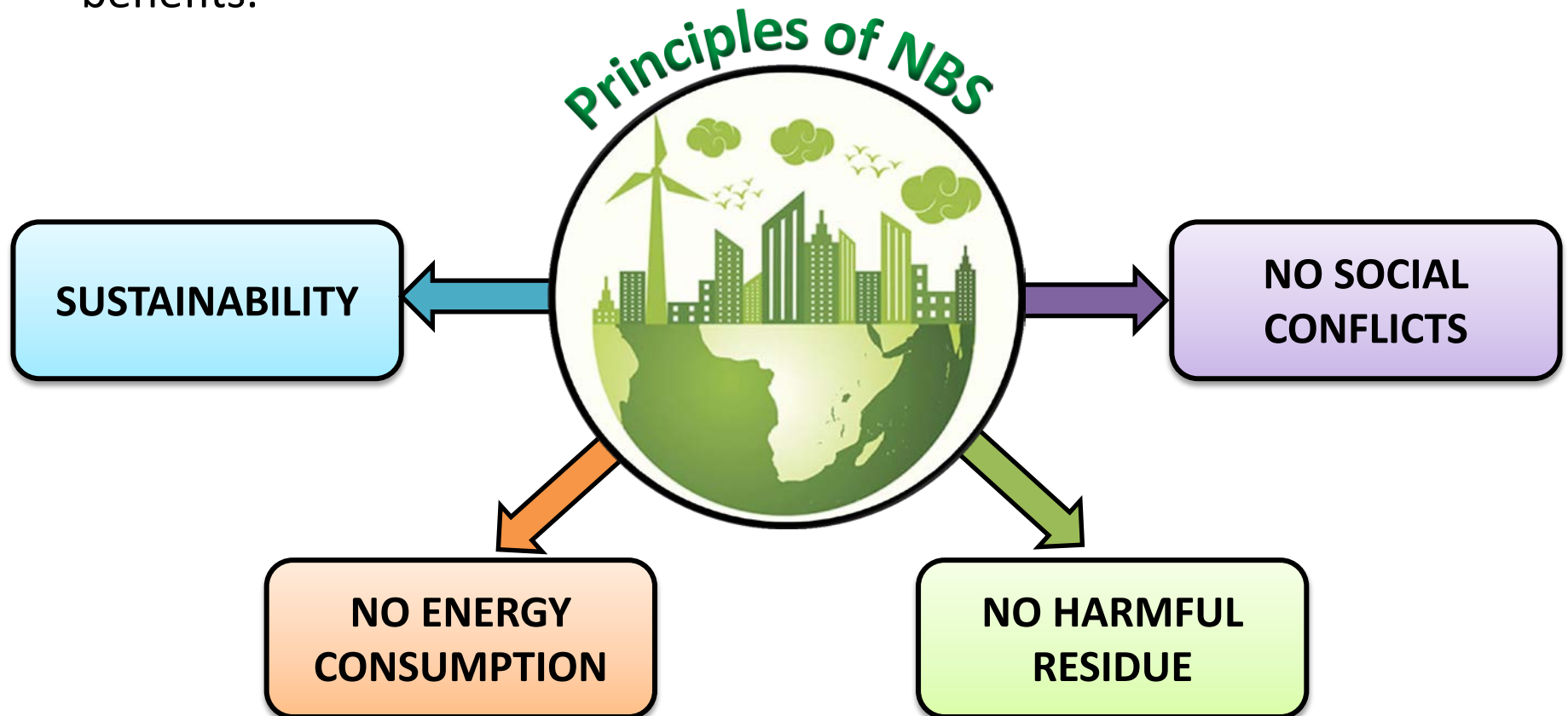
2000 - 2015

2015 - 2030



Definition of Nature-Based Solution (NBS)

- **Nature-based solutions** refer to the *sustainable management* and *use of nature* for tackling environmental challenges.
- These solutions sustainably provide environmental, social and economic benefits.



