

# ⑧ From Okinawa to Fiji

JICA training in Miyako  
Jima, in Aug. 2011.

⑧ 22 slides



**Hungry is Normal.**



Mr. Vishwa Jeet from  
Fiji asked me many  
questions during the  
training in 2011.



New plans for  
cleaner water

[https://www.youtube.com/watch  
?v=wxAGhjx7e40](https://www.youtube.com/watch?v=wxAGhjx7e40) 1:45

**New Constitution of Fiji shall come  
on 7 September 2013.** p24, No.36.

[https://laws.gov.fj/ResourceFile/G  
et/?fileName=2013%20Constituti  
on%20of%20Fiji%20\(English\).pdf](https://laws.gov.fj/ResourceFile/G et/?fileName=2013%20Constituti on%20of%20Fiji%20(English).pdf)

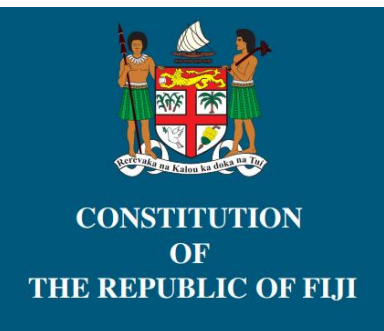
## 36. Right to adequate food and water

36.—(1) The State must 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.

*Mr. Vishwa Jeet remember these words.*

### 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.

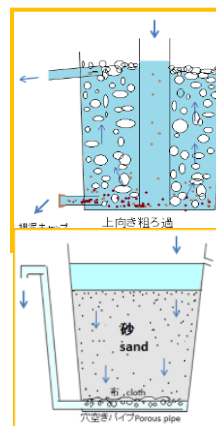




## JICA Training at Okinawa, in August, 2011



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



He returned back to Fiji, he made a model to make safe drinking water by EPS technology at the yard of Department of Sewage and Water. Water source was rain harvest tank.



The PM had attention for EPS display during the World Marine Time Day on **Sept. 28, 2012**. Our Director informed the PM on the functions of the EPS and reference to JICA was made.

**Kick off Workshop on Jan. 16. 2013.** at Holiday Inn. Commander Francis B. Kean, Permanent Secretary, Ministry of Works, Transport, Public Utilities.

Holiday Inn: Jan.16.2013



<https://www.youtube.com/watch?v=wxAGhjx7e40>



## The Fiji Times ONLINE

Quality water for all

Priya Chand  
Thursday, January 17, 2013

WITH the new Ecological Purification System (EPS) in the pipeline, water quality enjoyed by urban people can now also be made available in rural villages and communities.

A workshop on a new water treatment system, hosted by the Department for Water and in collaboration with the Japan International Cooperation Agency (JICA) in Suva yesterday, revealed that EPS was an economical and ecological way of purifying water.

Works permanent secretary Commander Francis Kean said the vision to provide safe adequate water and efficient sanitation to the whole population in Fiji was in government's roadmap.

"About 70 per cent of our rural population drink water directly from creeks and river sources which are most



Water treatment expert Dr. Nakamoto Nobutada speaking at the Holiday Inn. Picture: ELIKI NUKUTABU



Jan. 17. 2013.  
Dept. Sewage and Water



Rain harvest tank of 2.7 tons for this project.





*EPS technology is our technology for ours.  
We can make it by ourselves.*



## KALOKOLEVU VILLAGERS WELCOME ACCESS TO CLEAN DRINKING WATER

7/17/2013

More than 270 villagers in Lami now have access to clean and safe drinking water through an ecological purification system (EPS), thanks to the partnership between the Department of Water and Sewerage, the Water Authority of Fiji (WAF) and the Japan International Cooperation Agency (JICA).

The EPS, which is the first of its kind to be installed in a local rural setting, was commissioned by the Ministry of Works, Transport and Public Utilities permanent secretary Commander Francis Kean in Kalokolevu village, Lami yesterday.

Commander Kean said the pilot project was aimed at improving accessibility to clean water and sanitation to people living in rural areas.

He said this is a major milestone for the country and the Government in particular in its desire to lift the living standards of people in the rural and maritime areas.

"Improving the living standards of the rural citizens through better accessibility to clean water and sanitation is one of the key priorities of this Government as enshrined in the Peoples Charter for Change, Peace and Progress and the Government Roadmap to Sustainable Development in the medium term," Commander Kean said.

Ecological  
Purification  
System in Fiji,  
2013 for Safe  
Drinking Water -  
YouTube/ 3:05



<https://www.youtube.com/watch?v=kbCaSAACQZ0>



Beginning of  
Ecological  
Purification System  
(EPS) to make safe  
drinking water in  
Fiji / 1:45



<https://www.youtube.com/watch?v=wxAGhjx7e40>





Clean, safe water brings joy to village



## NAVATUVULA VILLAGERS GET ACCESS TO CLEAN DRINKING WATER

9/12/2013

Improving the living standards of the rural communities through better accessibility to safe drinking water and sanitation is one of the key priorities of the Fijian Government.

This was highlighted today by the Ministry for Works, Transport and Public Utilities permanent secretary, Mr Francis Kean at the commissioning of the second ecological water purification (EPS) at Navatuvula village in Sawani, Naitasiri.

The first EPS was commissioned at Kalokolevu village in Lami about two months ago.

Mr Kean said his ministry's aim is to install EPS into rural water supply systems to ensure removal of contaminants before water is consumed.

"The incorporation of the EPS into rural water projects will take place after further monitoring the results of the pilot projects by the Water Authority of Fiji (WAF)," Mr Kean added.

Villagers of Navatuvula, Naitasiri have a reason to smile, thanks to the governments of Fiji and Japan. From yesterday the villagers started drinking safe and clean water, commissioned by the Permanent Secretary for Works, Commander Francis Kean. The water is supplied through an ecological purification system (EPS) – similar to traditional mineral water production.

