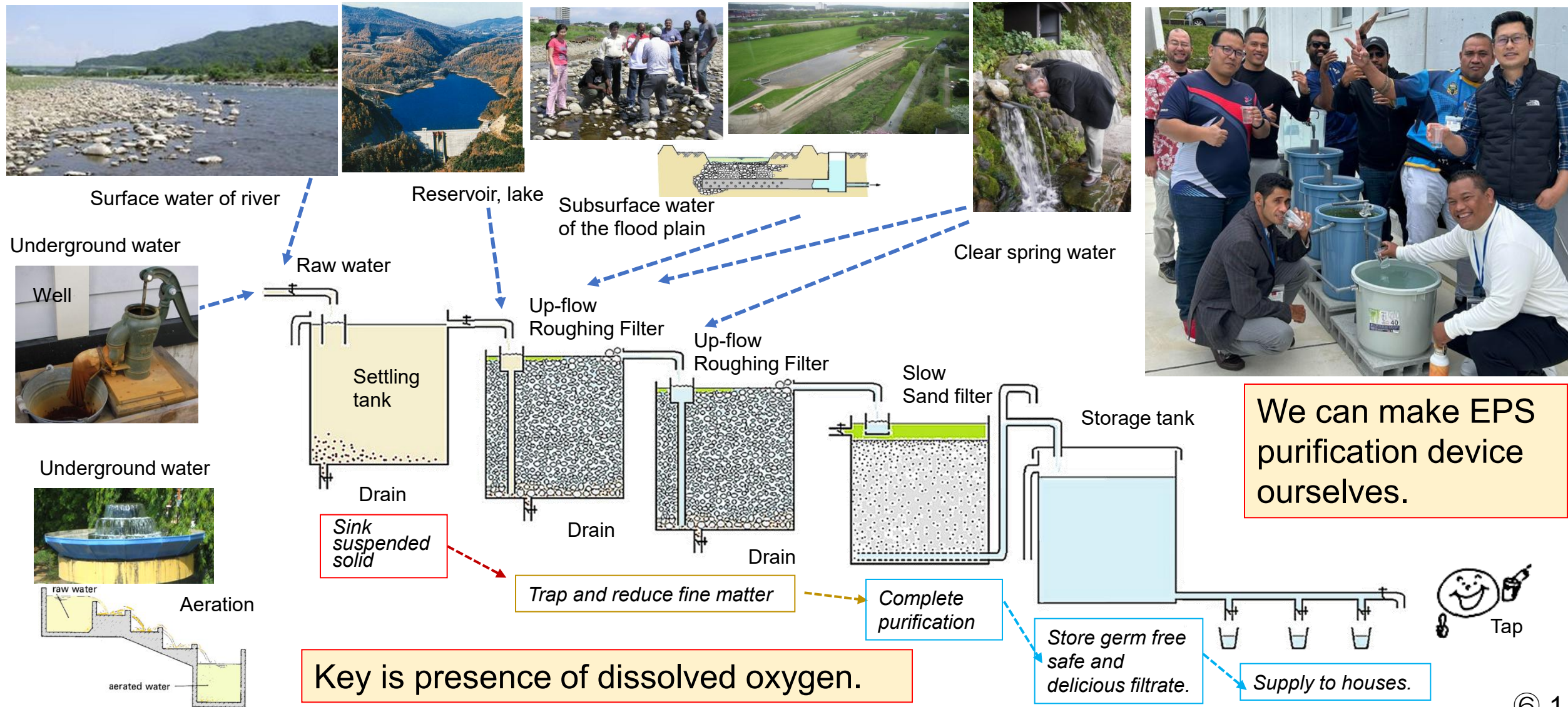


⑥ EPS trial in Malaysia and Guyana

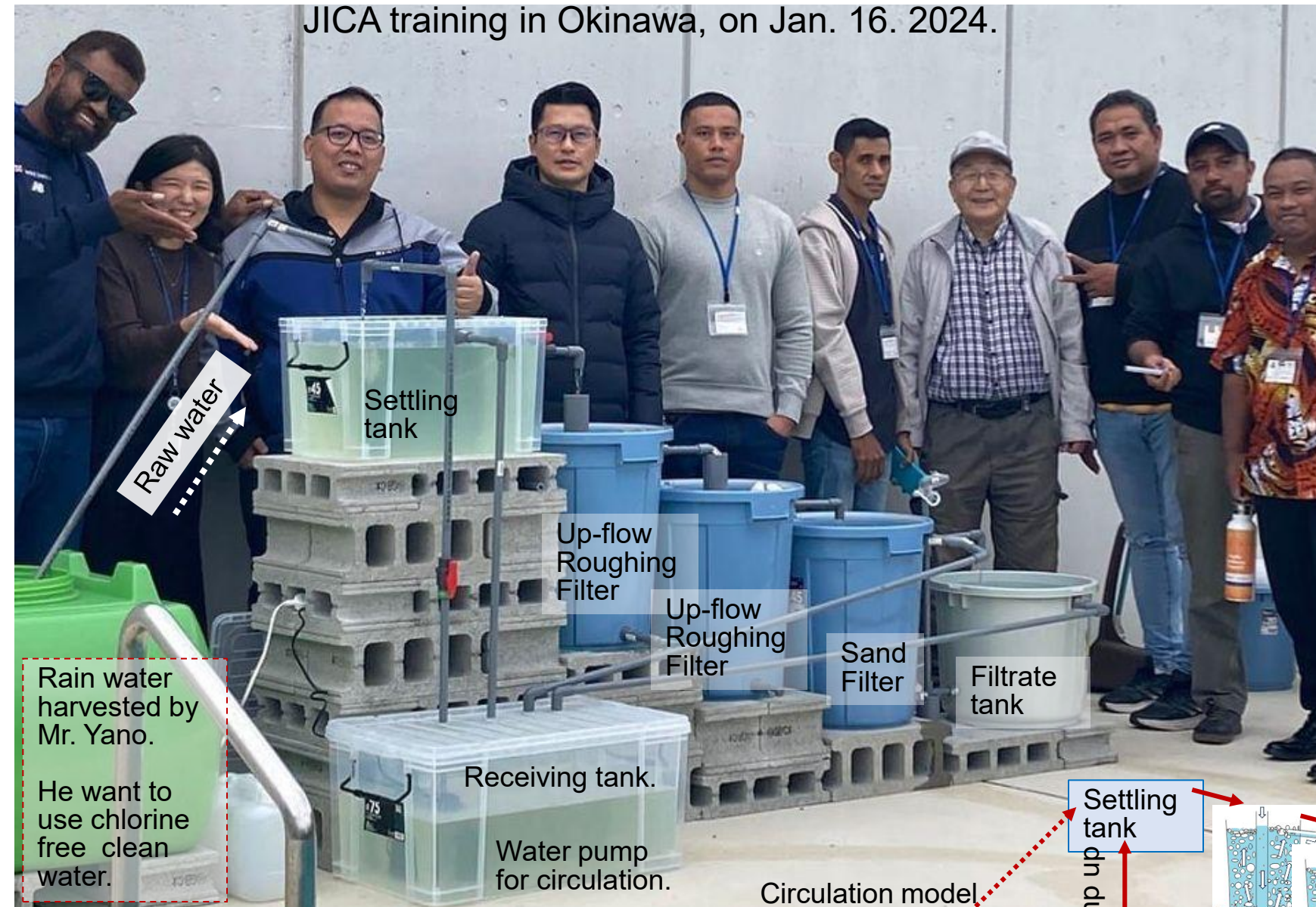
⑥14 slides

Ecological Purification System (EPS) : This is Wise Use of Natural Phenomena.



Ecological Purification System Model for Safe Drinking Water

JICA training in Okinawa, on Jan. 16. 2024.



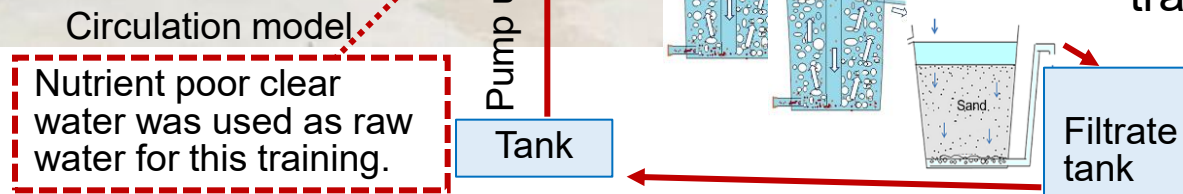
<https://www.youtube.com/watch?v=Ye-POV6qBU0&t=39s>

