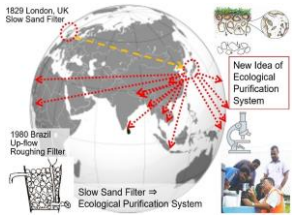


Chemical Free
Eco-friendly

Ecological Purification System (EPS)

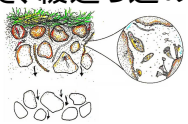
0. Introduction: Phytoplankton, Reservoir study, Meet Slow Sand Filter, Importance of Ecological point. JICA training
植物プランクトン、貯水池研究、緩速ろ過、生態学の視点、JICA研修へ

1-19 | 19

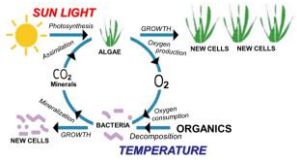
1. Water cycle, Safe water, Acceptable risk. *20-31* | 12
水循環、安全な水、許容できるリスク

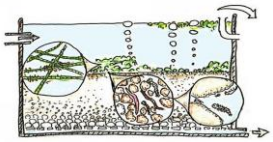


2. Key of purification in nature is food chain. Refocus to Slow Sand Filter. *32-57* | 26
浄化は食物連鎖が鍵、緩速ろ過の再認識

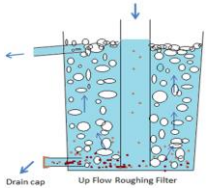




3. Algae and animals in Slow Sand Filter. *58-79* | 22
緩速ろ過池の藻類と動物





4. Up-flow Roughing Filter to reduce SS *80-108* | 29
濁り対策で上向き粗ろ過、モデルで解説



5. From JICA training in Miyako-jima, Okinawa to Samoa *109-124* | 16
宮古島JICA研修からサモアへ



6. Safe water for rural people by EPS in Fiji *125-147* | 23
フィジーの展開：生物浄化法で地方給水へ



7. Aerobic condition is essential for EPS. *148-157* | 10
生物浄化法は酸素が必須



8. Confirm by yourself. Don't believe commercial. Trust your true sense. 自分で確かめよう。 *158-172* | 15



JICA training in Hiroshima in July, 2024.

Hungry is Normal.

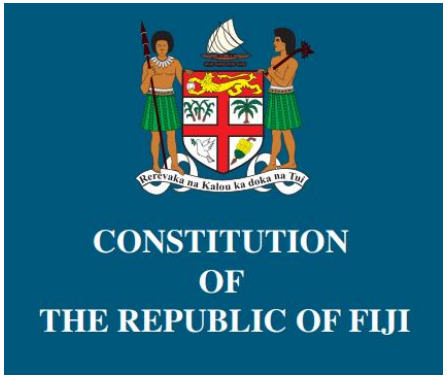



JICA training in Miyako Jima, in Aug. 2011.

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

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

https://laws.gov.fj/ResourceFile/Get/?fileName=2013%20Constitution%20of%20Fiji%20(English).pdf



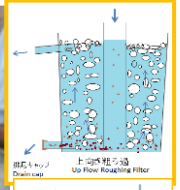
36. Right to adequate food and water

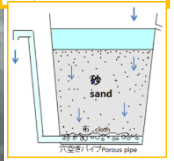
36.—(1) The State must take reasonable measures within its available resources to achieve the progressive realisation of the right of every person to be free from hunger, to have adequate food of acceptable quality and to clean and safe water in adequate quantities.

Remember Three Steps *He remember these words.*

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.

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

Holiday Inn:
Jan.16.2013

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 of 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

+ Enlarge this im

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 thr
ecological purification system (EPS), thanks to the partnership between the Departm
and Sewerage, the Water Authority of Fiji (WAF) and the Japan International Coopera
(JICA).

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

...proving accessibility ... are

Government in parti ... in

...igh better accessibility to ... key priorit

Change, Peace and Progress ... able Deve

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

Reverend Uraia Peni Volavola, left, JICA Fiji resident representative Shumon Yoshiara and Ministry of Works permanent secretary Commander Francis Kean cut the ribbon to officially commission the new ecological purification system at Kalokolevu Village on

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

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

THE FIJIAN GOVERNMENT

Opening ceremony of public tap on September 11, 2013. at 2nd Eps.

NAVATUVULA VILLAGERS GET ACCESS TO CLEAN DRINKING WATER

9/12/2013

Improving the living standards of the rural communities through better accessibility to c 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 perm secretary, Mr Francis Kean at the commissioning of the second ecological water purificat (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 ensu removal of contaminants before water is consumed.

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

Clean, safe water brings joy to village

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.

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

Settling storage tank

Sediment heavy muddy matter

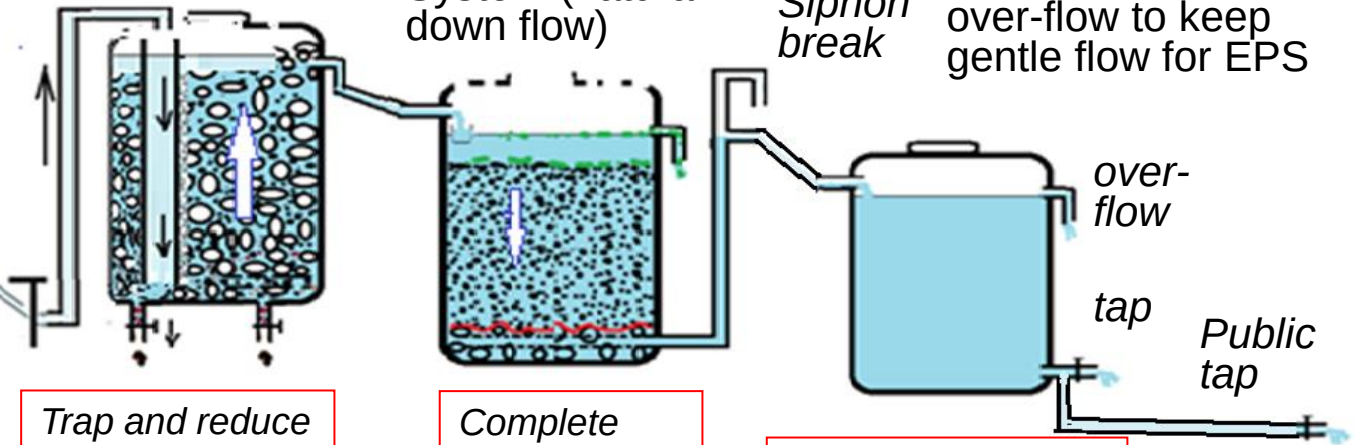
URF: Up-flow Roughing Filter

EPS: Ecological Purification System (natural down flow)

Siphon break

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

Tap in Village



Trap and reduce muddy matter by gravel tank

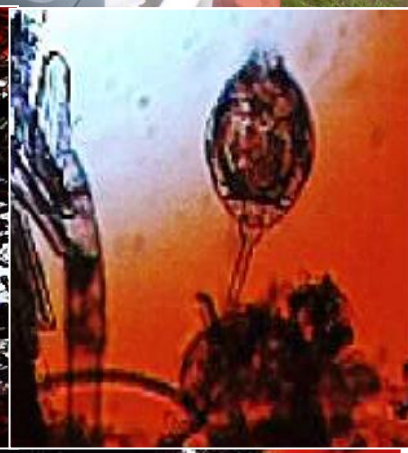
Complete purification by sand tank

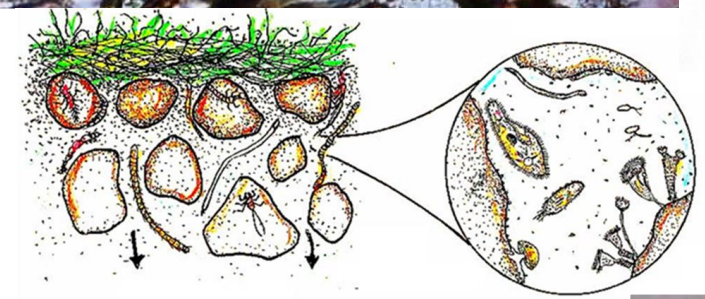
Store the germ free, safe and delicious drinking water

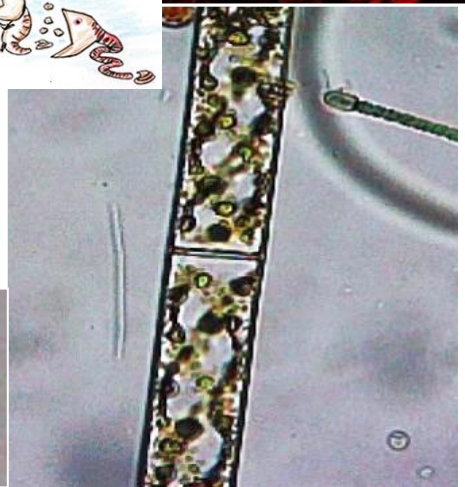
Existing system in village

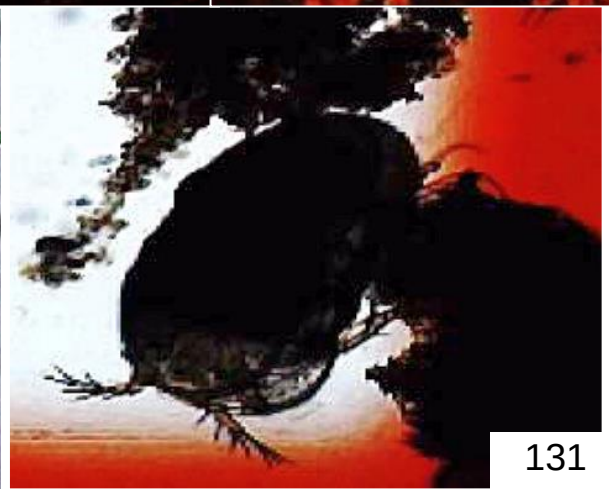
EPS (Ecological Purification System) for germ free drinking water

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



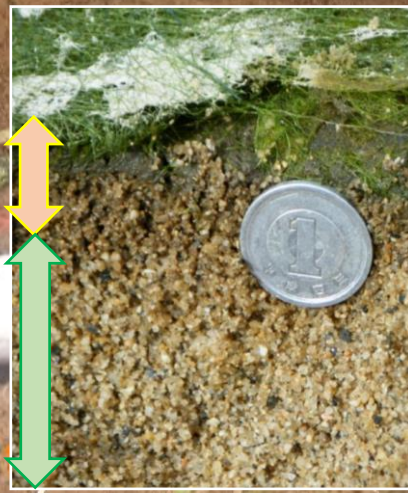






Trap and decompose layer by microscopic and small organisms

Insurance layer for adhesion of leak matters from biological active layer.



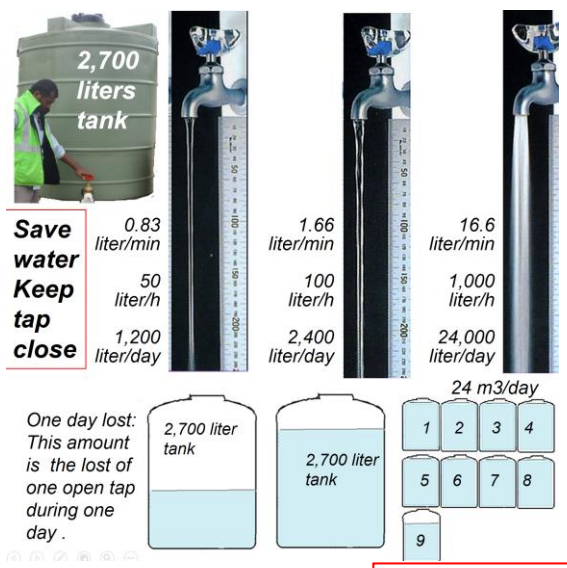
EPS capacity of 2,700 liters tank									
radius（r）=0.7m、（π x r x r）=1.54m2									
flow rate			filtrate			Available persons			remarks
m/d	cm/h	m3/d	liter/d	liter/h	liter/min	2 liter/d	6 liter/d	100 liter/d	
2	8	3.1	3,080	128	2.1	1,540	513	31	Original flow rate in UK, 1829
5	20	7.4	7,392	308	5.1	3,696	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

Comment on more use of EPS water in a village

Drink

Drink
Cook

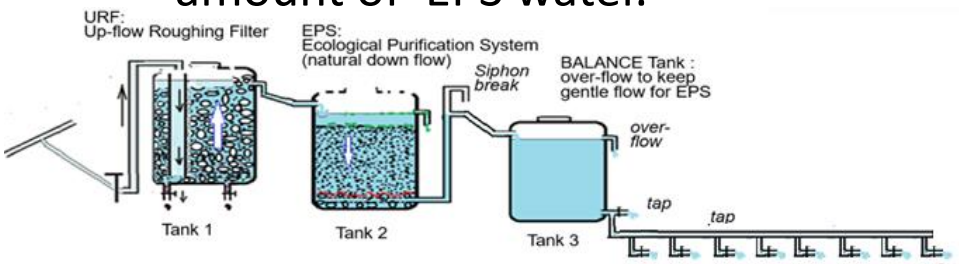
Drink
Cook
Shower



1. Block distribution system for EPS water is recommended.

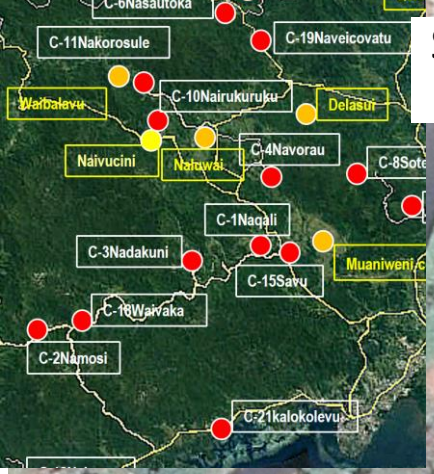
2. Install more public taps for villagers.

