

Ecological Purification System renamed from Slow Sand Filtration.

Water Purification and Water Supply Management
for Achieving Water Security

Managed by Makoto Yano,
Okinawa Blue Water

JICA Okinawa training from
Nov. 17. to Dec.12. in 2025.

An English invention of Slow Sand Filtration to make
artificial spring water for safe drinking water is re-
defined in Japan as Ecological Purification System.



53
seconds

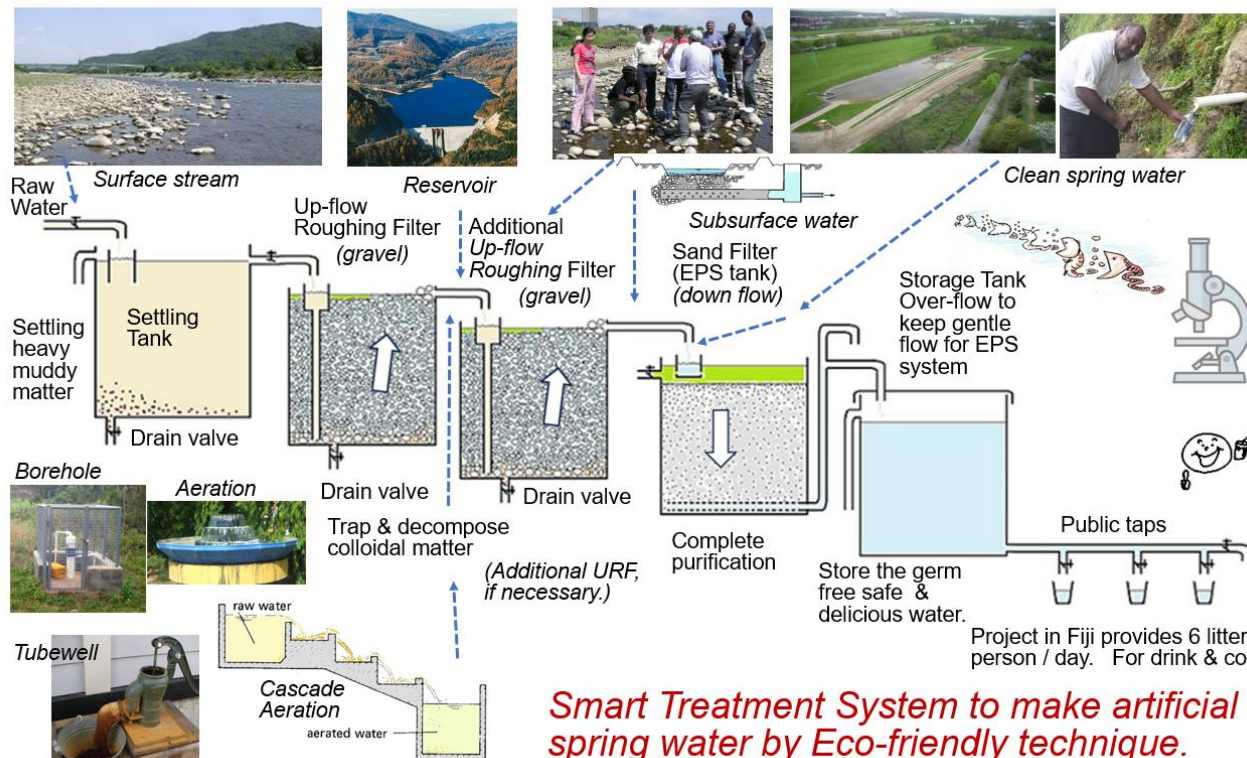
<https://www.youtube.com/watch?v=b7wPQIKVIMY>

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**Nakamoto joins from Nov. 21. to Nov. 27. in Okinawa
and web-contributes Nov.17. and Dec.11-12. from
Ueda city in Nagano, 2025.**



EPS-Use of Natural Process-**Chemical Free** : **Gentle for small organisms**



**Smart Treatment System to make artificial
spring water by Eco-friendly technique.**

Ecological Purification System for Safe Drinking Water

- Application of Natural Process -

Eco-friendly technique to make artificial spring water

NAKAMOTO Nobutada, Dr. Science
Prof. Emeritus of Shinshu University, Japan



Fig.0. Fijian EPS using rain harvest tanks in a village.

August 2018

I distributed this
textbook.
You can
download this.