Quality Water for All :  
Safe and Clean Water  
Project in Fiji, 2013 -  
YouTube/ 7:43



<https://www.youtube.com/watch?v=Vrr2EOS1PMA>





Water source

*EPS was settled between the existing distribution pipes of non-treated water supply. A public tap system of water supply for germ free safe water was proposed.*

Settling storage tank



*Sediment heavy muddy matter*



*EPS can provide 6 liters per person of water for drink and cooking.*



Tap in Village



Existing system in village

Non treated water

URF:  
Up-flow  
Roughing  
Filter

EPS:  
Ecological  
Purification  
System (natural  
down flow)

Siphon  
break

BALANCE Tank :  
over-flow to keep  
gentle flow for EPS

over-  
flow

tap Public  
tap

*Trap and reduce  
muddy matter  
by gravel tank*

*Complete  
purification  
by sand tank*

*Store the germ free,  
safe and delicious  
drinking water*

EPS (Ecological Purification System) for germ free drinking water

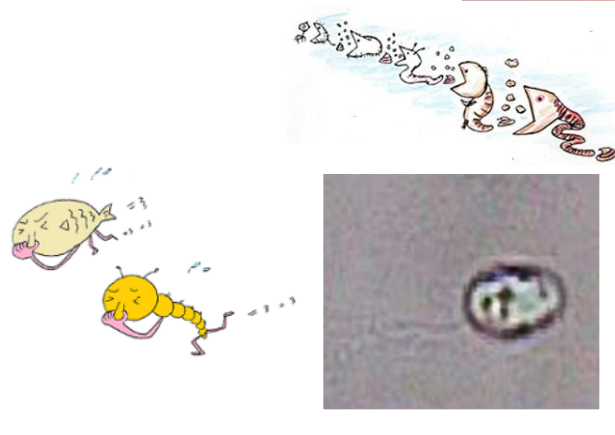
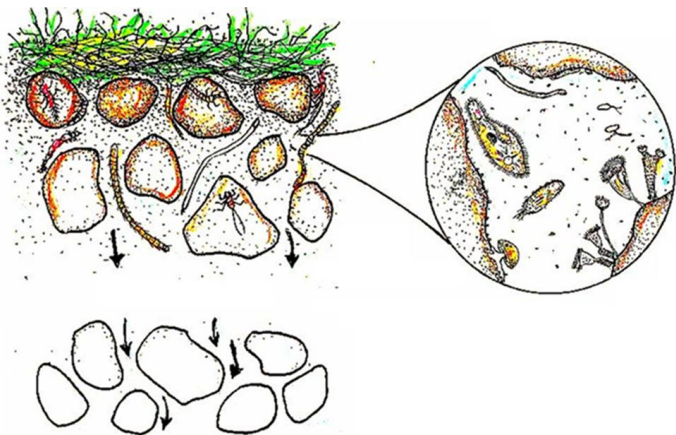
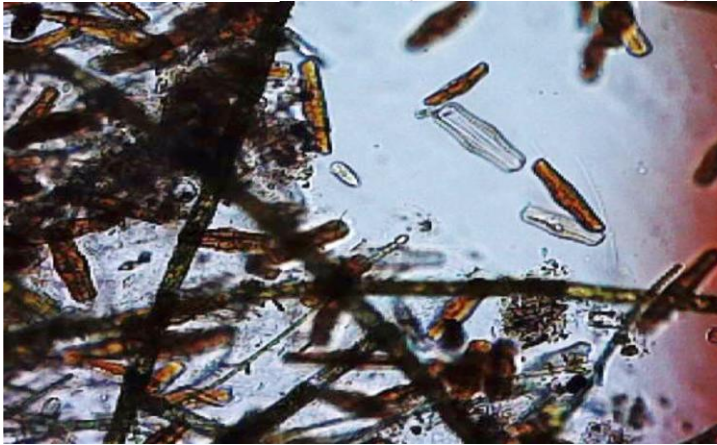




Look like dirty mud. There are so many microscopic organisms.



I showed microscopic organisms using portable microscope to villagers at the site.





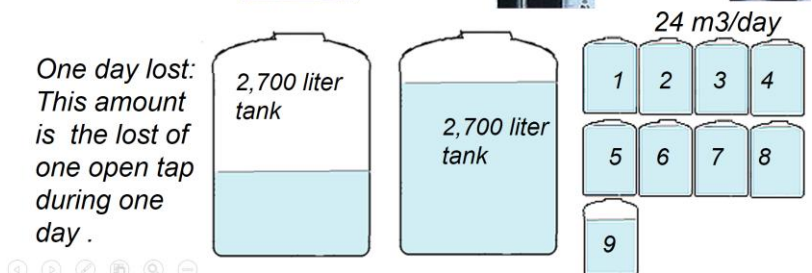
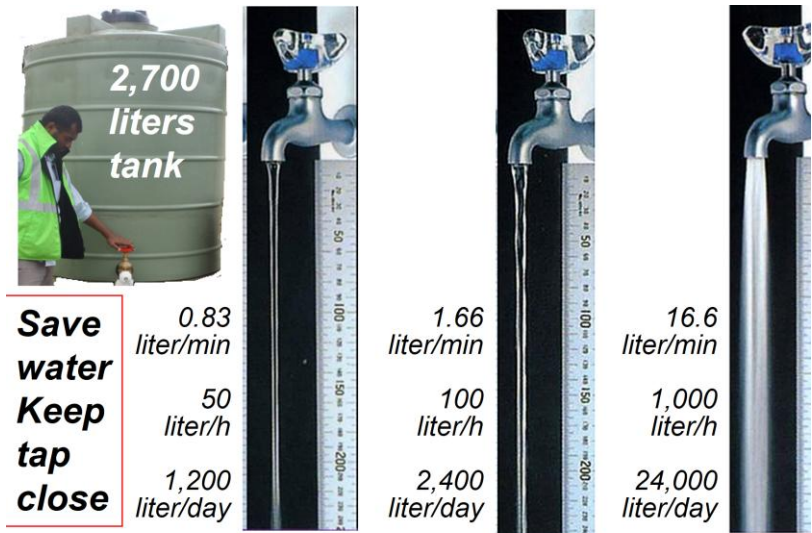