Principles for Leaving No One Behind

Technical Principles

No or Minimum Water & Energy Consumption

Separately Collection & Treatment of Excreta

Self Sustaining & Easy Maintenance

Utilizing Final Materials

Practically Proven & Scalability

Social Principles

Acceptability

Availability

Accessibility

Economic Principles

Affordability

Economically Beneficial



Centralized Sanitation Systems as Solution

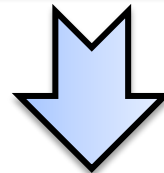
**HIGH WATER &
ENERGY
CONSUMPTION**



**COMPLICATED
INFRASTRUCTURE**



W + F + U



Septic Tank / WWTP

**THE SYSTEM MATCHES WITH
NEITHER NBS NOR LNOB!**



**LACK OF SOCIAL
RESPONSIBILITY**

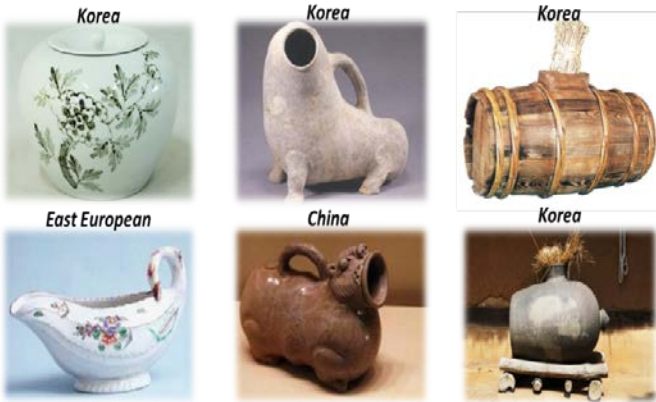


**LACK OF
SUFFICIENT
TREATMENT**

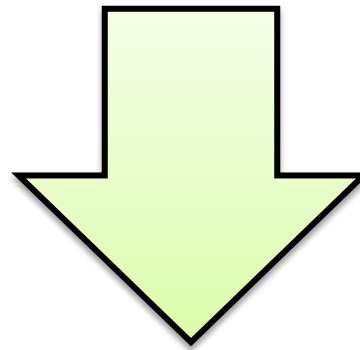
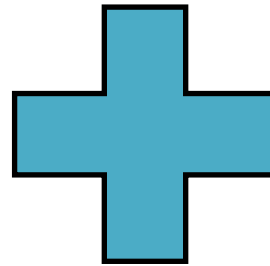