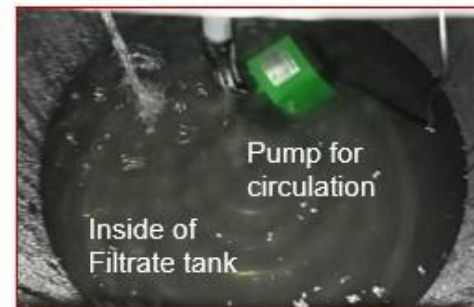
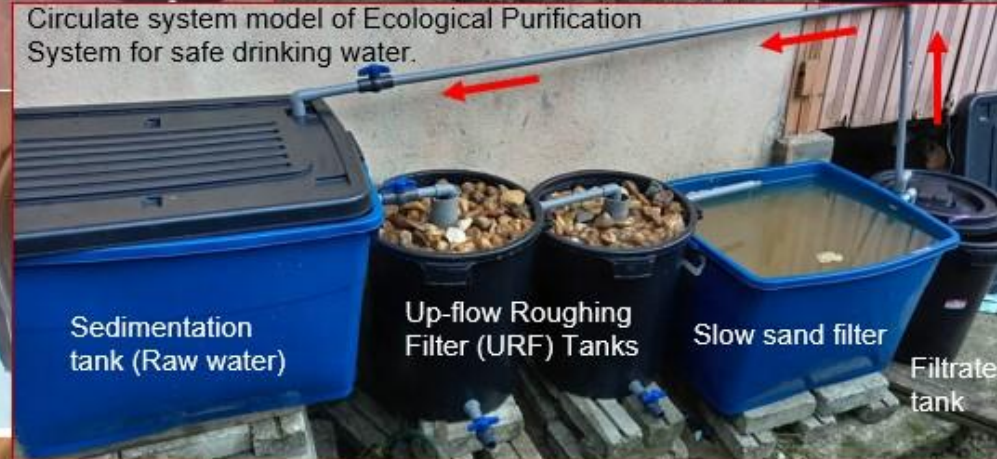


Daniel Castro
2017/07/20 に公開



JICA Hiroshima training, in July. 2017.





Mr. Mhd Zairi, trainee of JICA Okinawa returned back to Malaysia after JICA EPS training in Okinawa from January to February 2024.

He applied EPS knowledge at his brother in law's house in April, 2024.

On April 6, he washed the sand.

And EPS model was completed on April 11 2024.

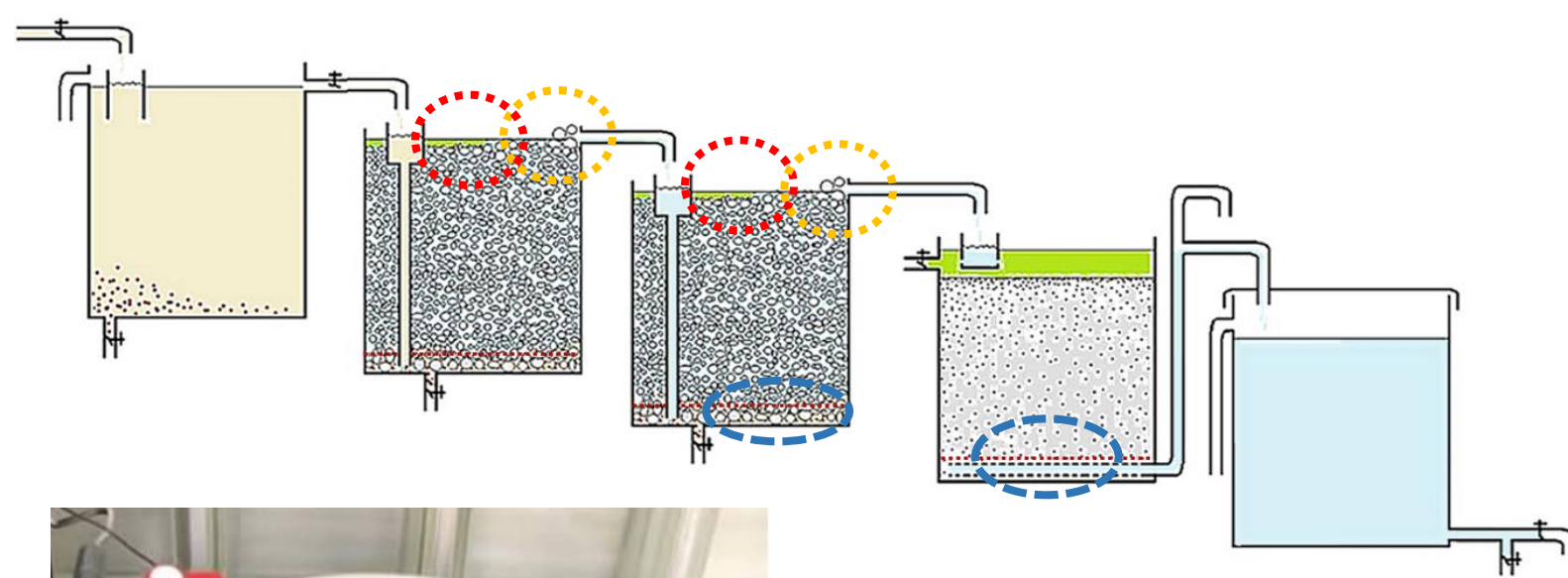
April 11. 2024.