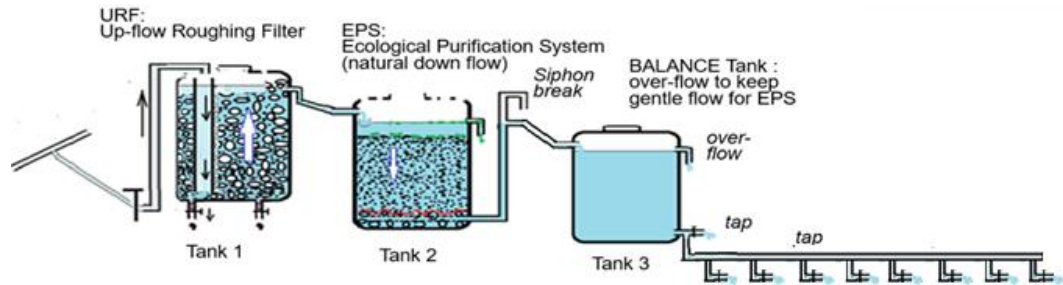
Comment on more use of EPS water in a village



EPS capacity of 2,700 liters tank									
radius (r) = 0.7m    (π x r x r) =1.54m <sup>2</sup>									
flow rate			filtrate			Available persons			remarks
m/d	cm/h	m3/d	liter/d	liter/h	liter/min	2 liter/d	6 liter/d	100 liter/d	
2	8	3.1	3,080	128	2.1	1,540	513	31	Original flow rate in UK, 1829
5	20	7.4	7,392	308	5.1	3,696	1,232	74	English standard rate
10	42	15.4	15,400	642	10.7	7,700	2,567	154	Present Thames Water rate
15	63	23.1	23,100	963	16.0	11,550	3,850	231	Possible rate in warm region
20	83	30.8	30,800	1,283	21.4	15,400	5,133	308	Possible rate in warm region



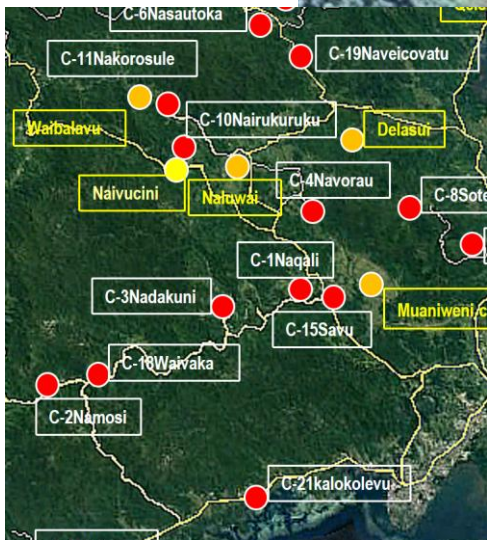
1. Block distribution system for EPS water is recommended.
2. Install more public taps for villagers.
3. Training for the save the limited amount of EPS water.



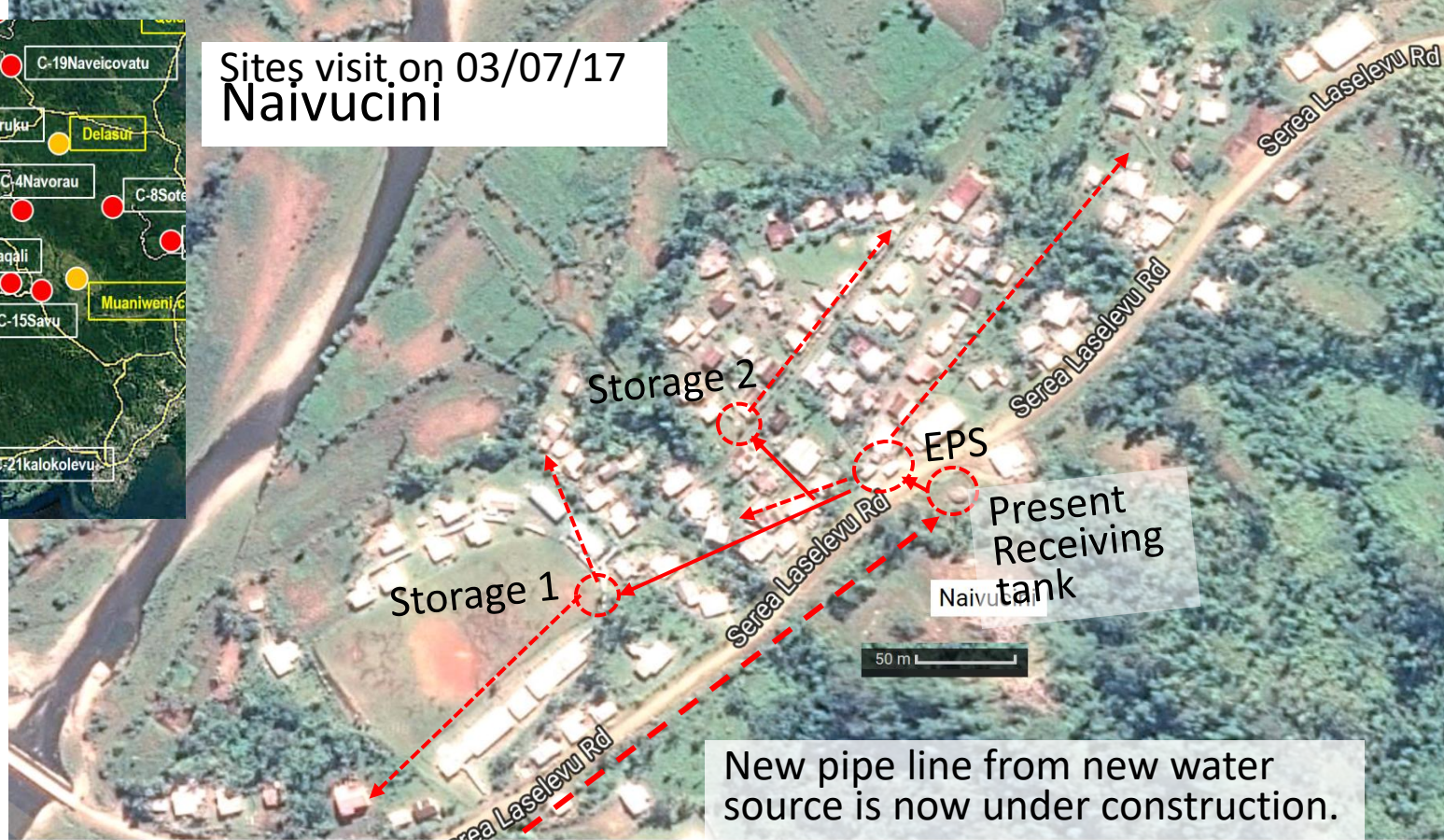
There is non-detected leak, therefore we have to install EPS pipe with may public taps in a small village (even up to 200 persons).