<https://eps.watervision.jp/wp-content/uploads/2025/04/EPStext-NC-2019.pdf>

Ecological Purification System for Safe Drinking Water Contents

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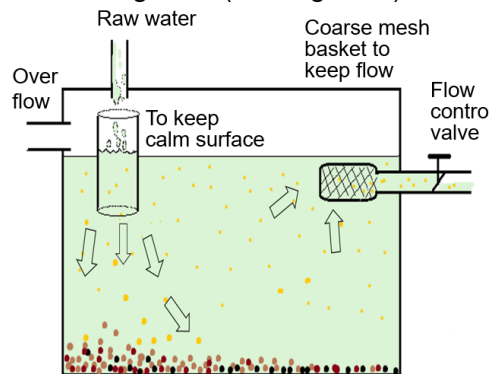


Fig.0. Fijian EPS using rain harvest tanks in a village.

August 1992

http://www.cwsc.or.jp/files/pdf/EPS_text-NC-2019.pdf

Receiving Tank (Settling Tank)

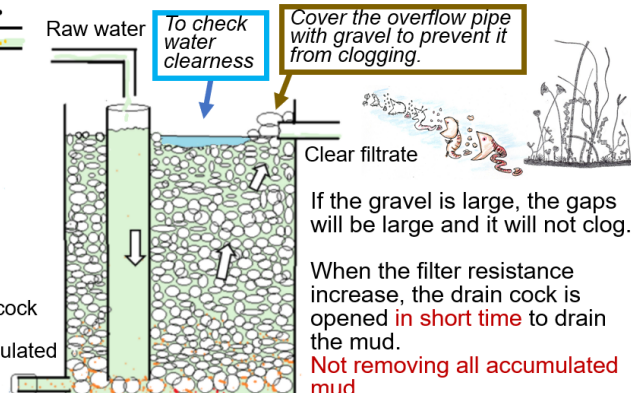


Heavy particulate matters are easily settled. However, colloidal light particles like silt material are not settled in this settling tank.

Up-Flow Roughing Filter (URF) : Gravel Filter

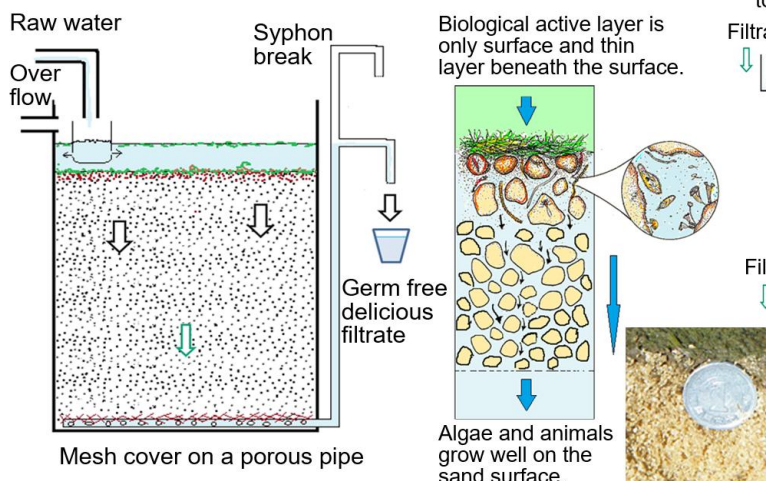
Additional URF if necessary.

Colloidal fine particles adhesive to the surface of gravels. Small animals scrape them and produces fecal pellets. Fecal pellets accumulated to the bottom.



EPS (Sand) Filter (Natural Down Flow)

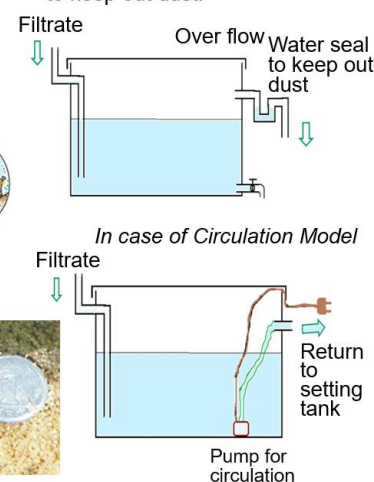
Ecological Purification System



Deep sand layer is a guarantee layer for emergency.

Storage (Filtrate) Tank

Cover for Storage tank is required to keep out dust.