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

Storage 2
EPS
Present Receiving tank
Storage 1
Serea Laselevu Rd
50 m
New pipe line from new water source is now under construction.

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

6 liters x 200 persons = 1,200 liters

Strg-2
2,000
Stem pipe with taps

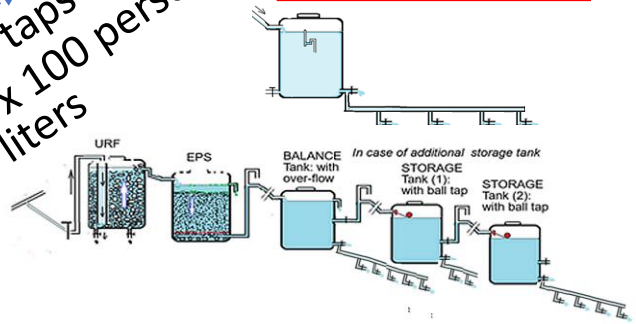
6 liters x 100 persons = 600 liters

Strg-1
1,000
Stem pipe with taps

Blc
1,000

EPS
2,700

URF
2,700
Stem pipe with taps
6 liters x 100 persons = 600 liters

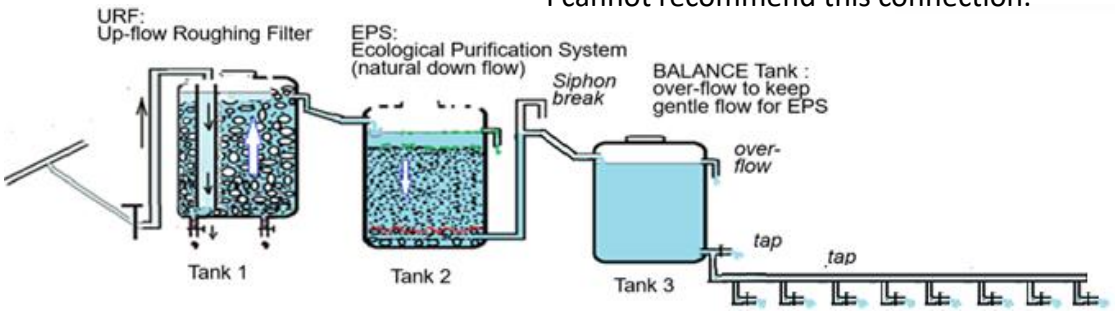


Comment on more use of EPS water in a village

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

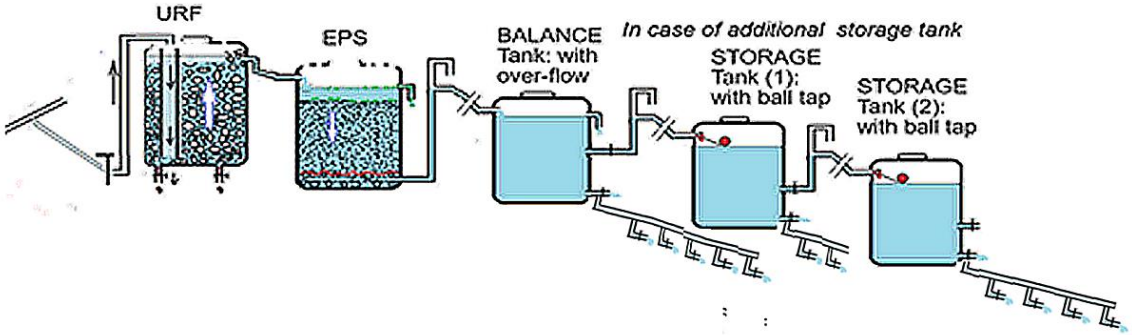
Up to 200 persons in a village

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.



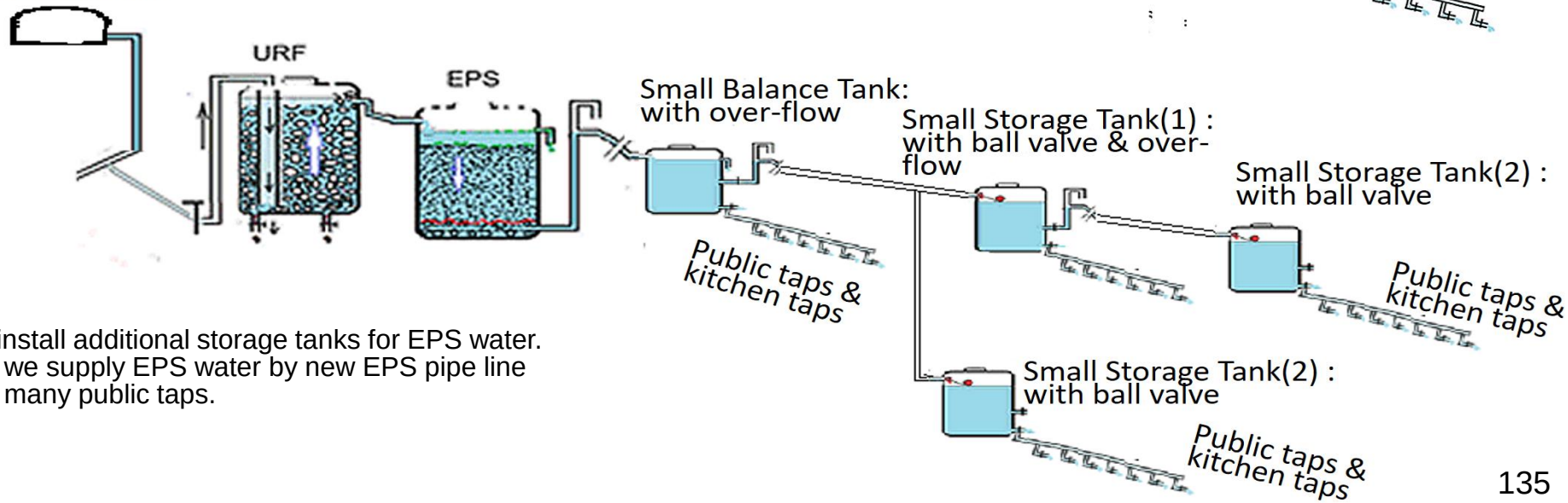
200 to 500 persons in a village

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

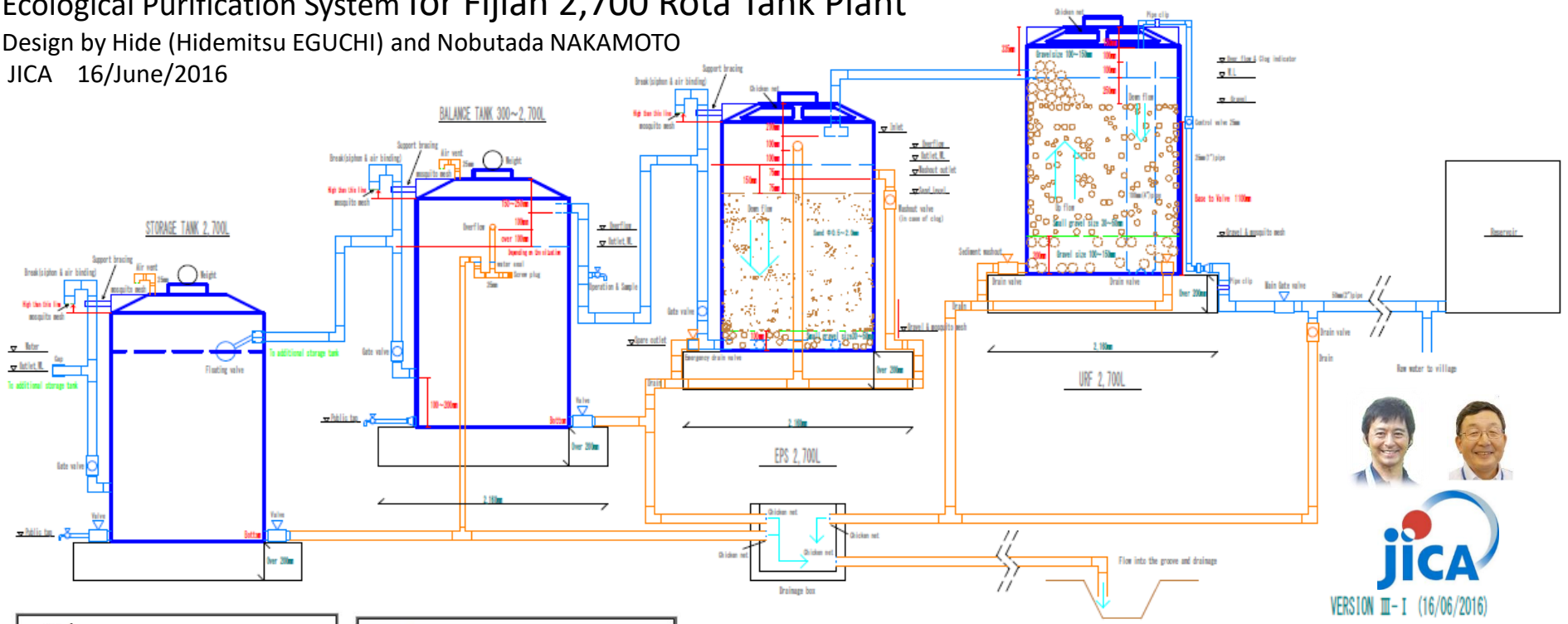


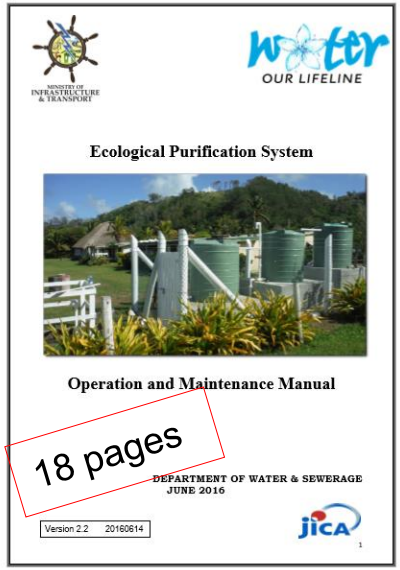
We install additional storage tanks for EPS water. And we supply EPS water by new EPS pipe line with many public taps.

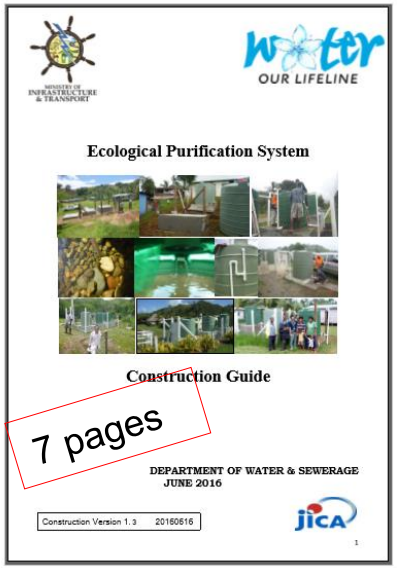
Ecological Purification System for Fijian 2,700 Rota Tank Plant

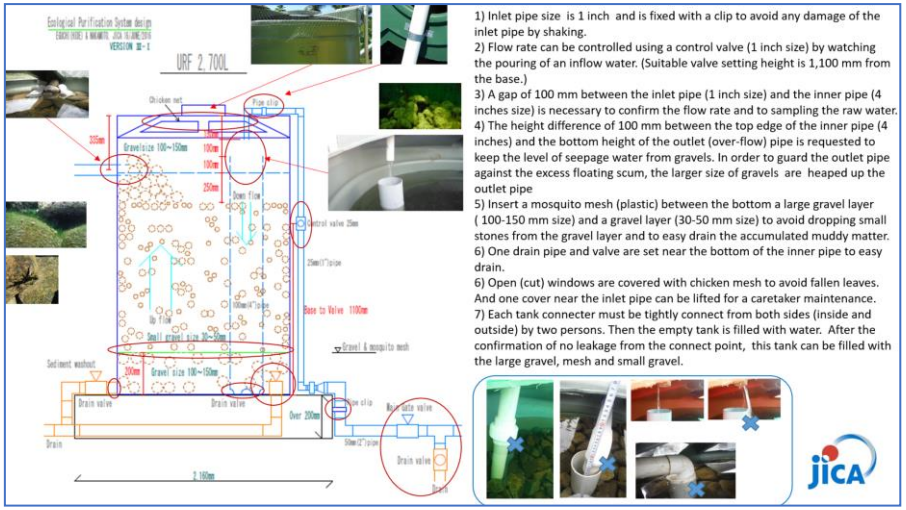
Design by Hide (Hidemitsu EGUCHI) and Nobutada NAKAMOTO