If there is absolutely no leak problem, we may connect to present distribution pipe in case of a small village. But this is risky. I cannot recommend this connection.





Sites visit on 03/07/17  
Naivucini



Present Receiving tank.  
Water shortage problem.

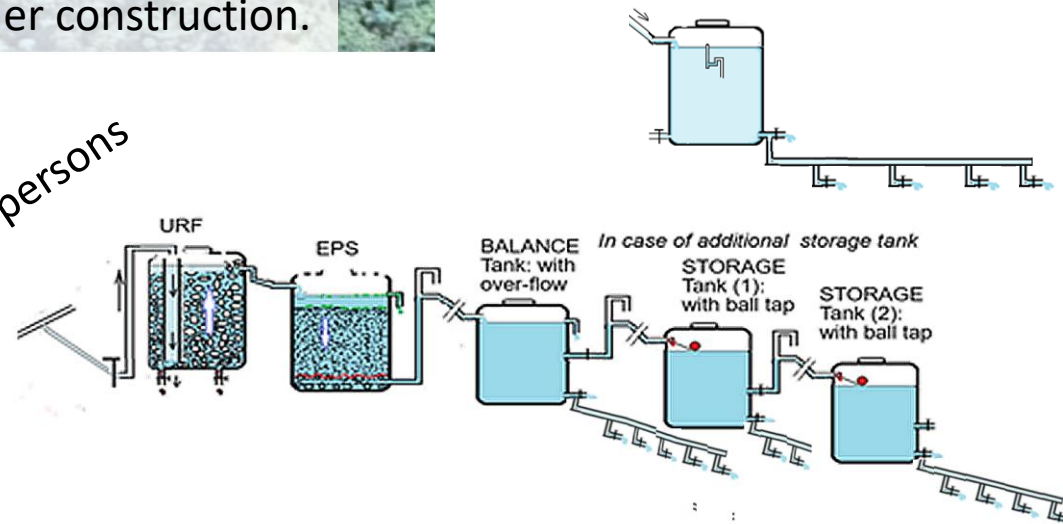
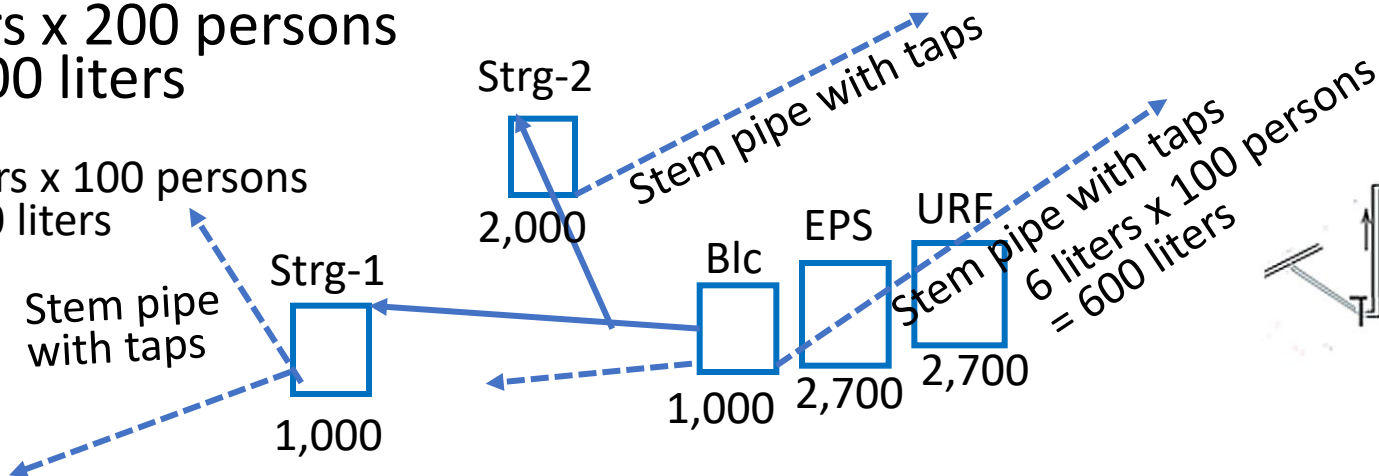


NEMANI TG 9501657  
500 persons 120 houses

More use of EPS water is  
key to be better quality.

6 liters x 200 persons  
= 1,200 liters

6 liters x 100 persons  
= 600 liters





# Comment on more use of EPS water in a village

Up to 200 persons in a village

If there is no leak problem, we may connect to present distribution pipe in case of a small village. But this is risky. I cannot recommend this connection.

There is non-detected leak, therefore we have to install EPS pipe with many public taps in a small village.