JICA Training on Ecological Purification System (EPS) in Okinawa, Japan in 2022

DIY EPS bucket model making 2022 - YouTube / 38:01

<https://www.youtube.com/watch?v=jz94KfLL3E>



NGO Okinawa Blue Water

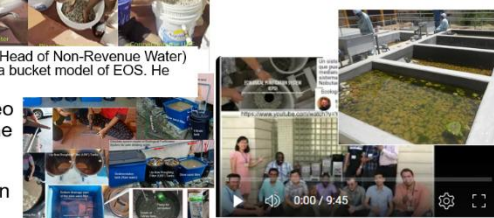


Mr. RAMJUG Jawaharlal (Guyana Water Incorporated/ Operations/ Head of Non-Revenue Water) returned back to Guyana from JICA training in Feb. 2015. He made a bucket model of EOS. He made a video on 3rd of September, 2025 and sent us.

I provided additional explanations to the video on Jim's smartphone. I also added photos of the training model created at JICA Hiroshima, a video of trainees in Malaysia, and the construction of a purification plant in Pakistan in 2025.



<https://youtu.be/uMdhSdxOSsQ>
9 min 45 seconds



1

Ecological Purification System
renamed from Slow Sand Filtration.

Treatment System for Safe Water by Wise Use of Natural Phenomena
An English invention of Slow Sand Filtration to make artificial spring water for safe drinking water is re-defined in Japan as Ecological Purification System.

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I proposed the new name of Ecological Purification System instead of Slow Sand Filter.

Slow Sand Filtration → Ecological Purification System

<https://youtu.be/jXP1efkgK8>



2

Invention of SSF in UK and a new technology of Rapid Sand Filter for turbid water in USA.
Refocus to SSF as risk free safe treatment system.

During the Industrial Revolution, the population of cities was doubled. The rivers in cities were polluted.

Chelmsford Water Works Company
London 1843

James Simpson examined vertical type of slow sand filter from 1827-1828 and made a practical plant in 1829.

Completion of present Slow Sand Filter: 200 years ago.

The filter rate was 2-3 m3/(100m2).
38 cm Water depth
61 cm sand layer
61 cm gravel layer

They believed that Slow Sand Filter purified by slow filtration with fine sand.

They believed this was mechanical reduction with fine sand.

Part 2.

https://youtu.be/iO_MjvFavVc



3

Up-flow Roughing Filter eliminates Suspended Matter without Chemicals.

Rapid Sand Filter

Down flow and Up-flow Roughing Filter Experiment

Master Thesis of Costa, R.H.R.: Univ. São Paulo, Brazil in 1980

Prof. Luiz Di Bernardo, Univ. São Paulo

Robert H. Harris et al. 1974 Consumer Report. IS THE WATER SAFE TO DRINK?

Chlorine sterilization is essential for rapid filtration of chemical treatment. There is a warning that tri-halo-methane, which are cancer risk substances, are generated by adding chlorine.

Research engineers researched ways to prevent turbidity without using chemicals.

Up-flow Roughing Filter of different size of sand and small stone.

Part 3.

<https://youtu.be/9aCIRzJwQME>



4

Using the Bucket Model in JICA training

I studied the ecological function of Miyako-Jima wks from 1987. The ecological function of EPS function of Miyako wks in March 2004 and published a book (How to make delicious water) in August 2005.

JICA training began in 2006.

Quest for Safe and Delicious Tap Water, Miyako-Jima, Island in March 2004, 15:22 With English subtitle version in Oct. 2007.

Ecological Purification System - JICA training for SIVA, April 18, 2015 at Miyako-Jima.

Slow sand filtration: creating clean, safe water (Full ver) in 2020 /26min

Slow sand filtration: (Digest ver) in 2021 /3:26

Part 4.

<https://youtu.be/P9bZnQVXzbG>



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PDF of ppt 1 (1 - 4)

<https://eps.watervision.jp/wp-content/uploads/2025/11/30d0919a92cc2928dba3cd7d5ce951e4.pdf>

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① - ④ Japanese

2025-Nov 横長-EPS-1-P1-4

日本語での解説

<https://youtu.be/vMz1LfZ-4D8>

その1. ppt1.(1-40)日本語解説 9:33

Slow Sand Filter is Ecological Purification System. Part 5.

Spread SSF to 45 warm countries. Biological activity is high in warm region.