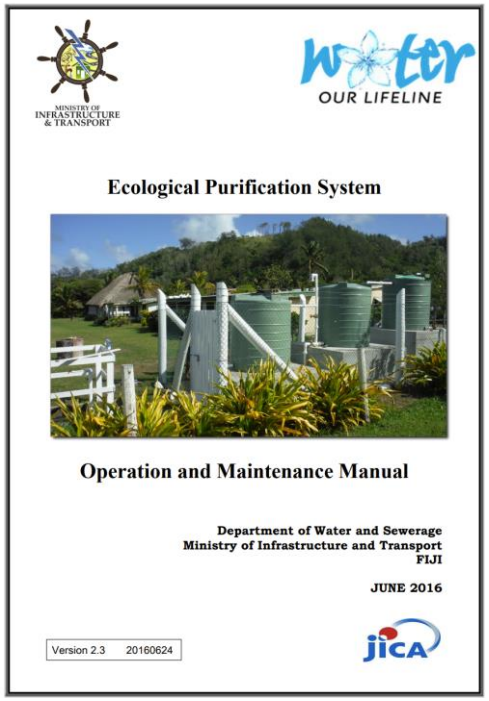
JICA 16/June/2016





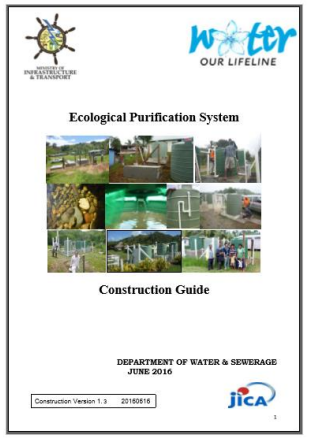






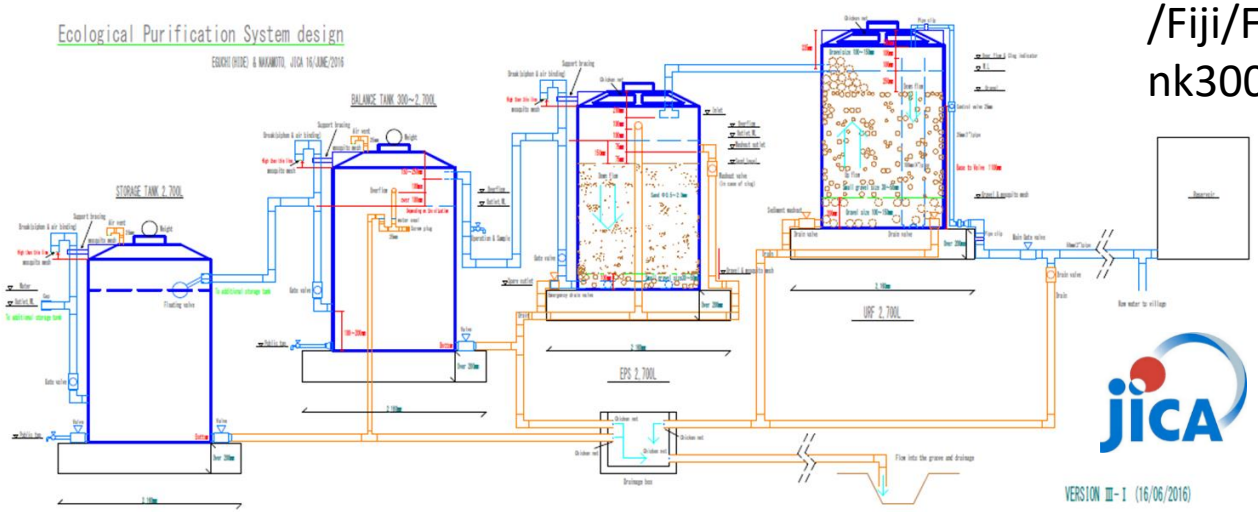
http://www.cwsc.or.jp/files/pdf/Fiji/160614-Eng-Fiji-EPS-Manual.pdf

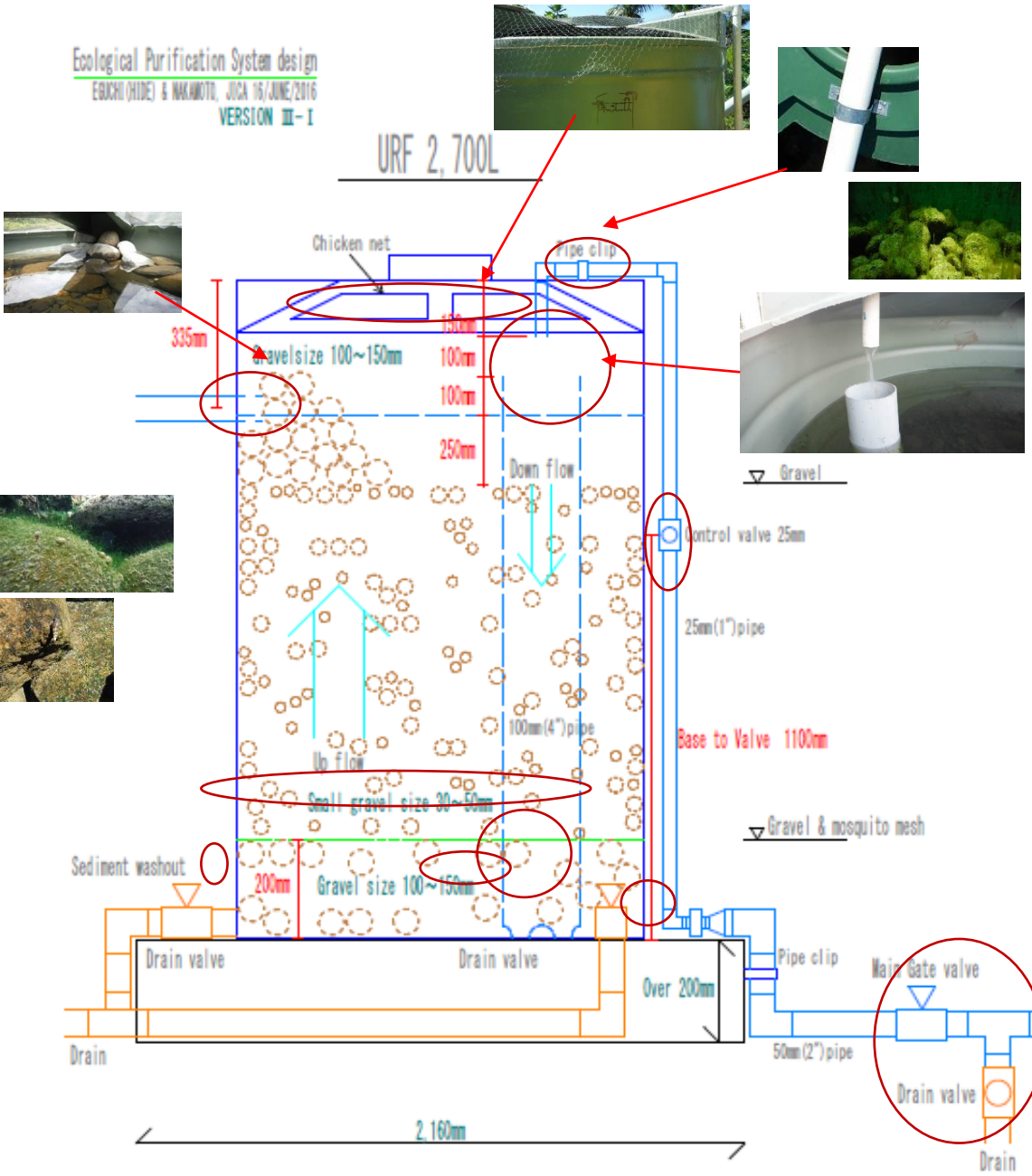
Operation and Maintenance Manual
June 2016



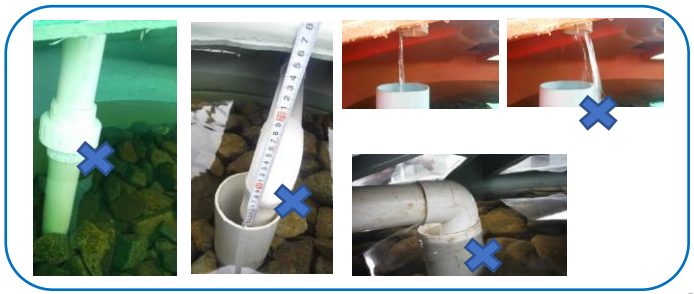
Construction Guide
June 2016

http://www.cwsc.or.jp/files/pdf/Fiji/Fiji%20EPS%202016%20tank300-2700CAD-Design.pdf



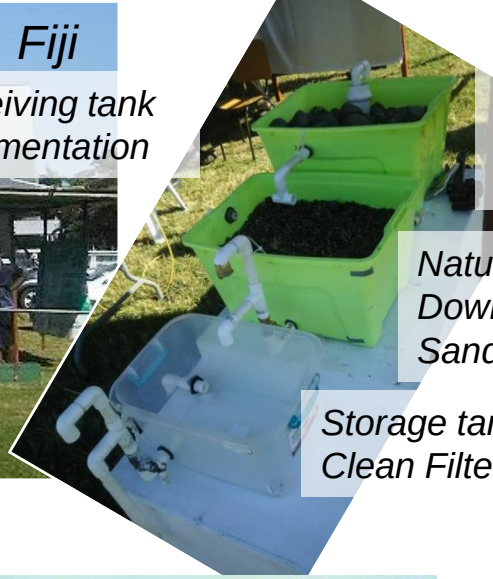


1) Inlet pipe size is 1 inch and is fixed with a clip to avoid any damage of the inlet pipe by shaking.
2) Flow rate can be controlled using a control valve (1 inch size) by watching the pouring of an inflow water. (Suitable valve setting height is 1,100 mm from the base.)
3) A gap of 100 mm between 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.
6) 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.
7) Each tank connecter 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.