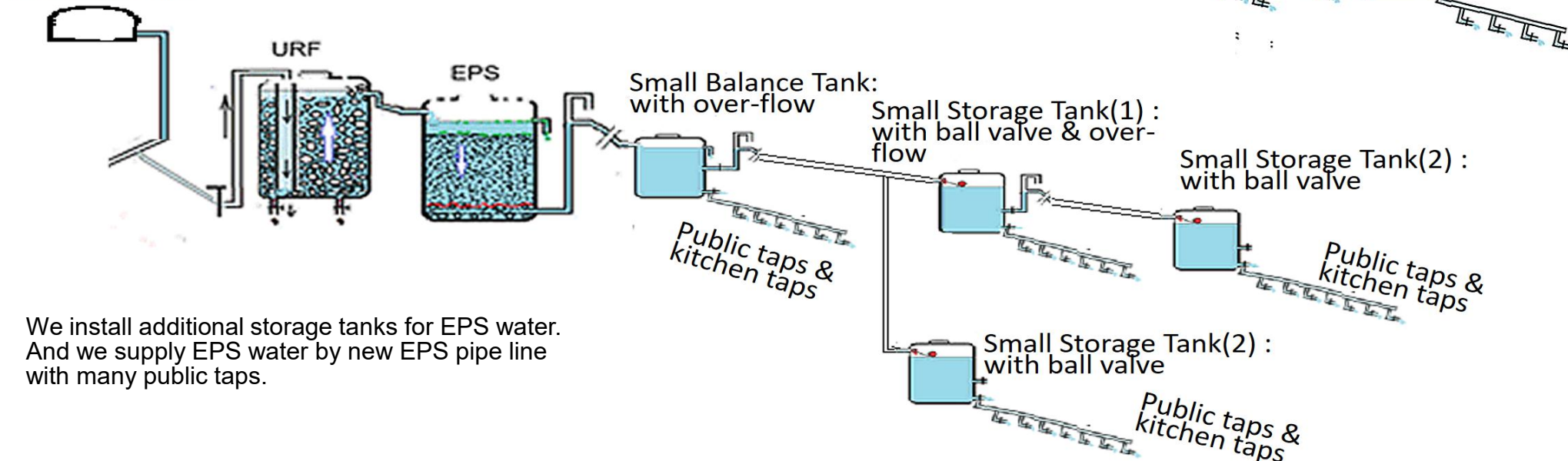


200 to 500 persons in a village

We supply EPS water by new EPS pipe line with many public taps. Or we install additional storage tanks for EPS water. And we supply EPS water by new EPS pipe line with many public taps.

More 500 persons in a village

Present receiving tank



We install additional storage tanks for EPS water. And we supply EPS water by new EPS pipe line with many public taps.



JICA Ecological Purification System design  
16/JUNE/2016  
EUCHI (HIDE) & NAKAMOTO, JICA 16/JUNE/2016




The image shows the front cover of a manual titled 'Ecological Purification System'. At the top left is a logo featuring a ship's wheel with a globe in the center, surrounded by the text 'MINISTRY OF INFRASTRUCTURE & TRANSPORT'. At the top right is the 'water' logo in blue, with 'OUR LIFELINE' underneath. The title 'Ecological Purification System' is centered in a bold, black, sans-serif font. Below the title is a photograph of a water treatment facility with several large green cylindrical tanks and white pipes, set against a backdrop of a tropical landscape with a thatched-roof building and a hill. Below the photo, the text 'Operation and Maintenance Manual' is centered. A red-bordered box on the left side contains the text '18 pages' in a large, black, handwritten-style font. Below this box, the text 'DEPARTMENT OF WATER & SEWERAGE' and 'JUNE 2016' are centered. At the bottom left is a small white box with a black border containing the text 'Version 2.2 20160614'. At the bottom right is the JICA logo, which consists of a blue circle with a red dot inside, and the letters 'jica' in blue. A small number '1' is at the bottom right corner.



**Ecological Purification System design**  
 TAKASHI KAWABATA, JICA IN JAPAN 2016  
 VERSION - III -

URF 2.700L

1) Inlet pipe size is 1 inch and is fixed with a clip to avoid any damage of the inlet pipe by shaking.

2) Flow rate can be controlled using a control valve (1 inch size) by watching the pouring of an inflow water. (Suitable valve setting height is 1,100 mm from the base.)

3) A gap of 100 mm between the inlet pipe (1 inch size) and the inner pipe (4 inches size) is necessary to confirm the flow rate and to sampling the raw water

4) The height difference of 100 mm between the top edge of the inner pipe (4 inches) and the bottom height of the outlet (over-flow) pipe is requested to keep the level of seepage water from gravels. In order to guard the outlet pipe against the excess floating scum, the larger size of gravels are heaped up the outlet pipe

5) Insert a mosquito mesh (plastic) between the bottom a large gravel layer (100-150 mm size) and a gravel layer (30-50 mm size) to avoid dropping small stones from the gravel layer and to easy drain the accumulated muddy matter

6) One drain pipe and valve are set near the bottom of the inner pipe to easy drain.

7) Open (cut) windows are covered with chicken mesh to avoid fallen leaves. And one cover near the inlet pipe can be lifted for a caretaker maintenance.

8) Each tank connector must be tightly connect from both sides (inside and outside) by two persons. Then the empty tank is filled with water. After the confirmation of no leakage from the connect point, this tank can be filled with the large gravel, mesh and small gravel.

JICA

**Ministry of Infrastructure & Transport**

**water**  
OUR LIFELINE

## Ecological Purification System

**7 pages**

**DEPARTMENT OF WATER & SEWERAGE**  
JUNE 2016

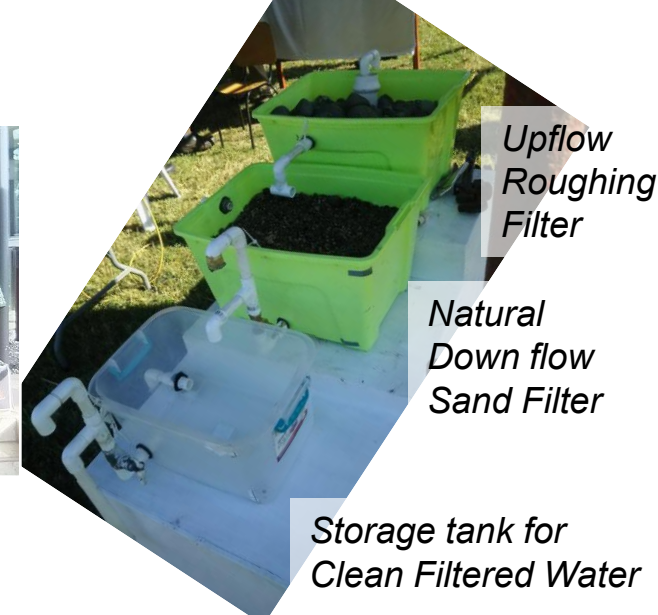
**JICA**

Construction Version 1.3    20160516



# World Water Day 2018. March 22/23 Lautoka, Fiji

Receiving tank  
Sedimentation



Upflow  
Roughing  
Filter

Natural  
Down flow  
Sand Filter

Storage tank for  
Clean Filtered Water

## Nature for Water



DWS actively promoted EPS when it had the chance.