Finally, his first EPS bucket model launching with production purification rate of 7.2m/d. He mentioned the volume of storage (filtrate) tank was 56 liters.

He mailed that hoping after few weeks, and the algae start growing, the quality and production rate may improve.



56 liters storage



On April 11. 2024. Nakamoto:

Thank you for your effort to make EPS model. I suggest that it is better to remove some gravel in URF. We can confirm the condition of URF which produce clear spring water. However, please cover the overflow pipe with gravel.



Mr. Mhd Zairi :

Yes, I agree with you, round tank is the best shape as the water tend to force the square wall to become round. I just found it when I see the URF tank maintain the shape. It's a lesson learn to me on how to design the tank. I take note your advise, sir.

We can easily confirm the clear water which is out.

Cover the over flow with gravel.

Please watch this video how to set sand and gravel in URF and Sand Filter.



<https://www.youtube.com/watch?v=Ye-POV6qBU0&t=39s>



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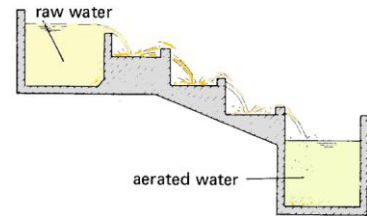
On April 11, 2024, Nakamoto advised:
Well water (underground water: tubewell water)
often contains iron and manganese.

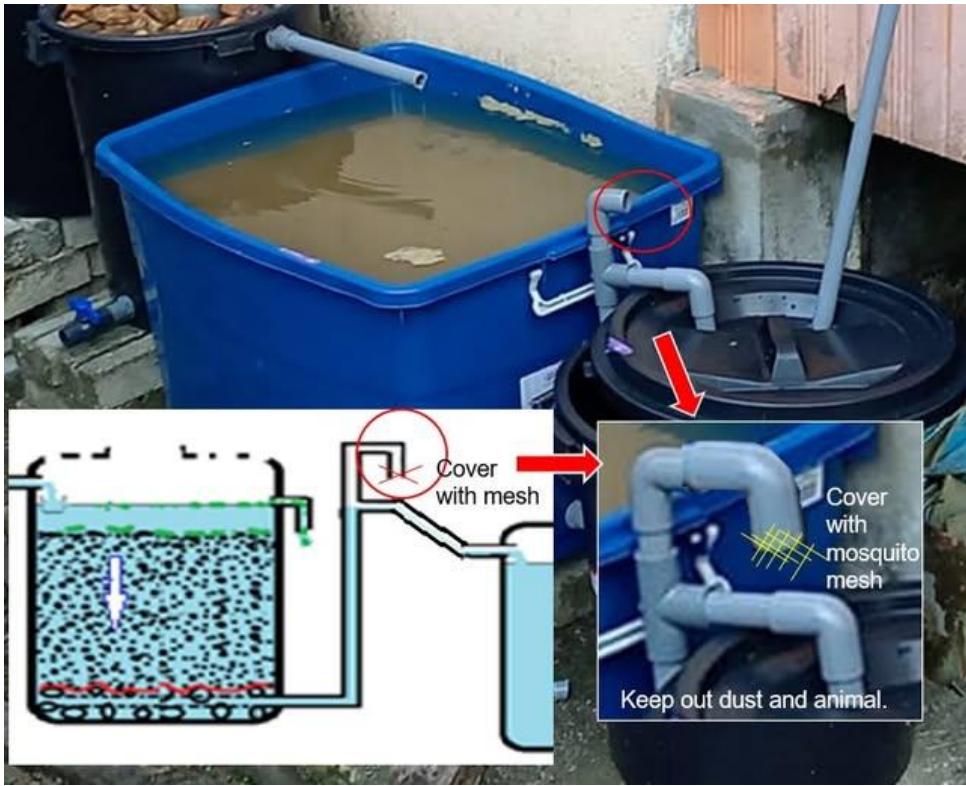
Since there is sufficient dissolved oxygen in URF,
these metal ions are removed by oxidation and
precipitation.

Precipitated iron and manganese accumulate on the
gravel surface and at the bottom of URF.

If the size of the URF gravel is too small, it will be
difficult to remove the material that has hardly
accumulated on the gravel surface over a long period
of time even with mud removal operations at the
bottom.

Therefore, in the case of well water, it is better to use
large URF gravel of about 1 to 3 cm. It could be bigger.