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

Receiving tank
Sedimentation

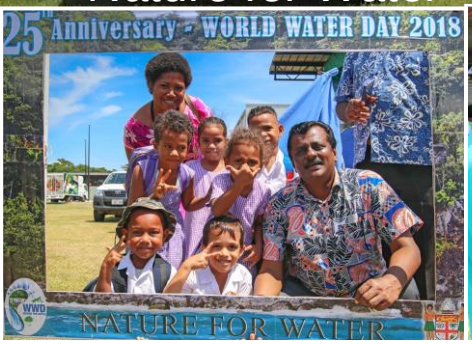


Upflow
Roughing
Filter

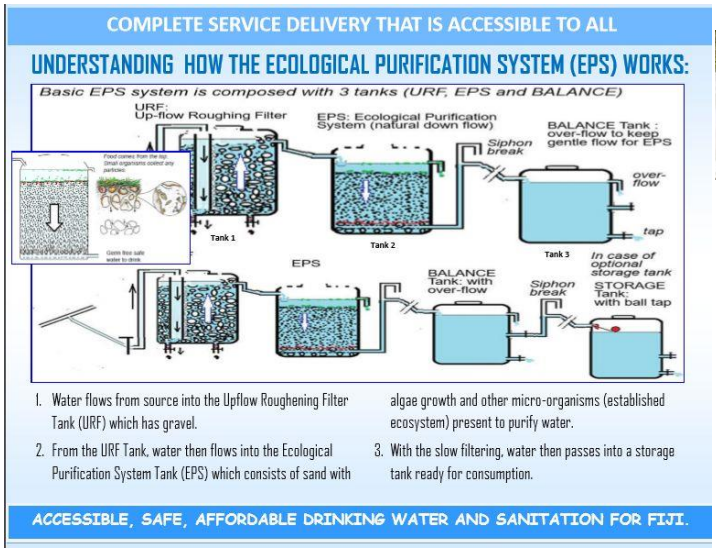
Natural
Down flow
Sand Filter

Storage tank for
Clean Filtered Water

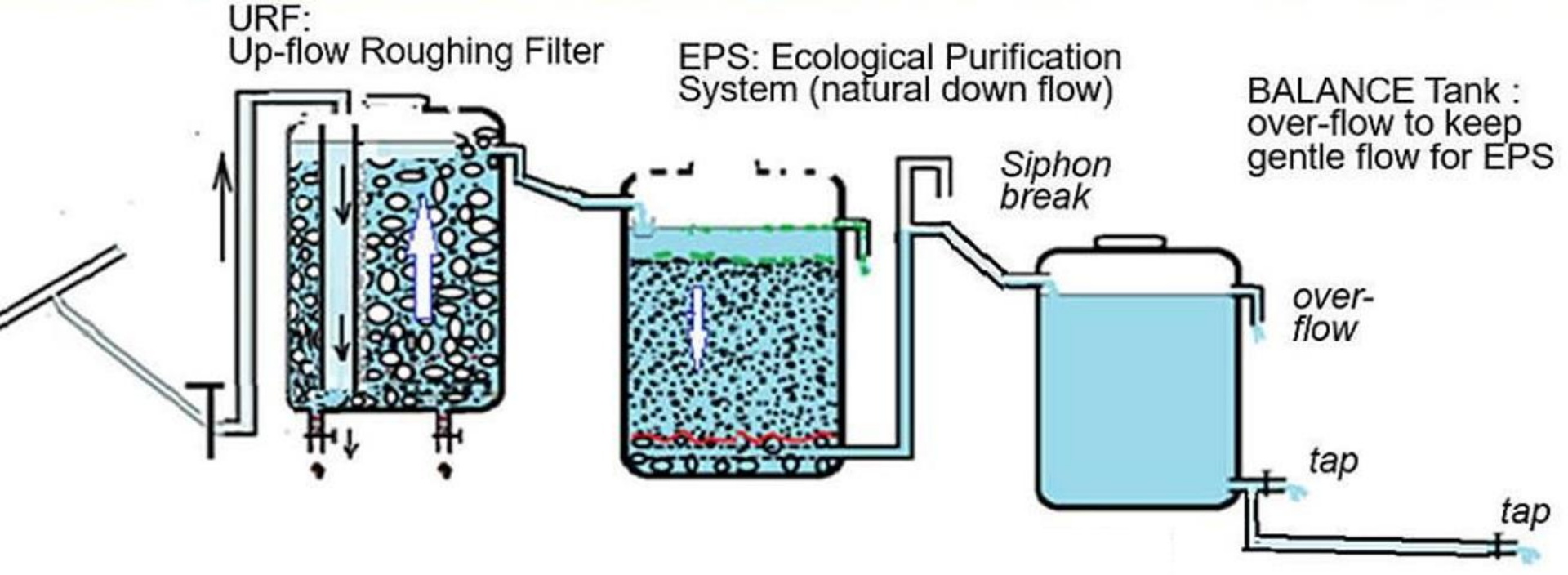
Nature for Water

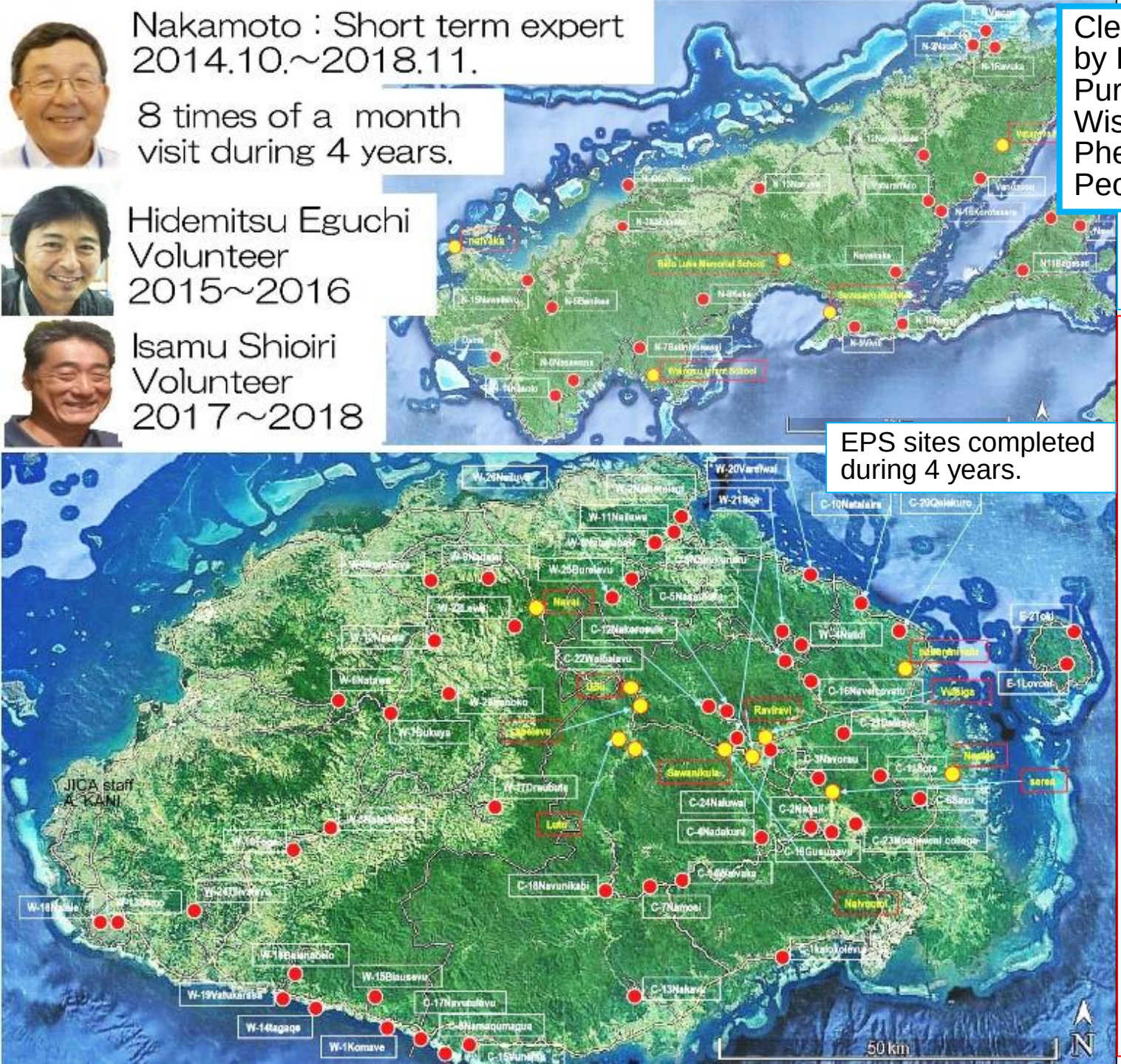


DWS actively promoted EPS when it had the chance.



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
Siphon break
over-flow
tap
tap



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

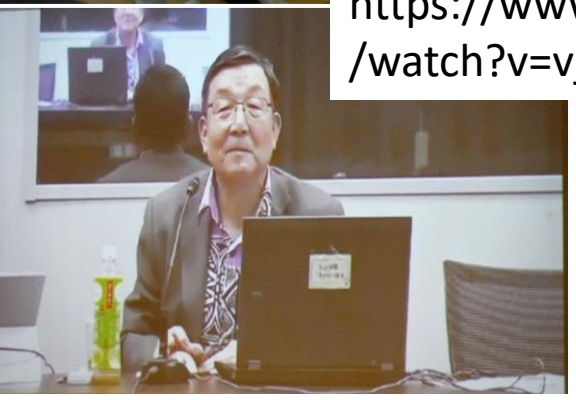
EPS project started from Kalokolevu and Navatuvula in 2013

EPS sites completed during 4 years.

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.

EPS Fiji Wksp 2019 for safe water/ 7:08

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



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

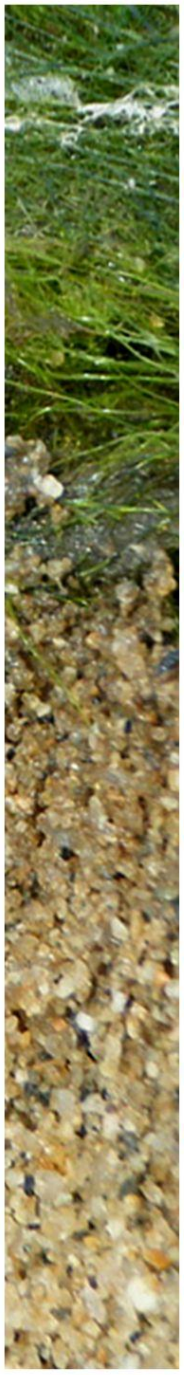
Study Tour - EPS Site Visit to NAKINI Village

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

JICA

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

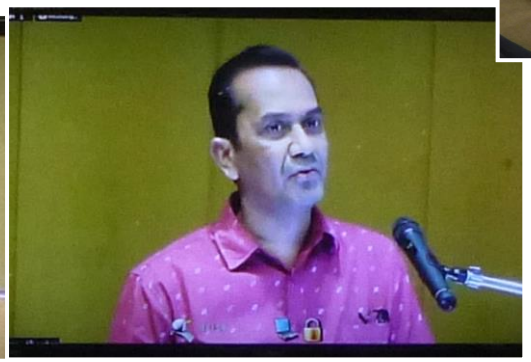
For further details, please contact JICA Fiji Office by email: jicafj-recept@jica.go.jp or telephone: +679 330 2522

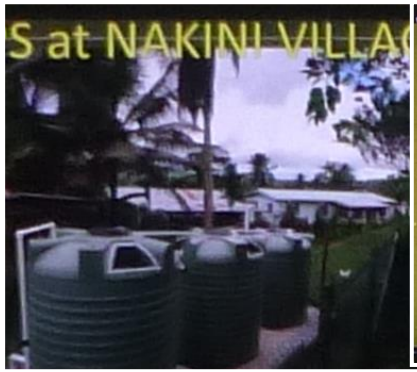
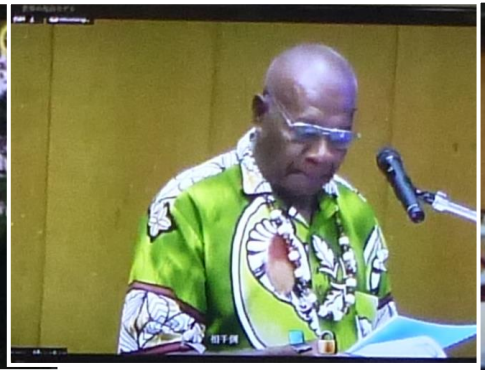


ECOLOGICAL PURIFICATION SYSTEM






S at NAKINI VILLA



JICA HQ 228

We are all happy!!

EPS

Public Seminar/ Workshop

Fijian EPS project for rural people started from Jan. 2013.

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

Day 2 09:00~18
Worksho

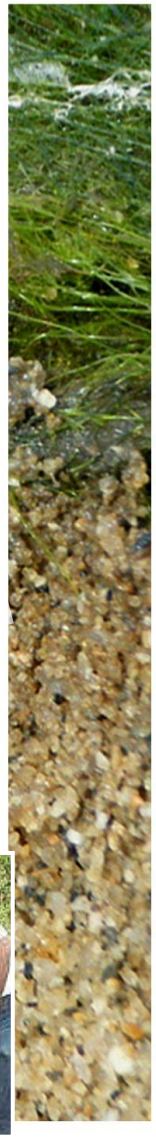
Study

18:30~

JICA

** Pre-registration is required at Da

For further details, please contact
or telephone: +679 330 2522



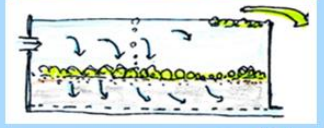
ECOLOGICAL PURIFICATION SYSTEM

17:30-18:30
Wrap-up

We are happy.

Fijian people made EPS plants by themselves.

From 2006,
JICA training
in Okinawa



1984.4.～

Someya,
Ueda,
Nagano

Ueda

Japan

Sea

Sendai
仙台

Nagoya
名古屋

Tokyo
東京

Osaka
大阪

Hiroshima
広島

Busan
부산

Fukuoka
福岡

Korea

Sodeyama

Ishigaki

Nago
名護

Naha
那覇

Okinawa

Miyakojima
宮古島

Ishigaki
石垣

Taketomi
竹富町

Taipei
台北

Taiwan

Fijian people made a big effort for the people.

2011.8.

Super clean
delicious water

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

JICA short term Expert
N. NAKAMOTO
Oct. 2014-Nov.2018
8 times:
Each about one month

JICA Volunteer
Hide EGUCHI
2015-2016

JICA Volunteer
Isamu SHIOIRI
2017-2018

We assisted a little for this project.

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

2018/11/ 9 11:

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.

Ecological Purification System for Safe Drinking Water

- Application of Natural Process -

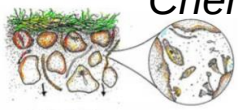
Eco-friendly technique to make artificial spring water

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

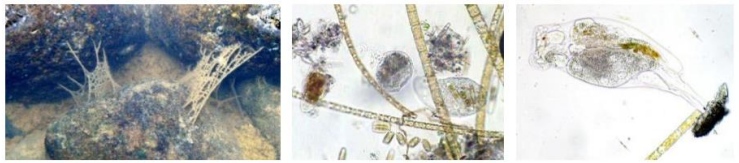
August 2018

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

Toward Zero Waste World by Chemical-free System



JICA training



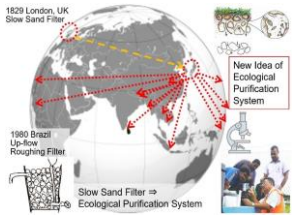
Microscopic organism is the key of EPS.

Biological activity was evaluated by the diurnal change of dissolved oxygen.

Ecological Purification System NAKAMOTO 2018

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

This is our technology.



Chemical Free
Eco-friendly

Ecological Purification System (EPS)

0. Introduction: Phytoplankton, Reservoir study, Meet Slow Sand Filter, Importance of Ecological point. JICA training
植物プランクトン、貯水池研究、緩速ろ過、生態学の視点、JICA研修へ

1-19 | *19*

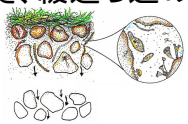
1. Water cycle, Safe water, Acceptable risk.
水循環、安全な水、許容できるリスク

20-31 | *12*



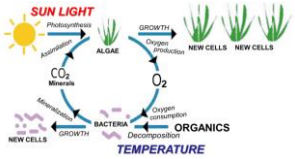
2. Key of purification in nature is food chain. Refocus to Slow Sand Filter.
浄化は食物連鎖が鍵、緩速ろ過の再認識