**WHAT IS AN ECOLOGICAL PURIFICATION SYSTEM?**

An Ecological Purification System or EPS is a method of purifying water using natural resources such as stones, gravel and sand stored in two or three different tanks where water will filter through the stones, gravel and sand as a purification process before it is ready for drinking or consumption.

Algae grows on the sand surface to provide oxygen and trap particles and remove nutrients. Other micro-organisms decompose organic matters. This food web results in the removal of impurities (organic/inorganic and pathogenic) in the process, resulting in purified water.

This system does not require power or chemicals. It is cost effective and easy to construct.

EPS AT NADELEI VILLAGE, BA

NAVALAU VILLAGER DRINKING WATER THAT HAD BEEN TREATED BY EPS

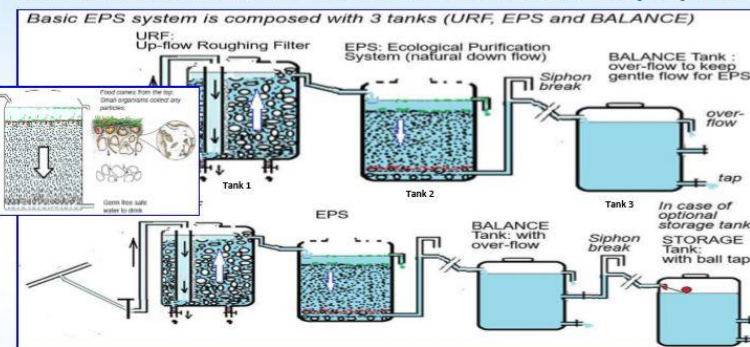
**water**  
OUR LIFELINE  
ECOLOGICAL PURIFICATION SYSTEM

The Department of Water and Sewerage is responsible for the implementation of Ecological Purification Systems in Fiji using biological processes of nature to clean and purify water for human consumption.

Contact Address:  
Level 3 Nasalavatu House, Samabula, Suva.  
Phone: (679) 3310 575 Fax: (679) 3310672

## COMPLETE SERVICE DELIVERY THAT IS ACCESSIBLE TO ALL

### UNDERSTANDING HOW THE ECOLOGICAL PURIFICATION SYSTEM (EPS) WORKS:



1. Water flows from source into the Upflow Roughening Filter Tank (URF) which has gravel.
2. From the URF Tank, water then flows into the Ecological Purification System Tank (EPS) which consists of sand with algae growth and other micro-organisms (established ecosystem) present to purify water.
3. With the slow filtering, water then passes into a storage tank ready for consumption.

ACCESSIBLE, SAFE, AFFORDABLE DRINKING WATER AND SANITATION FOR FIJI.

New movement to make more large scale EPS plant arises by own activities of a rural village in March, 2018.

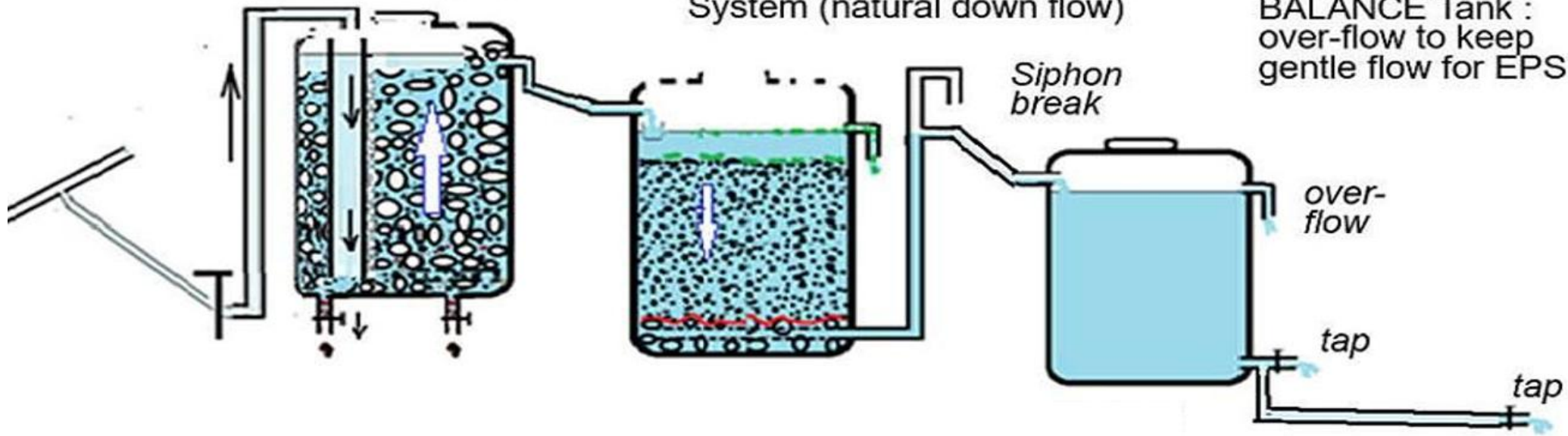




URF:  
Up-flow Roughing Filter

EPS: Ecological Purification  
System (natural down flow)