Solution Roadmap

Indigenous Wisdom

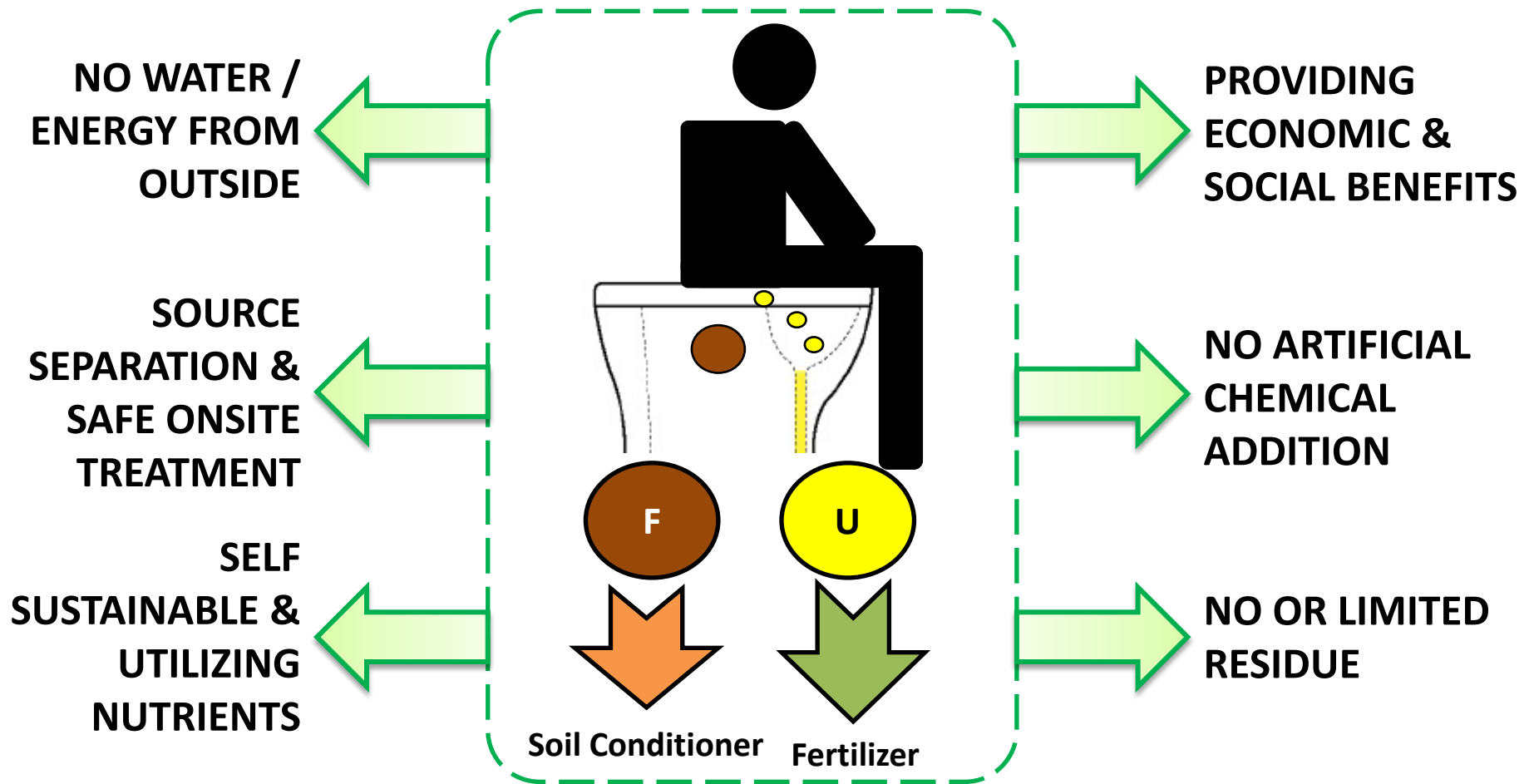


Science & Engineering

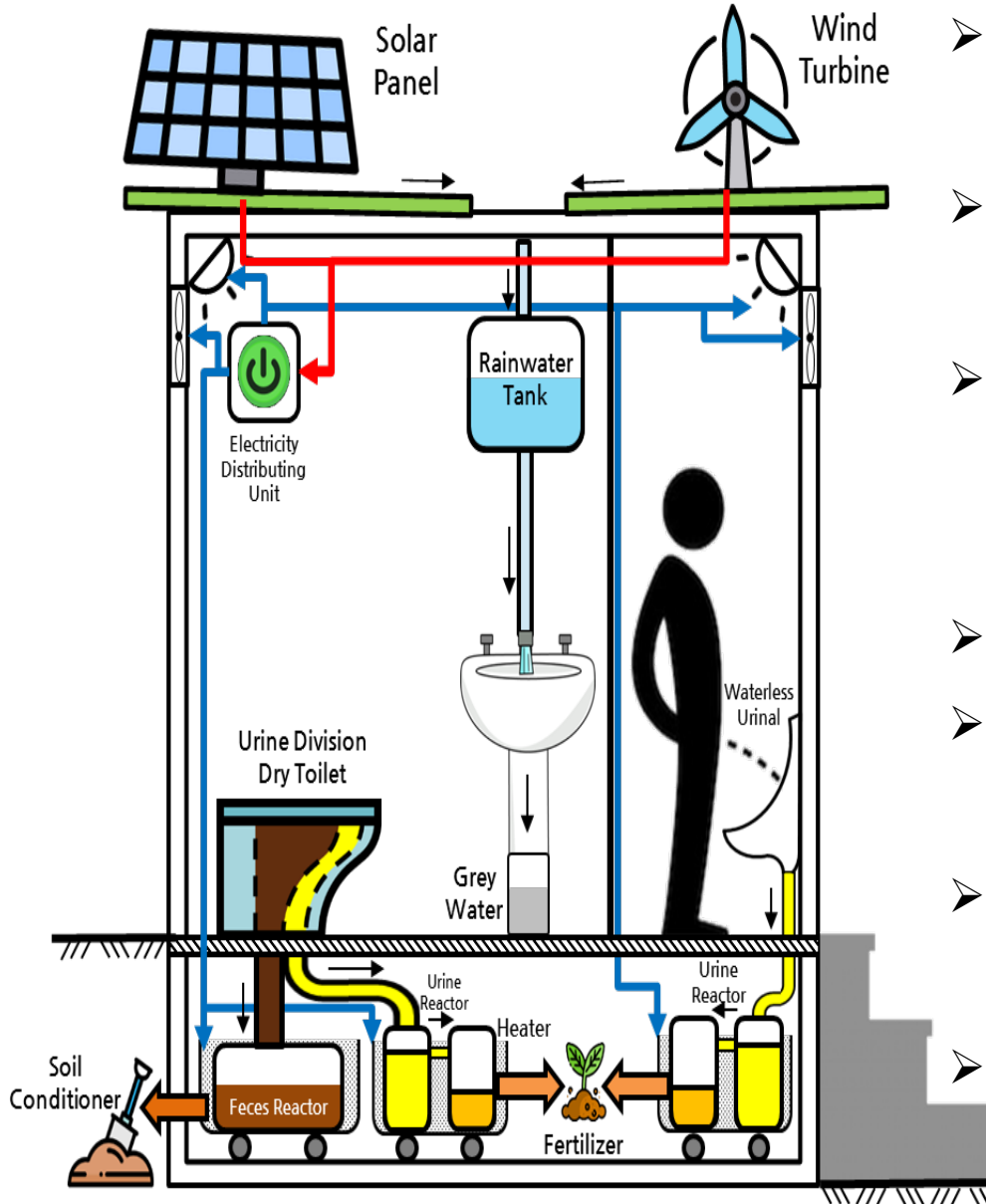


Self Sustaining Resource Circulated Sanitation
From Waste to Resource

Concept of the Self Sustaining Resource Circulated Sanitation



Example Designs for the SSRCS



- Self-Sustainable: No **water** & sewer or **energy** infrastructure is required!
- Can be used anywhere, especially in Sub-Saharan Africa and south east Asia.
- Safe, sustainable, and nature based onsite treatment for urine & feces through controlled nitrification process.
- Human right-based approach.
- Applicable for remote areas and safe for women and children.
- Possibility of utilizing treated urine & feces as fertilizer or soil conditioner.
- Rainwater and energy harvesting from nature.

The Field Applications



Operation Year: 2018

Venue: Seoul Sunset Park (Public)