Nakamoto April 11. 2024:

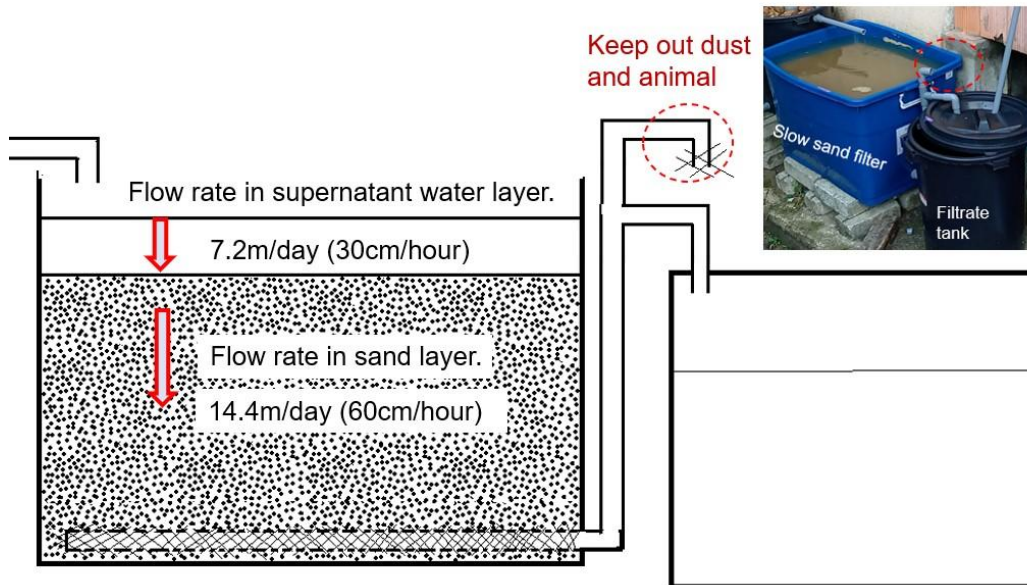
Round tank is better for the model. Round tank is gentle for small organisms. If the sand filter tank is square, when sand or water enters the tank, the tank will try to become round and expand.

The actual facility is made of concrete, which is good.

Nakamoto April 12. 2024:

I suggest you that please put L cap and cover with mesh to keep out dust and animal contamination to filtrate water.

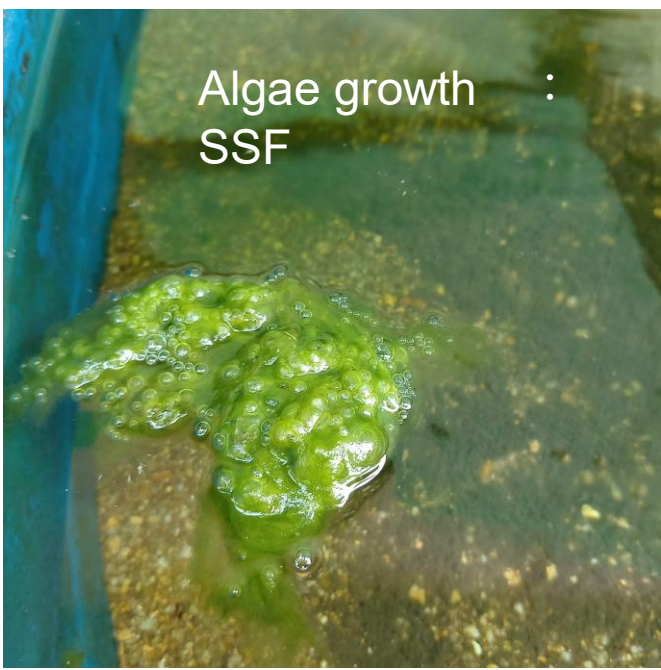
We call the flow rate is in the supernatant water over the sand layer. The real flow rate in the sand layer becomes about double.



Nakamoto April 12. 2024:

The filtration speed of the sand filter tank is 7.2m/day (water layer above the sand), or 30cm per hour. In the sand layer, water passes through the gaps between the sand. The space per volume is about half. The speed will be approximately doubled. Therefore, the flow rate of water in the sand layer is 60 cm per hour. Slow filtration is said to take time. However, when we calculated the actual flow velocity ourselves, we found that it was faster than we imagined.