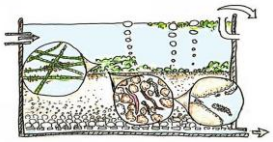
32-57 | *26*


3. Algae and animals in Slow Sand Filter.
緩速ろ過池の藻類と動物

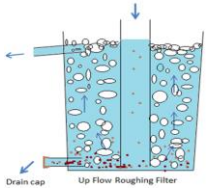
58-79 | *22*





4. Up-flow Roughing Filter to reduce SS
濁り対策で上向き粗ろ過、モデルで解説

80-108 | *29*



5. From JICA training in Miyako-jima, Okinawa to Samoa
宮古島JICA研修からサモアへ

109-124 | *16*



6. Safe water for rural people by EPS in Fiji
フィジーの展開：生物浄化法で地方給水へ

125-147 | *23*



7. Aerobic condition is essential for EPS.
生物浄化法は酸素が必須

148-157 | *10*

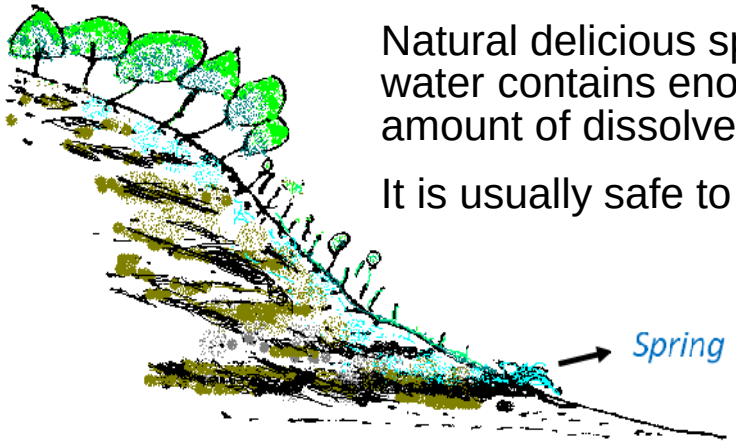


8. Confirm by yourself. Don't believe commercial. Trust your true sense. 自分で確かめよう。

158-172 | *15*



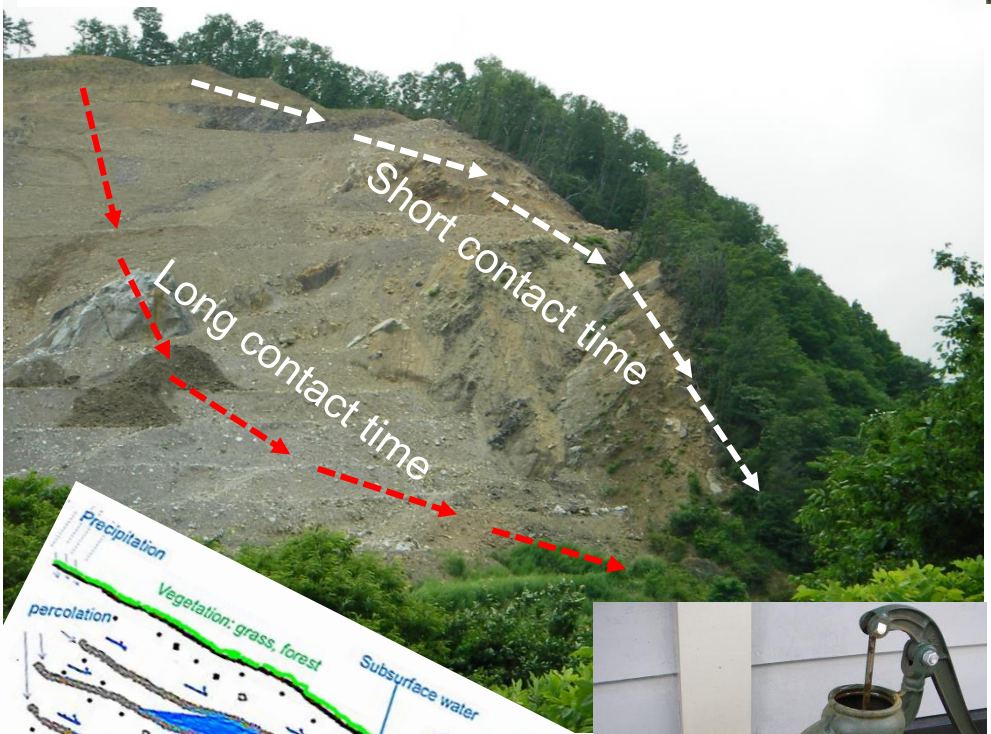
JICA training in Hiroshima in July, 2024.



Natural delicious spring water contains enough amount of dissolved oxygen.

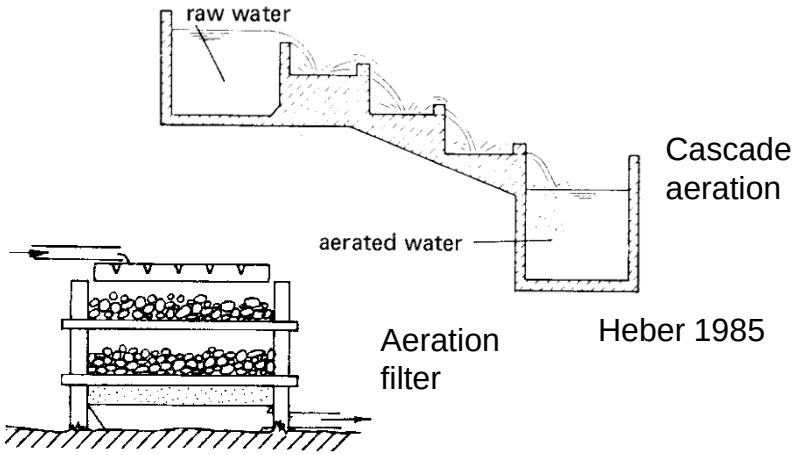
It is usually safe to drink.

Dissolved oxygen is key.



Addition of oxygen:

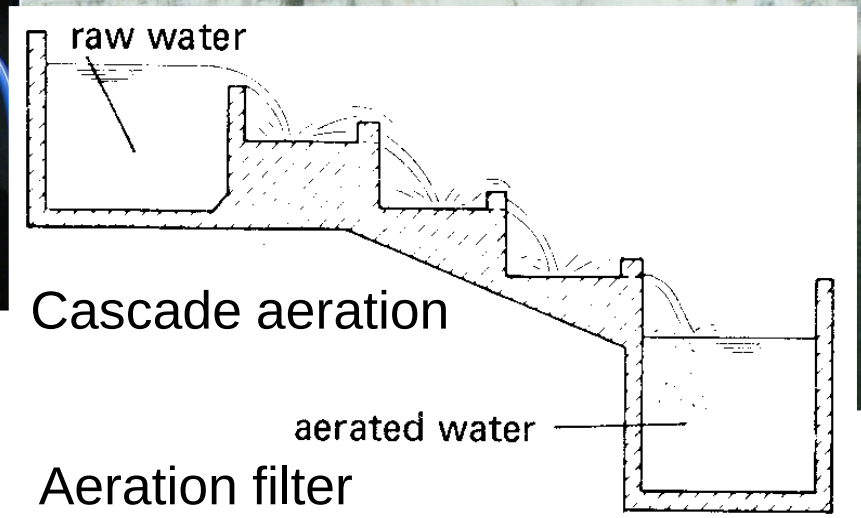
Aeration is frequently used for treatment of groundwater (reduction of unpleasant tastes and odors, discoloration, precipitation of iron and manganese).



Iron and manganese are oxidized and form nearly insoluble hydroxide sludge. They can be removed in a settling tank (a coarse filter).

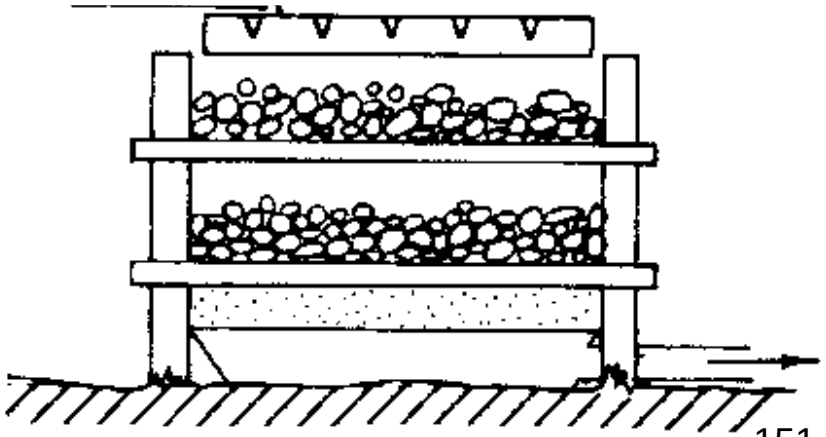
Underground water contains iron and manganese in Jakarta plain.
Tubewell water was clear.
But the brown colloidal particle was formed soon.
They could make clear water using cascade aeration system without any chemical reagent.

Bekasi, Jakarta, Indonesia

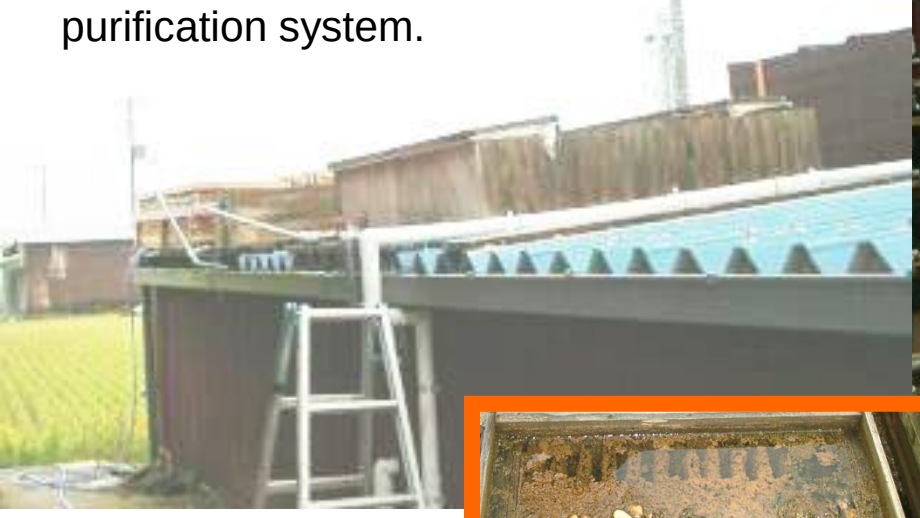


Cascade aeration

Aeration filter



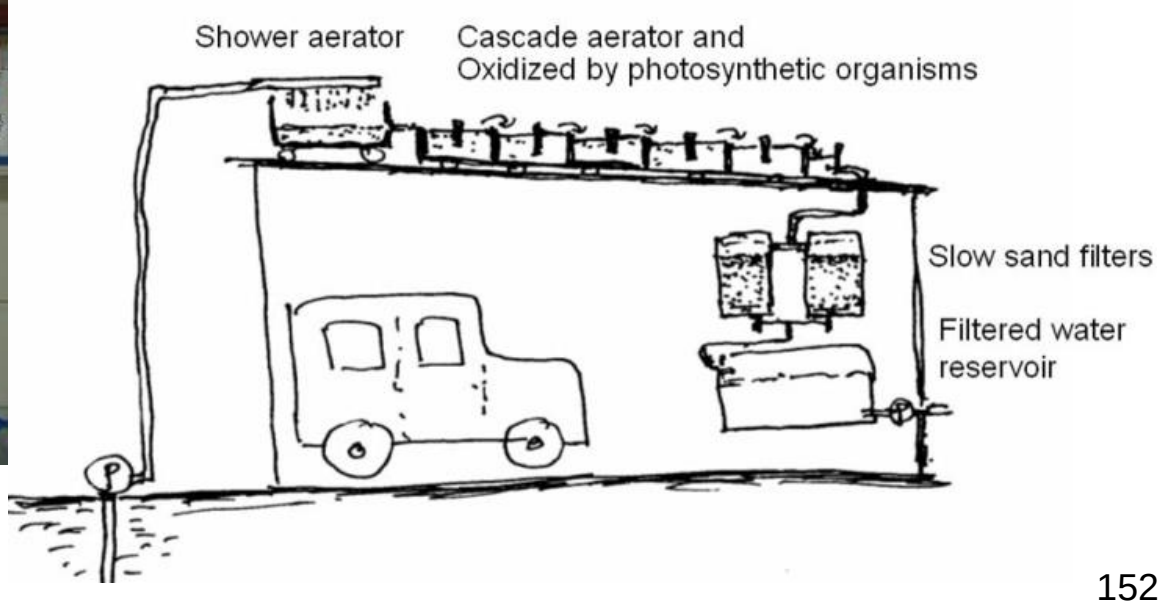
High concentration of iron and manganese in a tube-well water was treated by a cascade aeration with an ecological purification system.



Pre-treatment of cascade aerator using biological activity of bacteria, algae and animals.

Final treatment of slow sand filter.

Mr. Jun Kinoshita



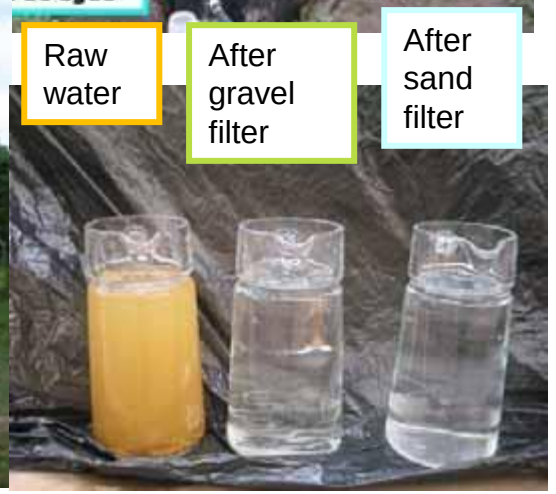
Use of natural slope, drinking water could be made by EPS, Bolivia, 2008

Pump for groundwater and source water tank

3 gravel filters

Use of natural slope, pour in sand filter

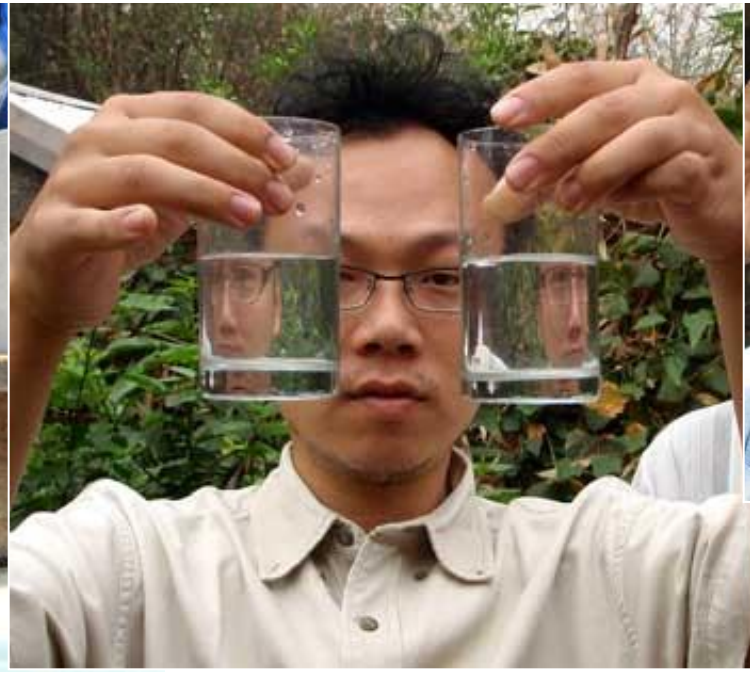
Filtered water tank



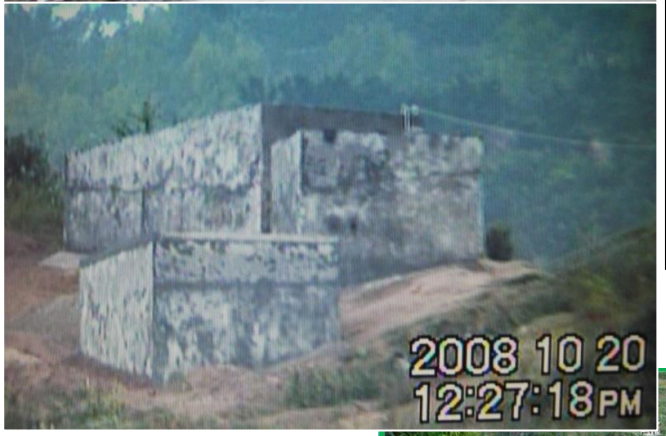
After 4 days, filtered water became clear. After one month, the water became drinkable water, in which coli-form bacteria form was not detected.