Users: Ordinary People

Land Owner: Seoul Municipality



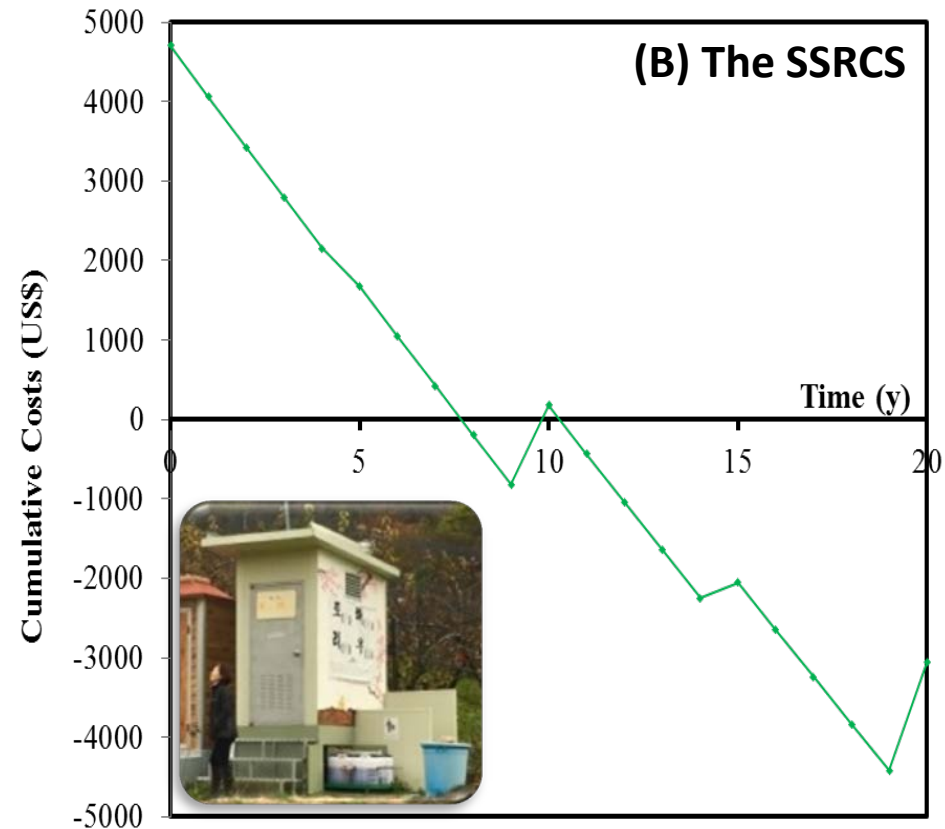
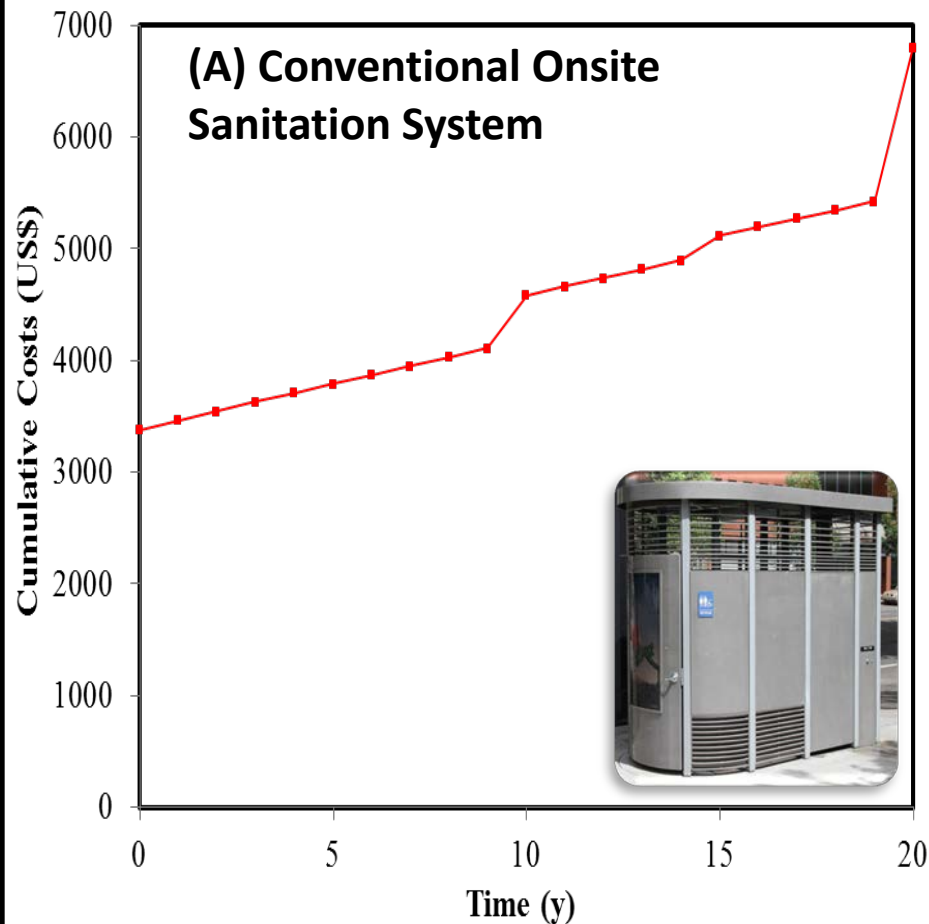
Operation Year: 2017