BALANCE Tank :  
over-flow to keep  
gentle flow for EPS



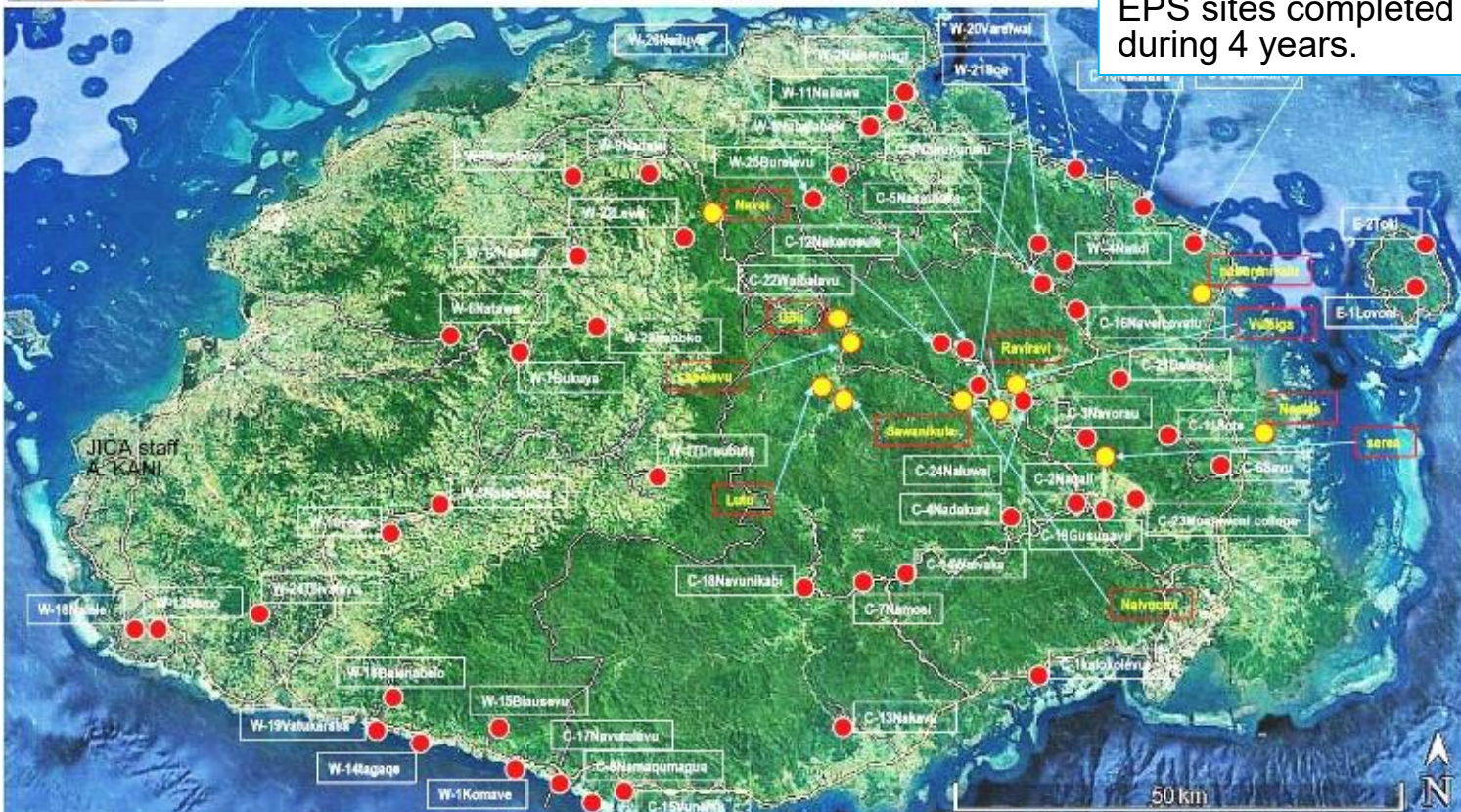




8 times of a month  
visit during 4 years.



EPS sites completed during 4 years.



# Cleaner Water Project by EPS (Ecological Purification System: Wise Use of Natural Phenomena) for Rural People in Fiji

EPS project started from  
Kalokolevu and Navatuvula  
in 2013

**The project was implemented under the initiative of the Fiji government**, and construction of around 30 plants was covered by the government budget every year, and JICA only provided technical cooperation by dispatching Nakamoto and volunteers. EPS technology has been transmitted from Japan to Fiji as a technology that can be done by themselves.





<https://www.youtube.com/watch?v=vji0ay-7GA8>

This seminar was held at the end of 4 years EPS JICA contribution (Nov.2014 to Dec.2018) in Fiji by Nakamoto.

**EPS Fiji Wksp 2019 for safe water/ 7:08**

People loved the latest advanced technology. However, there is suitable technology for each country. That can be maintained and managed by local people. That is EPS.

**EPS Seminar/ Wksp at USP, Suva, Fiji March 2019/ 4:32**

<https://www.youtube.com/watch?v=fEl5ghBzfMw&t=23s>

# EPS

## Public Seminar/ Workshop

*“ An approach to  
securing the safe water ”*

Reviewing Fiji's successful EPS implementation at Rural Area and future perspective of implementation in PICs

**12 & 13 March 2019**

@ Japan-Pacific ICT Centre, USP Laucala Campus



Day 1 09:30~17:00 Public Seminar (inc. refreshments & lunch)

Main Presenter - Dr Nobutada NAKAMOTO\*

JICA Expert, EPS advisor for Rural Water Supply  
Professor Emeritus of Shinshu University, Japan

\* Live lecture from JICA HQ, Tokyo Japan

Day 2 09:00~18:30 Workshop & Study Tour (inc. lunch)\*\*

Workshop - Demonstration of EPS Construction

By Mr Makoto YANO, Okinawa Blue Water, Japan

Study Tour - EPS Site Visit to NAKINI Village

18:30~20:00 - Evening Reception (Cocktail Party)



\*\* Pre-registration is required at Day 1 (close at 11:30) due to limited space.

For further details, please contact JICA Fiji Office by email: [jicafj-recept@jica.go.jp](mailto:jicafj-recept@jica.go.jp)  
or telephone: +679 330 2522



ECOLOGICAL PURIFICATION SYSTEM



## Fijian Minister for Infrastructure opens the Ecological Purification System Project at USP (The University of South Pacific)

<https://www.youtube.com/watch?v=iBcjbocOleQ&t=2s>

11 min 21 sec

Fiji Government



The implementation of community based Ecological Purification System was made possible through the funding of government.