Algae growth :
SSF

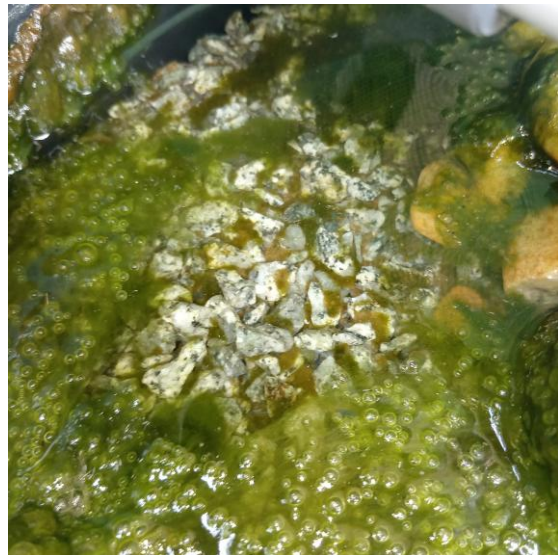


Mr. Mhd Zairi : Sept. 15. 2024: Just come back to home town in Kelantan after 5 months installing the EPS.
Thank you for the knowledge you share and benefits the people in rural area to enjoy crystals clear, clean and delicious water.

I feel proud & thank full for the knowledge I gain from JICA Program.

In addition, I want to share to all of you, up-flow filtration method is super value for money, maintenance & stress free as to compare to normal downflow filtration.

Non stop producing
crystal clear spring water



Algae growth :
URF



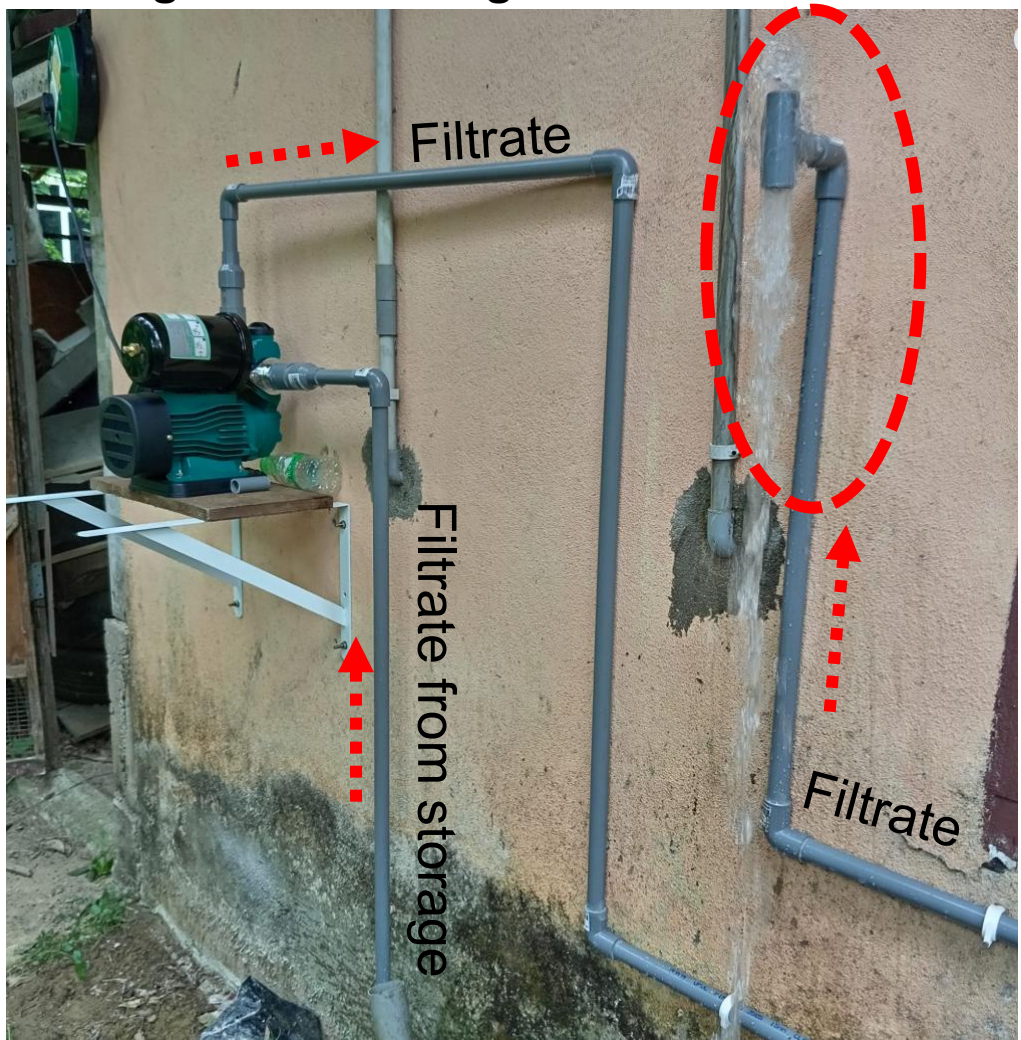
Sept. 15. 2024
1st backwash after 5 months



Backwashing up-flow roughing filter



June 9, 2025: I asked to Mhd Zairi that this was **under construction photo** or not?
Mhd Zairi: Yes, this picture is before I connect the **filtrate pipe to kitchen tap behind the wall**. While the black storage tank after sand filter only store about **180liters** and **balance storage at the ceiling inside the house**.