1987 Yokohama Japan. 1987 NJ, USA. Coagulation treatment. Origin of Rapid sand filter. 1910 NJ, USA. Chlorine treatment Completion of American Filter.

Non-polluted river in new continent. poor food for small organisms. Food is not rich. Poor food for small organisms. Food is not rich. Poor food for small organisms. Food is not rich.

Non-polluted water contains fine SS and poor food for small organisms in continent rivers in USA.

Biological activity is weak in winter. Does not settle. Filter easy to block by suspended solid.

People loves new technology. RSF spread to the world.

3:27

<https://youtu.be/kenaU8PEStA>

Filter Clog relates to Biological Activity. Filter Resistance relates to Temperature. Part 7.

EPS 2025-08V Nov. Part 7:57-65 8 slides

Slow Sand Filter Plant (EPS) in Ueda, and NHU (youtube.com) 4 min. <https://www.youtube.com/watch?v=1x0dARE3TUG&t=15s>

3:11

<https://youtu.be/Tlvfsih7EOI>

EPS from Japan to the world as our technology that we can make it by ourselves. Part 9.

Yamaha motor company provided Safe Water to Villagers as Social Contribution in Indonesia in 2001.

Villager maintains over 10 years by themselves.

Public tap system. Two bottles of 20liters per 1 family. This water is used for drinking and cooking only. This water is not used for bath and washing hands. Diarrhea and eye sickness are disappeared.

Turn to Health village. Sanitary sense and its level are distributed to the villagers. This acts to protect against sickness.

YAMAHA clean water system to the world.

Acceptable Risk

4:41

<https://youtu.be/i6gYGt5bRAM>

Slow Sand Filter is Ecological Purification System. Part 5.

⑤ - ⑨ Japanese

2025-Nov 横長-EPS-2-P5-9

日本語での解説 <https://youtu.be/8BW73DrE5xI>

その2. ppt2. (41-80)日本語解説 10:57

Hungry condition is normal. Living things are always ready to grow. Part 6.

Stagnant environment. Running environment. Stream, river. Horizontal running water.

The bottom of the river and lake or inland lake. There is a transition site. Suitable organisms grow at new environment.

All living things are in a hungry condition, always waiting for an opportunity to reproduce.

1974, Broa (Lobo), São Carlos, São Paulo, Brazil. Broa reservoir.

3:38

<https://youtu.be/ojPKWKujk5k>

EPS makes Safe and Super Clean and Delicious Water. Acceptable Risk of Bacteria. Part 8.

EPS 2025-08V Nov. Part 8:56-71 6 slides

Original image of Slow Sand Filter.

Burn out change. Collection. Dilute. Real purification? Ecological Purification System.

Acceptable risk

2:07

https://youtu.be/8kCqHE23_6E

PDF of ppt 2
(⑤ - ⑨)

<https://eps.watervision.jp/wp-content/uploads/2025/11/3e2e7062a89f5a854f53788742897a22.pdf>

EPS is Wise Application of Naturel Purification System. Part 10.
EPS 2025-08W
Nov. Part 10:81-90
9 slides

Wise Application of Naturel Phenomena
Rural people can manage this system.

Chlorine is essential for safe water.

American RSP is a commercial filter. SSF of EPS is a natural filter.

Think about where the money is going.

Simple system can be easily managed by local people.

Small simple system is suitable in rural area than high tech system in urban area.

<https://youtu.be/2r8MWh6q5PA>



Solving filter block problem in Samoa. Part 11.
EPS 2025-08W
Nov. Part 11:91-99
9 slides

Alaia WTP, August 2009

Alaia WTP, after heavy rain.

The German consultant who designed it could not have imagined the heavy rains of the tropics. The Okinawa team recommended improvements to prevent extreme turbidity in tropical regions where heavy rain occurs.

JICA EPS training in Miyako Island from 2006 to 2008.

In order to check the training effect, I visited to Samoa with Mr. Akito UECHI from Miyako Water Wks in 2009.

Intake Bar Screen filter

Agreement to Samoa Water Authority. Then, Miyako-Jima's Water Supply Model Project in Samoa from 2010 to 2012 was done.

<https://youtu.be/v82qaSSzE9c>



Every Rural People for Safe Water in Fiji Part 12.
EPS 2025-08W
Nov. Part 12:100-119
20 slides

Right to adequate food and water
36-(1) The State take reasonable measures within its available resources to achieve the progressive realisation of the right of every person to be free from hunger, to have adequate food of acceptable quality and to clean and safe water in adequate quantities.

https://www.fiji.gov.fj/getattachment/33cd6d01-dc73-4823-83b8-7290672ddae0/2013-Constitution-of-The-Republic-of-Fiji.aspx

Mr. Vishwa Jeet from Fiji gave many questions to me.