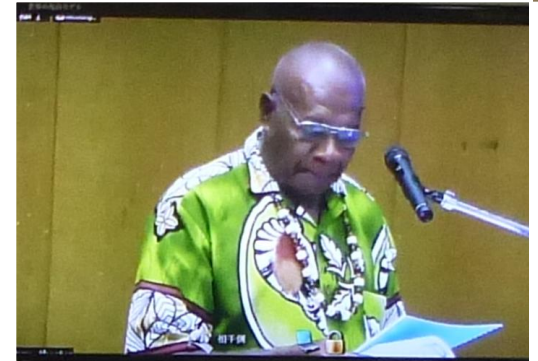
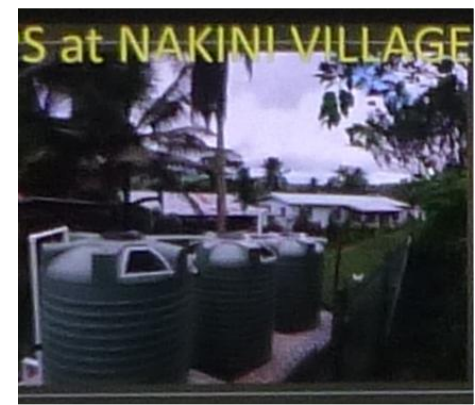
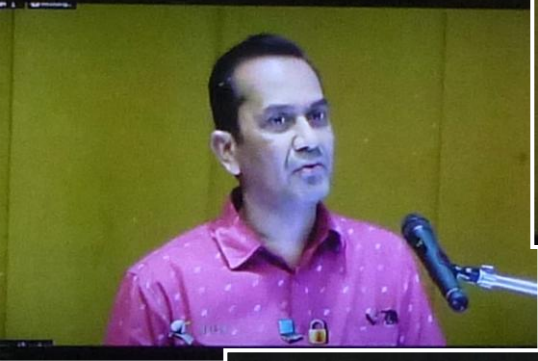
The Fijian Minister for Infrastructure, Transport, Disaster Management and Meteorological Services Hon. Jone Usamate, in saying this, officiated as Chief Guest at the opening of the Ecological Purification System (EPS) Workshop which was held at The University of the South Pacific.

**The EPS is a chemical-free and energy-free water purification technology** which was initiated by Dr. Nobutada Nakamoto, Professor Emeritus of Shinshu University in Japan.

Also present at the opening event was special guest was Deputy Vice Chancellor of USP Mr. Derrick Armstrong.

The workshop is a two-day event hosted by JICA from 12-13 March, 2019 at The University of the South Pacific ICT Centre in Suva, Fiji.





We are all happy!!



2018/ 8/27



# EPS

## Public Seminar/ Workshop

*"An approach to  
improving the environment  
by the people"*  
Fijian EPS  
project for rural  
people started  
from Jan. 2013.



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or telephone: +679 330 2522

ECOLOGICAL PURIFICATION SYSTEM

### 17:30-18:30 Wrap-up



We are happy.



Fijian people made EPS plants by themselves.



# Ecological Purification System for Safe Drinking Water

## - Application of Natural Process -

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

Eco-friendly technique to make artificial  
spring water



<https://www.youtube.com/watch?v=fEI5ghBzfMw&t=62s>

4min 32 sec

EPS to make safe drinking  
water is real our technology.

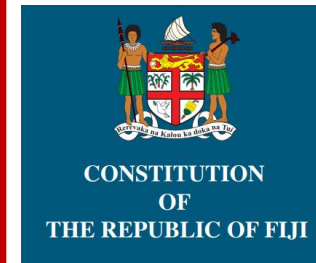
## Remember Three Steps

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.



<https://www.youtube.com/watch?v=vji0ay-7GA8&t=254s>

7min 08 sec

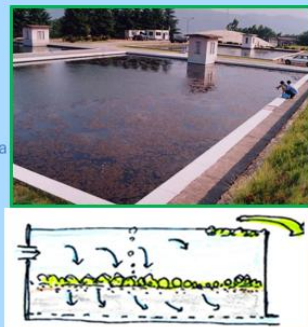


This Constitution issued  
on 7 September **2013**.

36: Right to adequate  
food and water

the right of every person to have adequate  
food of acceptable quality and to **clean and  
safe water in adequate Quantities.**





1984.4.~



SSF was recognized as Ecological Purification System in Ueda, Japan.

JICA training began in Okinawa, from 2006.

From 2006,  
JICA training  
in Okinawa



Sodeyama

Ishigaki

Ishigaki  
石垣

Taketomi  
竹富町

Miyakojima  
宮古島

Okinawa

Nago  
名護

Naha  
那覇

Busan  
부산

Hiroshima  
広島

Osaka  
大阪

Nagoya  
名古屋

Tokyo  
東京

Ueda

Japan

Sendai  
仙台

Someya,  
Ueda,  
Nagano

2011.8.

Super clean  
delicious water



Fijian people  
made a big effort  
for the people.

EPS spread to Pacific  
countries.



*This is Fijian EPS project.  
Fijian people made EPS by themselves.*

JICA short term Expert  
N. NAKAMOTO  
Oct. 2014-Nov.2018

JICA Volunteer  
Hide EGUCHI  
2015-2016

JICA Volunteer  
Isamu SHIOIRI  
2017-2018

*8 times:  
Each about  
one month*



*We assisted a little for this project.*

The contribution of  
short-term expert by  
Nakamoto was from  
Oct. **2014** to Nov. 2018.



This Fijian EPS project  
for rural people **still  
continues** until now by  
Fijian government in  
**2024**.

***This is a real technical  
transfer from JICA training.***



*EPS is Our Smart Treatment System. Fijian people realized  
and certified. We can have safe and delicious water.*





Timaima Bolaciri, carrying Taniela Tabukarawa, and Una Koroi try out the new ecological purification system at Kalokolevu Village yesterday. Picture: JONACANI LALAKOBAU

<https://www.youtube.com/watch?v=SVuR44Xwu7s&t=43s>

3 min