Volunteer JICA's report, Horie, T. 2009

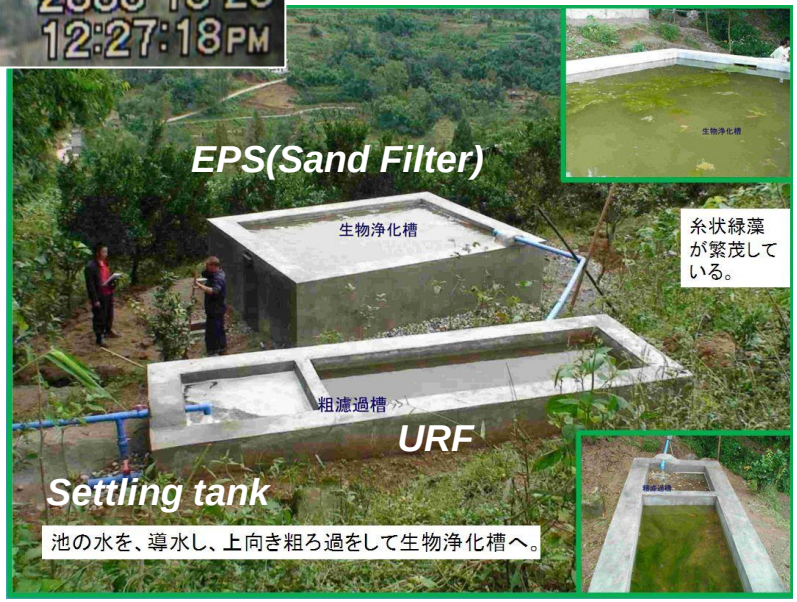
ApamNapat Art Project (Mr. Sohei Iwata managed near Korcata in 2008).



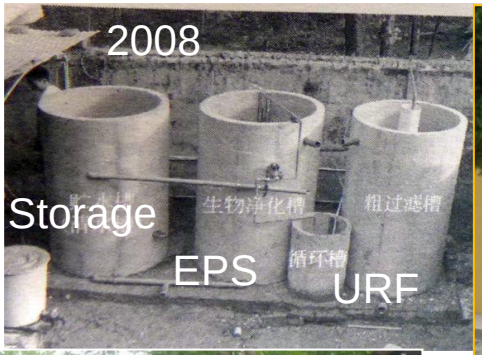
Mr. Jin Shengzhe, translator of Chinese version, made several water plants in China in 2008 after the Sichuan great earthquake, May 12. 2008.

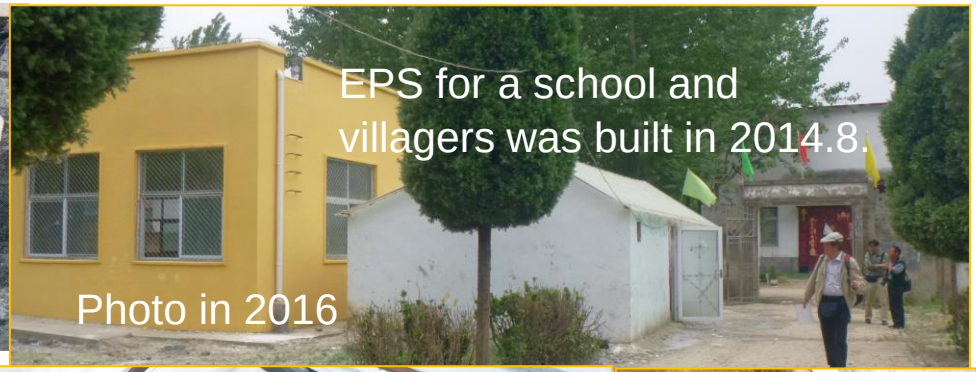


This is 30 tons per day.



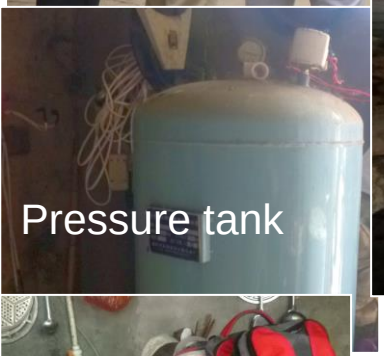
China: Mr. Huo Daishan 霍岱珊 and his sons built EPS to made safe drinking water. (helped by Mr. Jin shengzhe 金胜哲)





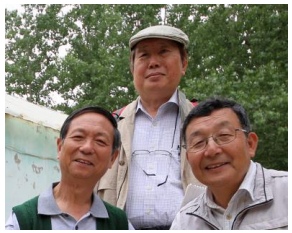
70-80 t/d, 4,600 villagers (246 students) 16 liter/person/d

Filter(2 m x 4 m) x 2 set of filters (URF+EPS)

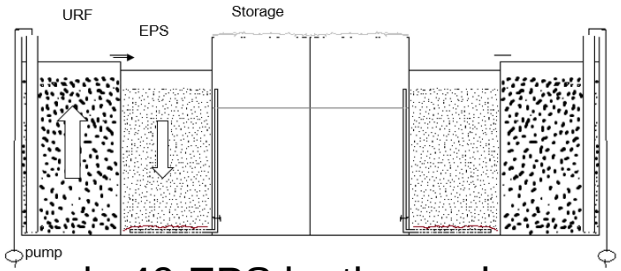


6 t/d, 500 persons.
12 liter/person/d

Supply to owner's kitchen.

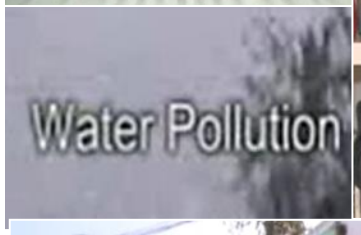


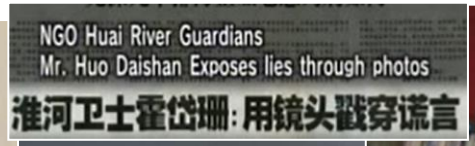
Public tap system for villagers

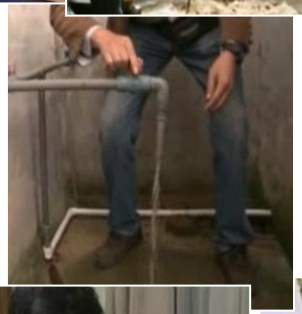


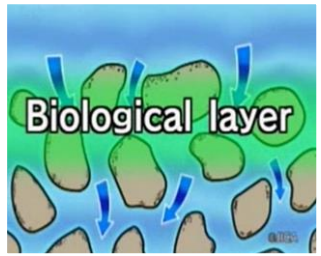
Mr. Huo and his sons made 40 EPS by themselves.

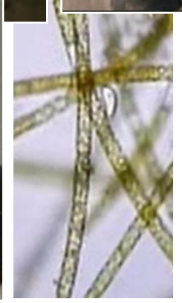
NHK World Living beyond boundaries Dec. 13. 2014.



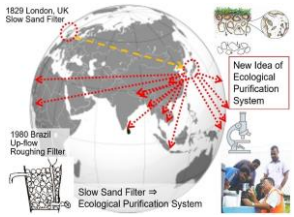








EPS, which originated in Japan, has also begun to spread in China.



Chemical Free
Eco-friendly

Ecological Purification System (EPS)

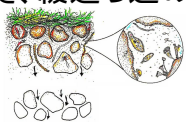
0. Introduction: Phytoplankton, Reservoir study, Meet Slow Sand Filter, Importance of Ecological point. JICA training
植物プランクトン、貯水池研究、緩速ろ過、生態学の視点、JICA研修へ

1-19 19

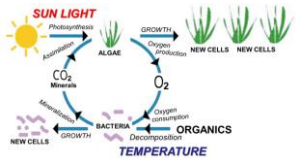
1. Water cycle, Safe water, Acceptable risk. *20-31*
水循環、安全な水、許容できるリスク 12

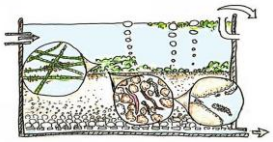


2. Key of purification in nature is food chain. Refocus to Slow Sand Filter. *32-57*
浄化は食物連鎖が鍵、緩速ろ過の再認識 26

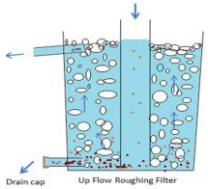




3. Algae and animals in Slow Sand Filter. *58-79*
緩速ろ過池の藻類と動物 22





4. Up-flow Roughing Filter to reduce SS *80-108*
濁り対策で上向き粗ろ過、モデルで解説 29



5. From JICA training in Miyako-jima, Okinawa to Samoa *109-124*
宮古島JICA研修からサモアへ 16



6. Safe water for rural people by EPS in Fiji *125-147*
フィジーの展開：生物浄化法で地方給水へ 23



7. Aerobic condition is essential for EPS. *148-157*
生物浄化法は酸素が必須 10



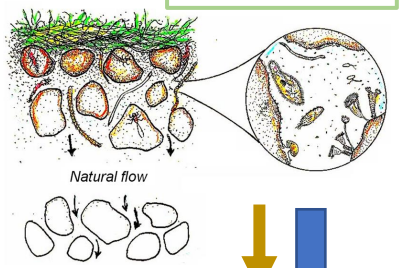
8. Confirm by yourself. Don't believe commercial. Trust your true sense. 自分で確かめよう。 *158-172*
15



JICA training in Hiroshima in July, 2024.

Slow Sand Filter

Ecological Purification System



Settling pond

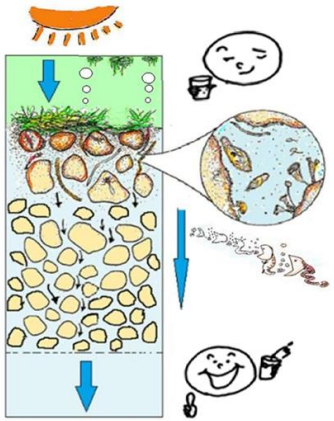
1923 Someya WPT

56,000m3/day capacity

Main Process

Slow Sand Filter

Ecological Purification System



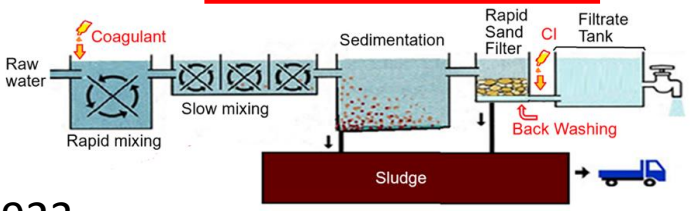
Chlorination

Natural Filter

Filtrate tank

Rapid Sand Filter

Chemical Physical Treatment



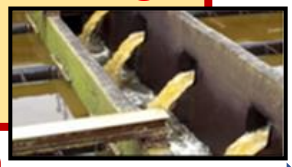
1964 Suwagata

48,000m3/day capacity

Activated carbon

Main Process

Pretreatment (coagulation/ mixing/ settling)