Mhd Zairi : Sept. 21. 2024:
Done upgrading reticulation system from **56 liters** storage to **454 liters** for my village house.
Thank you for the support I have received all this time and I can describe EPS as "Old Is Gold".

Filtrate pipe to new pump.

Mhd Zairi : Sept. 21. 2024:
Floating valve help me to maintain the water level that self filling water (underground water) into the sedimentation tank.





On Jan. 25. 2025. Mr. Mhd Zairi :

I take this Chinese New Year holidays to review my EPS filtration after 8 months commissioned. The result still produce the same, fresh, cool and refreshing water.

This is Super clean delicious water.

On June 6. 2025. Mr. Mhd Zairi :

Comparison between 1st URF and 2nd URF. It shows 1st URF works well in filtration for underground water.

Nakamoto:

You mentioned that water source is underground water. The 1st drain is brown. This means oxidized iron and another metal ions. The 2nd is clear. This means that only one URF is very effective to remove dissolved metal ions in the underground water. I would like to set 2 URFs for safe system. I will introduce next this result for next JICA training. Thank you for this information.

Mr. Mhd Zairi :

Yes, 1st URF is enough but for safety purpose 2nd URF is a must. Exactly and I found actually 1URF is sufficient to filter the well water but having 2 sets of URF is highly recommended for safety reasons.



JICA-Okinawa Training on Small water supply and EPS in Jan. 2024.



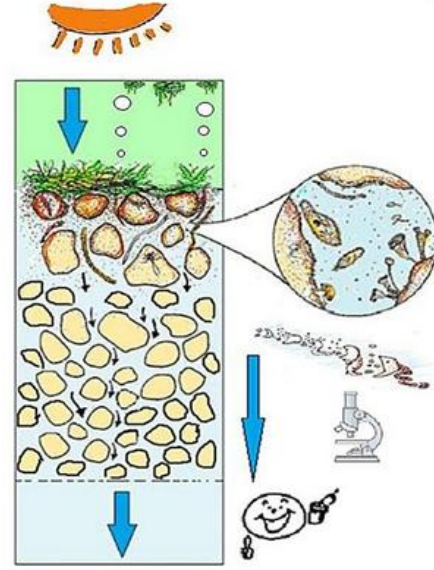
Mr.RAMJUG Jawaharlall (Guyana Water Incorporated/Operations/Head of Non-Revenue Water) returned back to Guyana. He made a bucket model of EPS. He made a video on 3rd of September, 2025 and sent us.



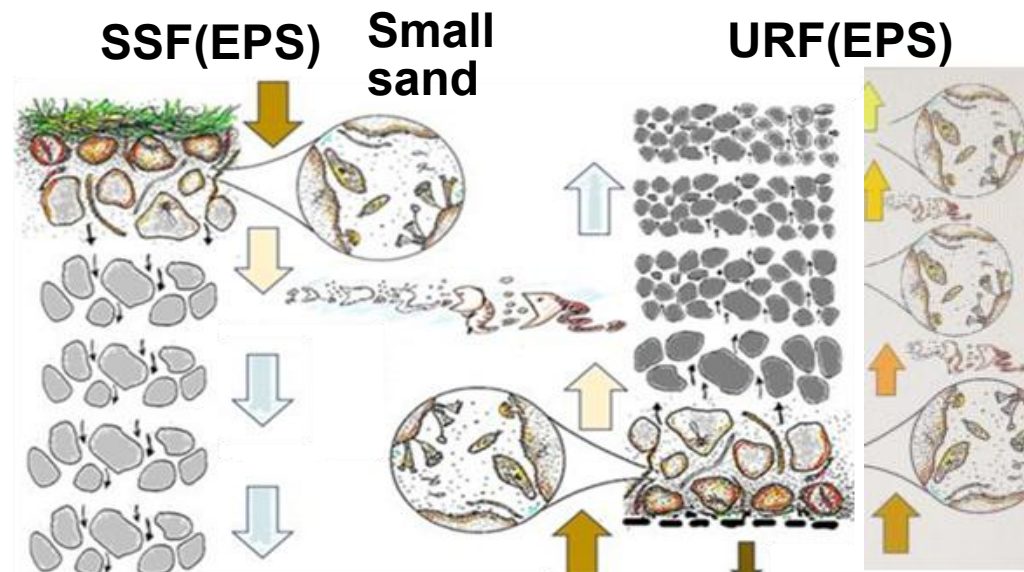
https://youtu.be/8auY7_MSIEk

https://youtu.be/8auY7_MSIEk





Where is biological active layer.