Venue: An urban agricultural center

Users: Farmers and Other Visitors

Land Owner: Private Sector

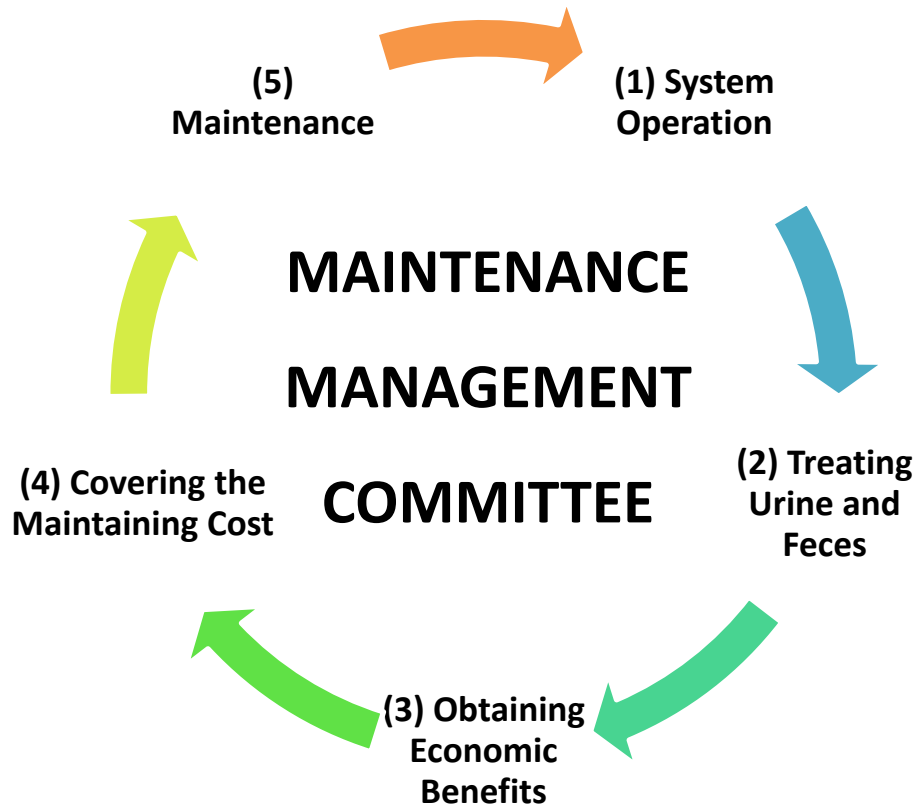
Economic Sustainability of SSRCS



20 Years Life Cycle Cost Assessment

For SSRCS, the **Benefits** can **Cover** the **Capital and Maintenance Costs**!

Social Sustainability of SSRCS



- Establishing maintenance management committee from educated local people.
- The duty of this committee is keeping the system sustainable by providing plans and actions for system operation, maintenance, and educating other users.
- This committee is responsible for social and economic sustainability.

Benefits of SSRCS



Benefits for Human Right

- Prevention of widespread death and disease.
- Prevention of social crimes.
- No gender disparities.

Benefits for Investors, Donors & UN Organizations

- Providing a new paradigm of sustainable sanitation.
- Returning capital cost and maintenance cost coverage.

Innovation Achievements

World Water Challenge 2017 Excellent Award Gyeongju, Korea, September 2017



Certificate of Award

World Water Challenge 2017

Solution Title	Sanitation Revolution : From Waste to Resource
Presenter Name	Shervin Hashemi
Organization	Seoul National University

This is to certify that the above stated person has been participated and awarded the “Excellent” prize in the World Water Challenge 2017 hosted by the Ministry of Land, Infrastructure and Transport of the Republic of Korea, held on September 21, 2017 during the Korea International Water Week 2017 in Gyeongju, Korea.

Issued Date : May 16, 2018

Lee Jung Moo

Jung-Moo Lee

President of Korea Water Forum

KIWW 2017 Organizer

Leaving No One Behind Innovation Award 2019 Geneva, Switzerland, February 2019



Certificate of Achievement *Shervin Hashemi*

has presented their project as a finalist of the

1st World Summit on Leaving No One Behind

and been the recipient of the

Leaving No One Behind Innovation Award 2019

Finding human-rights based solutions to water and sanitation

A project that could help solve some of the problems associated with identifying, including or supplying solutions for people that are being left behind regarding access to water and sanitation.