Sludge treatment

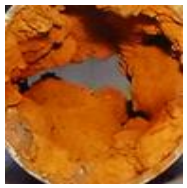
Sludge

Rapid Sand Filter

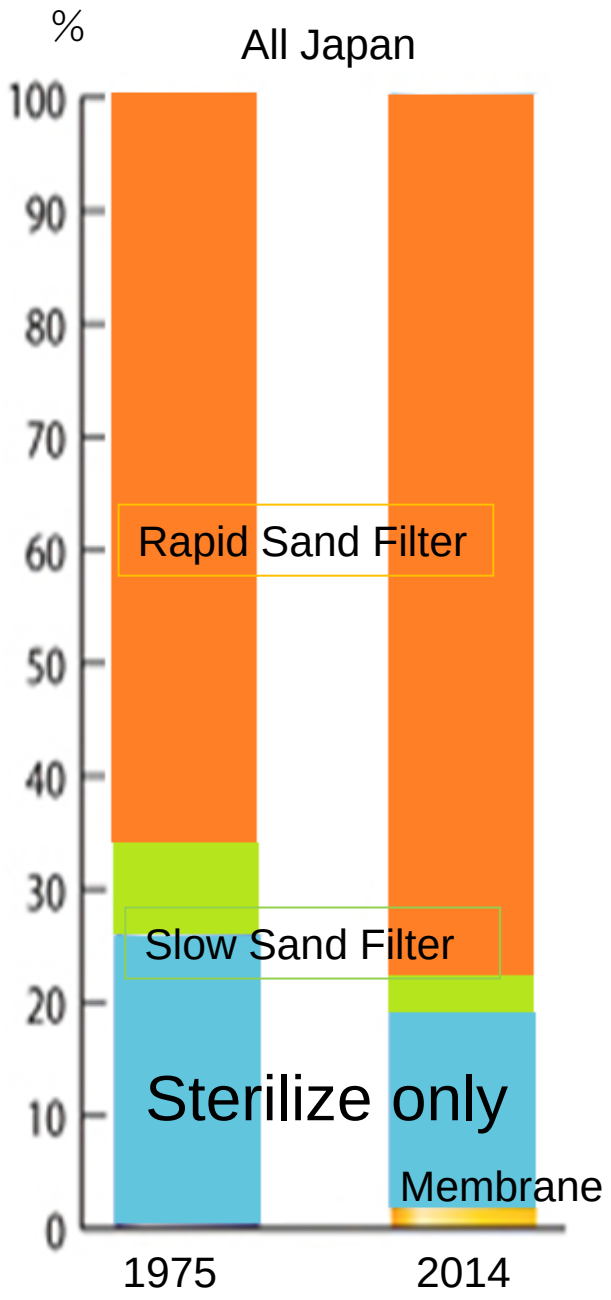
Chlorination

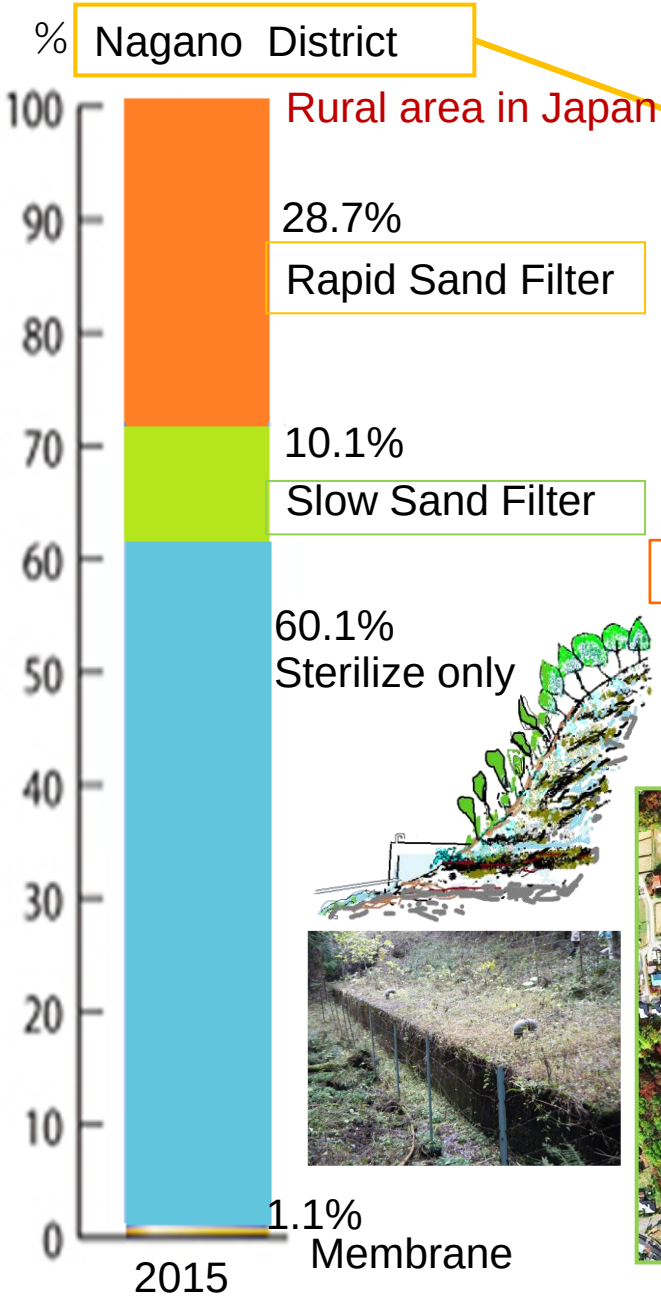
Back Washing process is essential.

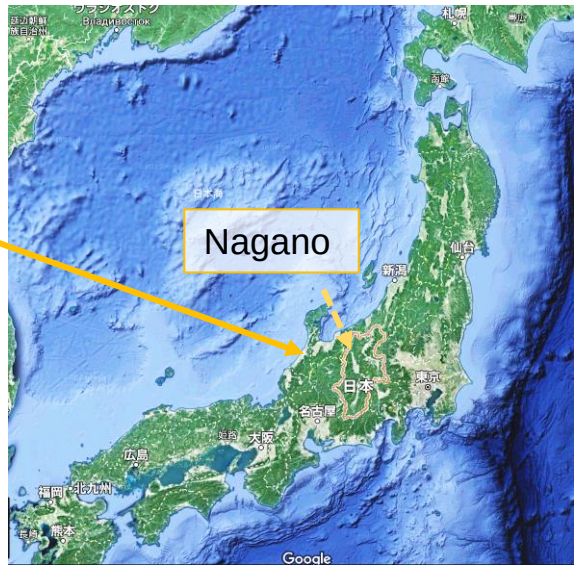
Commercial Filter



Treated amount by different treatment in large plants (over 5,000 persons per plant)







Rapid Sand Filter
48,000m3/day

Slow Sand Filter
56,000m3/day

Nagano prefecture

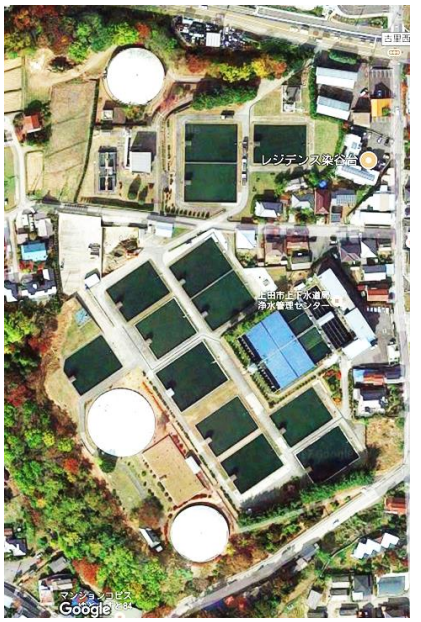
Ueda city

*Nagano (**2 million people**) is mountain region.*

Rural area in Japan

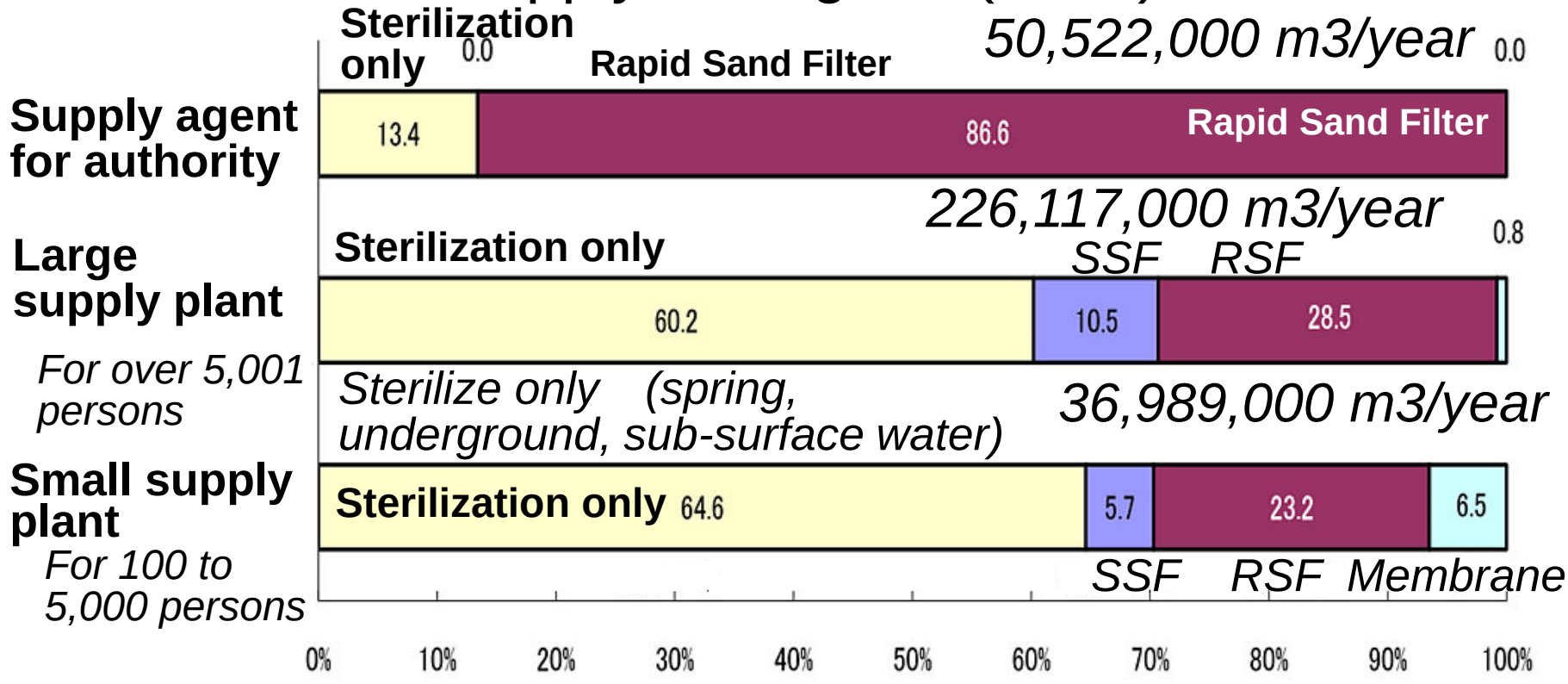
Someya WTP in Ueda city
Capacity: **56,000m3/day**

In case of 0.3m3/d/person,
Capacity: **187,000persons**



Rural area in Japan

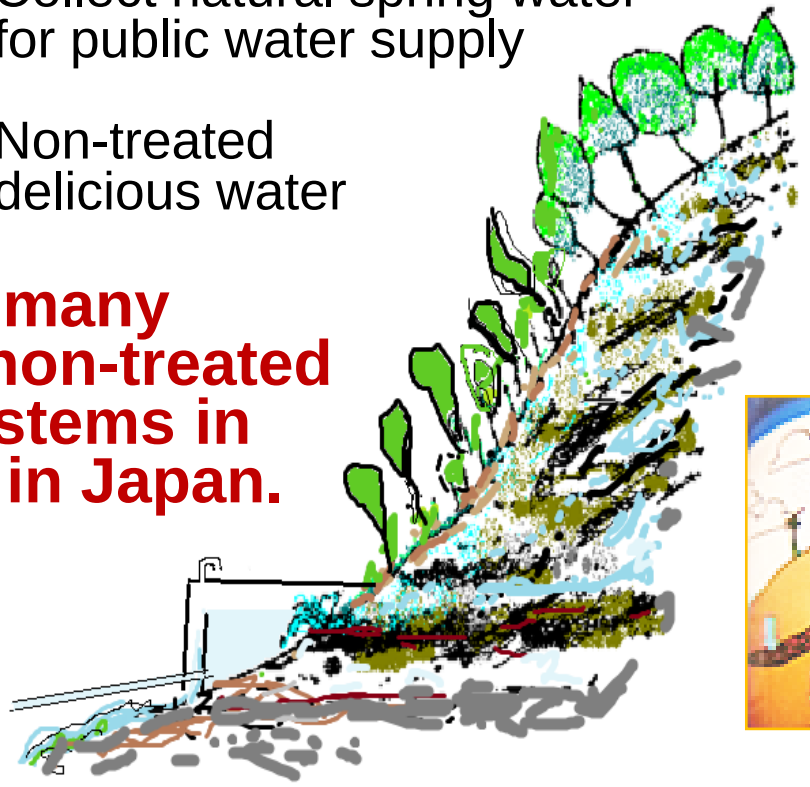
Statics of water supply in Nagano (2012).



Collect natural spring water
for public water supply

Non-treated
delicious water

There are many plants of non-treated supply systems in rural area in Japan.