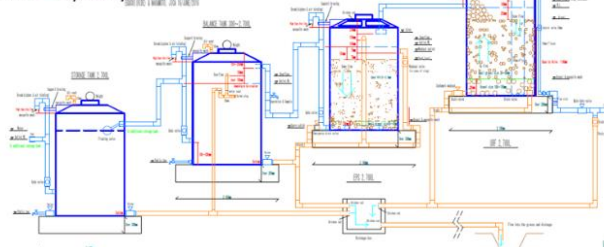
The PM had attention for EPS display during the World Marine Time Day on Sept. 28, 2012.

Mr. Vishwa Jeet informed the PM on the functions of the EPS and reference to JICA was made.

<https://youtu.be/IKk3yQBghYE>



Ecological Purification System for Fijian 2,700 Rota Tank Plant Design by Hide (Hidemitsu EGUCHI) and Nobutada NAKAMOTO
JICA 16/June/2016



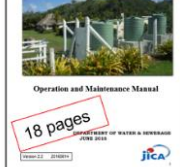
https://eps.watervision.jp/wp-content/uploads/2025/04/EP-S_design.pdf



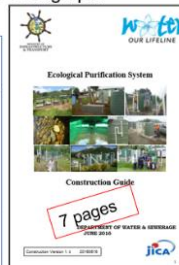
<https://eps.watervision.jp/wp-content/uploads/2025/04/Fiji-EPS-2016-tank300-2700CAD-Design.pdf>

Operation and Maintenance Manual June 2016

https://eps.watervision.jp/wp-content/uploads/2025/04/160-614-Eng-Fiji-EPS-Manual_Eng.pdf



Construction Guide June 2016



PDF of ppt 3 (10 - 12)

<https://eps.watervision.jp/wp-content/uploads/2025/11/eee2443dac46066fbf5c0d1ea92839b2.pdf>

10 - 12 Japanese

2025-Nov横長-EPS-3-P10-12

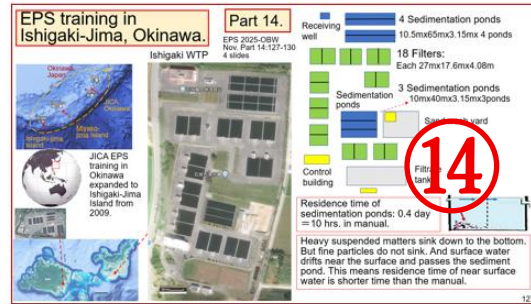
日本語での解説

<https://youtu.be/qi31pZmAwvM>

その3. ppt3. (81-120)日本語解説 11:20



https://youtu.be/1mKg_P7DFIs



<https://youtu.be/mph2NIHyswo>



<https://youtu.be/eORovvI89sk>



JICA EPS Training started from Miyako-Jima, Okinawa. EPS is Wise Use of Natural Purification System. Part 13. EPS 2025-OBW Nov. Part 13:121-126 6 slides. Miyako-Jima island is an uplifted coral reef island where is quite different environment compared with main part of Japan. Area of islands of Miyako-Jima is 204 km2, population is 55,000 persons.

PDF of ppt 3 (13 - 15)

<https://eps.watervision.jp/wp-content/uploads/2025/11/84356be9d811bb52b5b34bf958ab3f0b.pdf>

EPS from Japan to the World Wise Use of Natural Phenomena for Human Life. Safe and Delicious Water by EPS. Our Smart Technology. This is Smart Applied Ecology for Human Life.

Slow Sand Filter

Nigeria

Remember Three Steps

1. Knowing is NOT enough. We must APPLY it to something useful.
2. Willingness is NOT enough. We must PUT it into the PLAN and ACTION.
3. Putting the PLAN into action is NOT enough. We must ACCOMPLISH the goals.

Trust Our Sense!

Mechanism of EPS 7 minutes

<https://www.youtube.com/watch?v=ArWM3PVY3GM>

79 to 139

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13 - 15 Japanese

日本語での解説

<https://youtu.be/hT-rFLZsR7o>

その4. ppt4. (121-140)日本語解説 6:46