February
2019



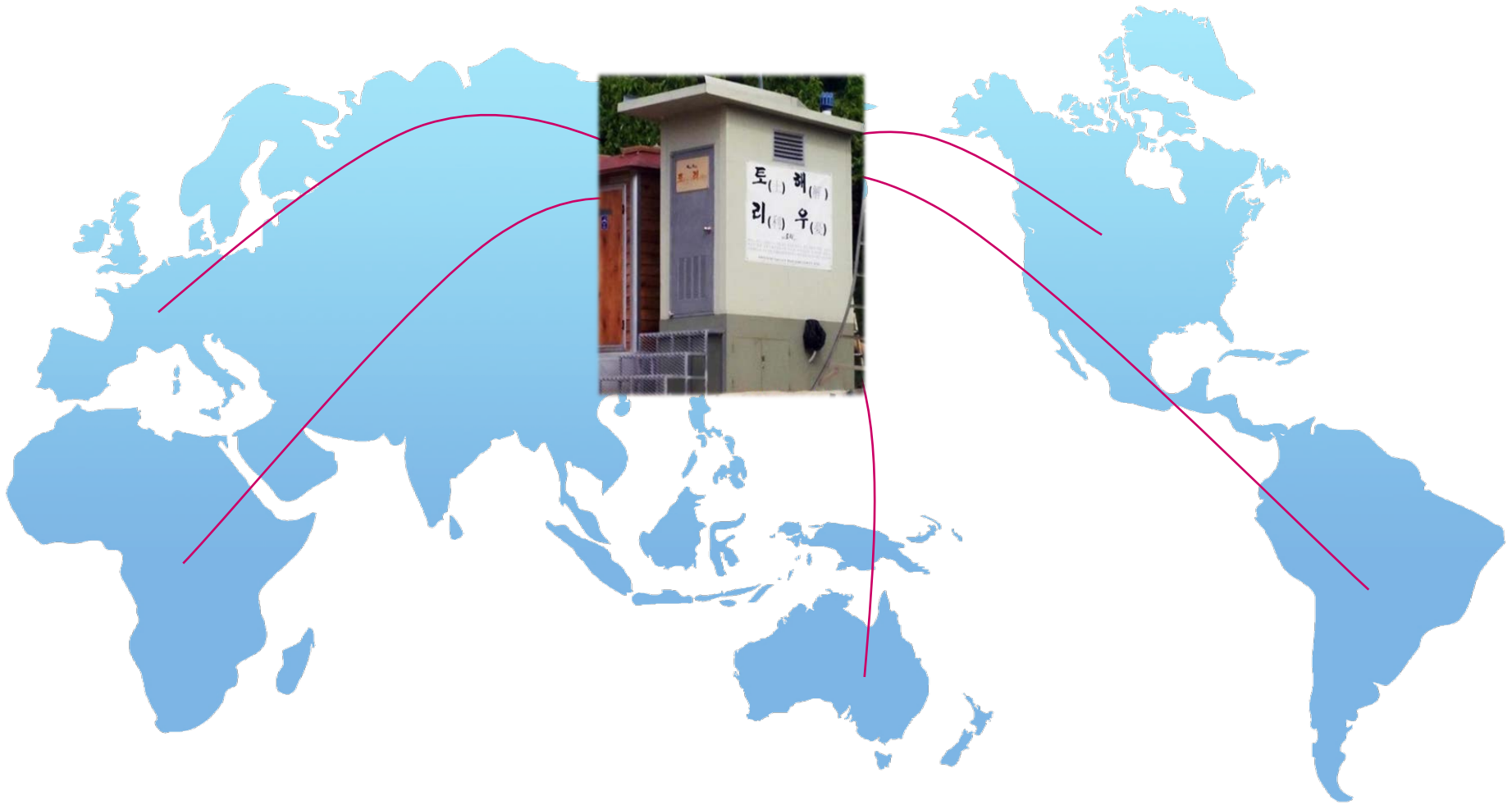
Amanda Loeffen
Amanda Loeffen, Director General



Take Home Messages

- ① Sub-Saharan Africa and South East Asia are left behind in provision of sustainable sanitation.
- ② Sustainable solutions should be nature based and ensure that no one will be left behind!
- ③ Our developed Resource Circulating Sanitation system is science-based, practically proven, and culturally acceptable.
- ④ It is self-sustaining and can be used at where there is no water, sewer, and energy infrastructure. It can provide economic and social benefits.
- ⑤ The SSRCS system can contribute toward SDG-6.2.

SELF-SUSTAINING RESOURCE CIRCULATED SANITATION LEAVING NO ONE BEHIND IN OVERCOMING SANITATION CHALLENGES



THANK YOU FOR YOUR ATTENTION!