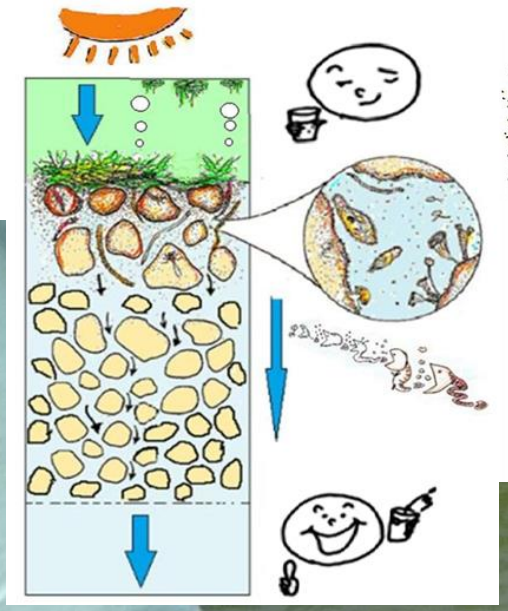
Surface water of River Ohta

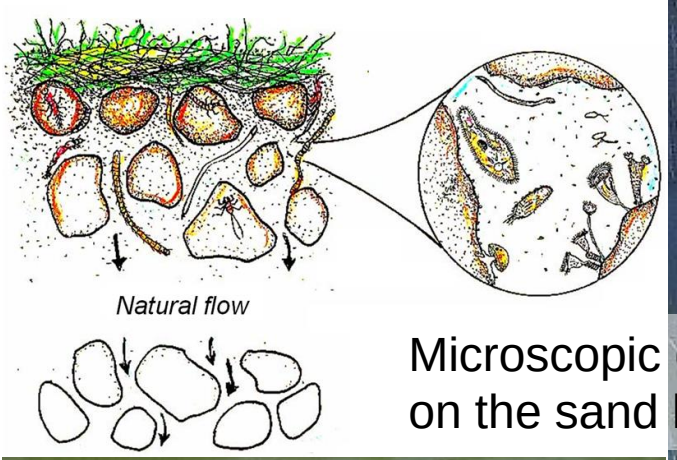
Toita Intake
+Settling

Settling + Sedimentation

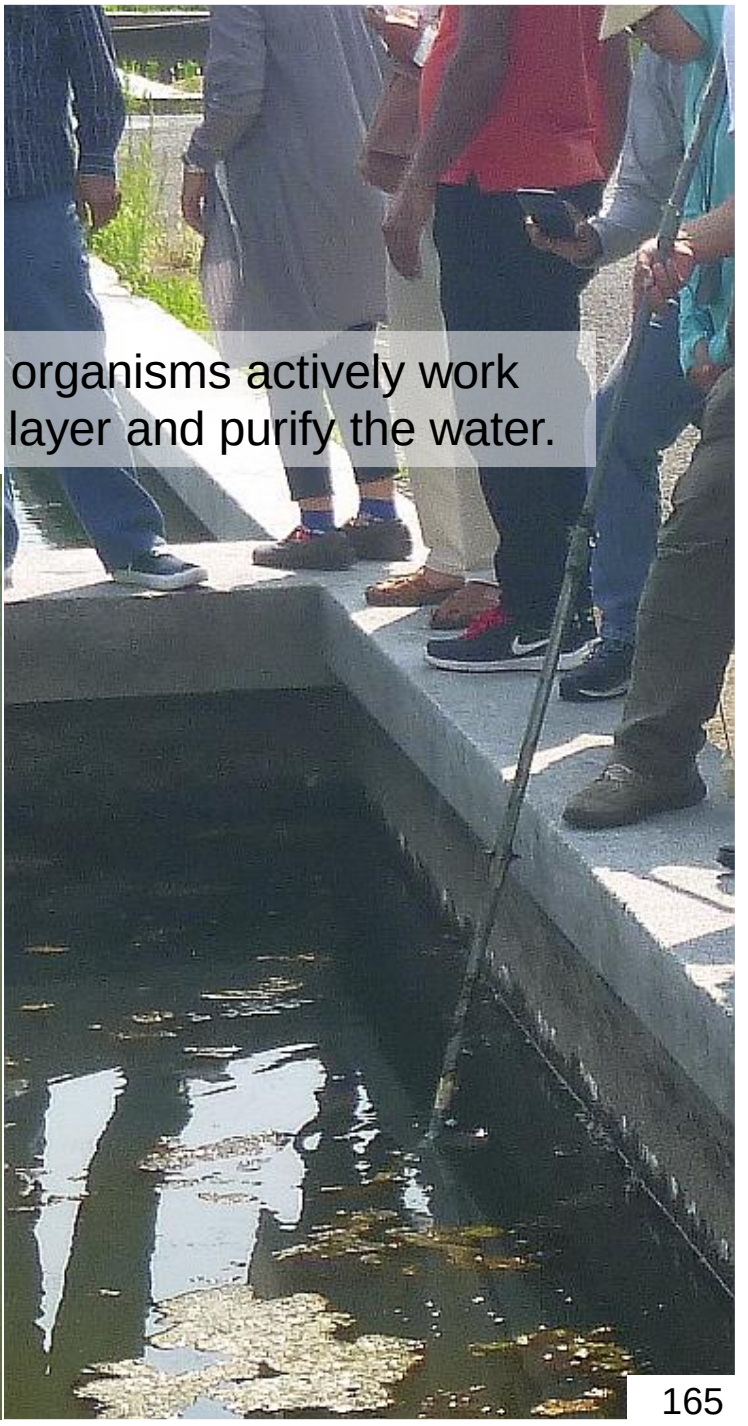
Fuchu WTP (Slow sand filter)：
From May 6, 1965,
capacity 27,000m³/day

In July, 2017, at that time,
Fuchu WTP was working.



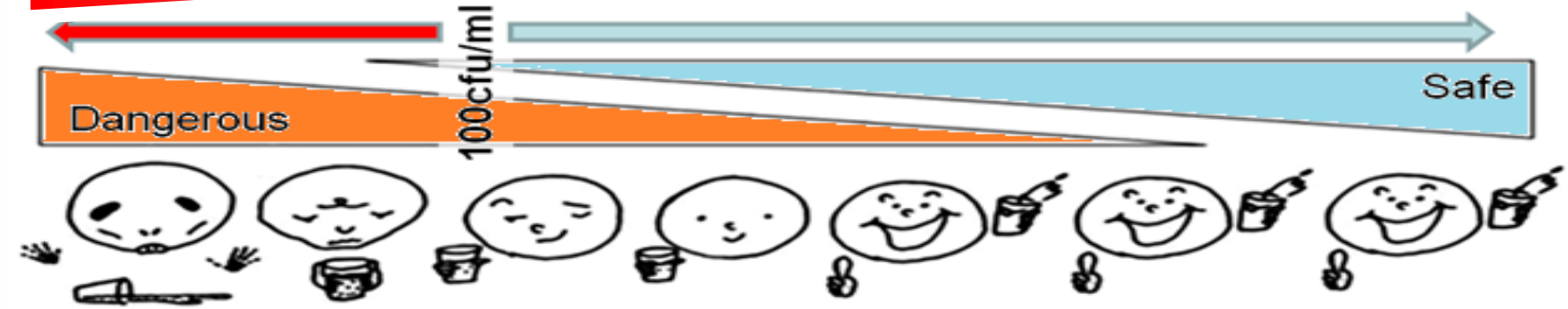


Microscopic organisms actively work on the sand layer and purify the water.



Which level of water, we need?

Germ : Cholera | Fecal Coli-form | Coli-form bacteria | General bacteria



We have to think about acceptable risk and treatment.

Is this, safe or not?

THIS is FOOD CHAIN

①The present vertical type of slow sand filter was devised by James Simpson in 1829 after his 2,000 miles inspection trip all over the Britain.

② This filter provided safe drinking water, free of pathogens to residents in London. This vertical type of filter spread round the world and was known as the “English Filter”.

③ Slow sand filter has been believed that it was a mechanical filter with fine sand under slow current.

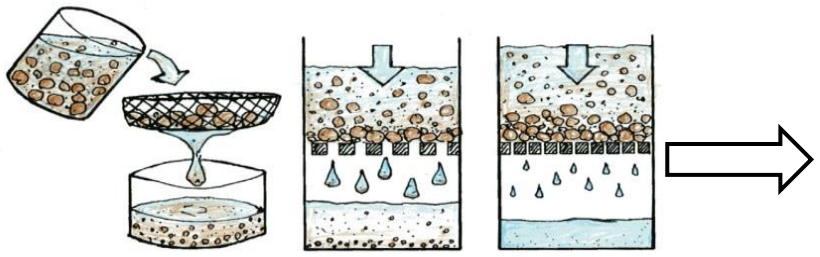
④ However, the major contribution of the purification of the impurities is the food chain in this system.

⑤ The word of “**slow**” was “**gentle for organisms**”.

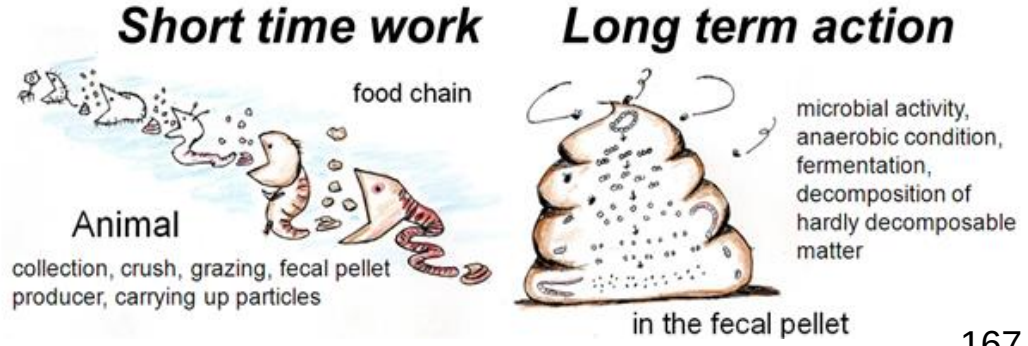
⑥ Recently, the English filter of “**Slow Sand Filter**” has been recognized as “**Ecological Purification System**” in Japan.

Slow Sand Filter → Biological Filter → ***Ecological Purification System***

English Filter : Mechanical filter



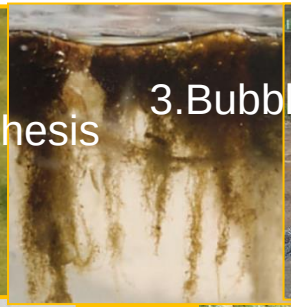
New Concept and New Name



When we can understand EPS, we can make the plant for our life by ourselves.

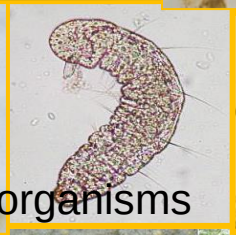

1.Shallow depth

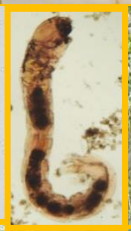

2.Photosynthesis


3.Bubbles


4.Lift up

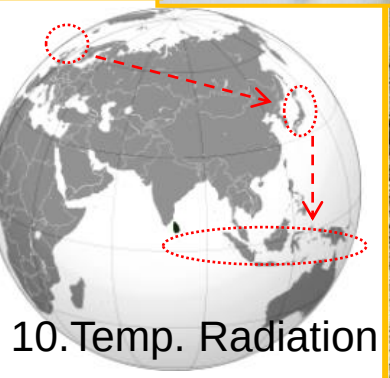

5.Microscopic organisms






6.Trap & decomposition

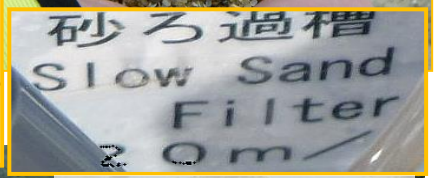

7.Food chain


10.Temp. Radiation


11.Short passing time through active layer.

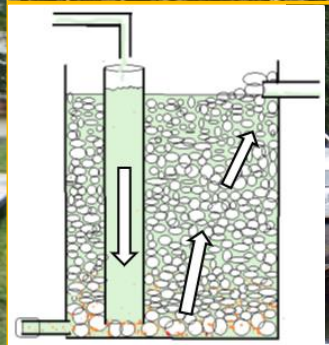

8.Sand is habitat


9.Large size of sand



12.Fast flow rate


Gentle: chemical free


URF for turbidity reduction

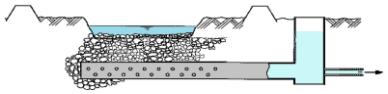

EPS is Eco-Friendly Smart Technology.

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

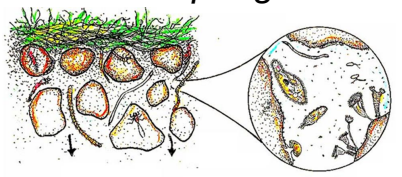
Surface stream water

Reservoir

Clean spring water



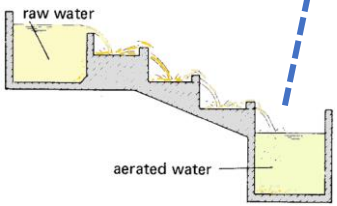
Subsurface water



Borehole

Aeration

Tubewell



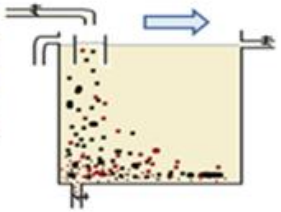
Smart Treatment System to make artificial spring water by Eco-friendly technique.

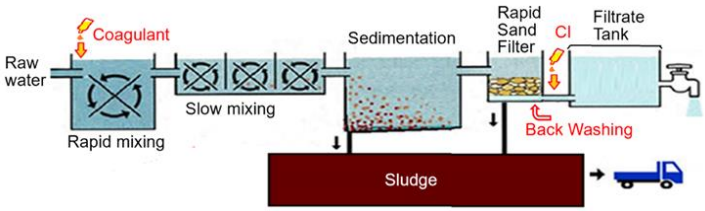
Turbidity mg/L

500
200
100
50
20
10
5
2
1
0.5
0.2
0.1
0.05
0.02
0.01
0.005
0.002
0.001
0.0005
0.0002
0.0001

Storm event

Major turbid matter in mountain stream is easily set within several hours.





Coagulant＋Chlorine
Rapid Sand Filter

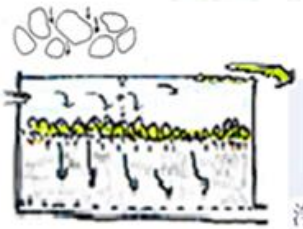
SS passes by backwash.

2 degrees
Jap. standard

After Crypto outbreak.

Recommended to 0.1 degrees

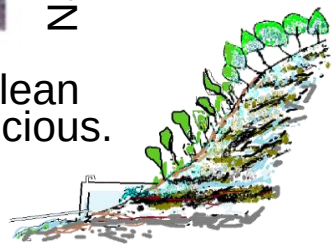
Chlorination is essential.



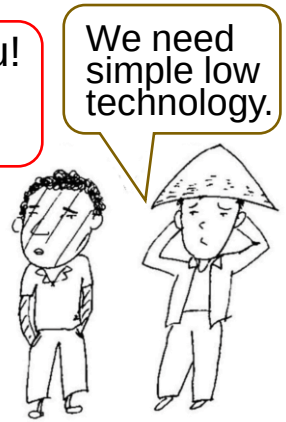
Purified by small organisms

Natural spring

Super clean and delicious.



Artificial Natural spring water



People love a new technology.
People imagine new world.

People trust natural spring water.

This water is purified by natural EPS.

Japanese Ministry of Foreign Affair and Japanese Government promote EPS to the world.

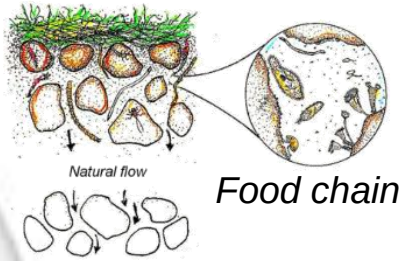
EPS from Japan to the World

Wise Use of Natural Phenomena for Human Life.
Safe and Delicious Water by EPS, Our Technology.

Slow Sand Filter

Purification mechanism of SSF was misunderstood by the name.

Ecological Purification System



Food chain

Gentle for small organisms

Trust Our Sense !

Super clean delicious water

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.