Organisms are active throughout the entire layer.



Slight light may reach to the inside wall of deep sand layer.

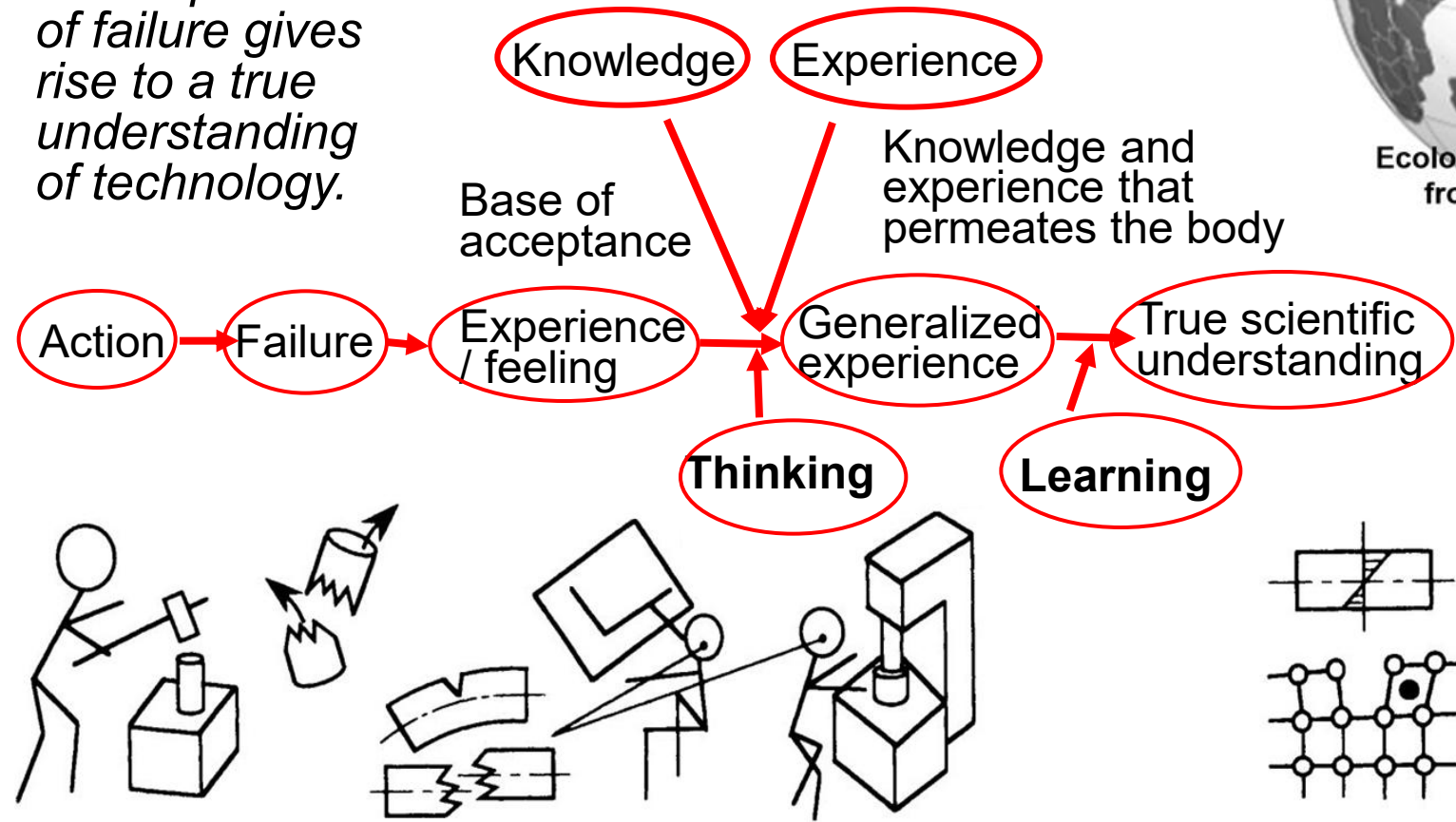


Complete shut out the light from the wall.

Don't afraid Failures. Recommending the Study of Failures

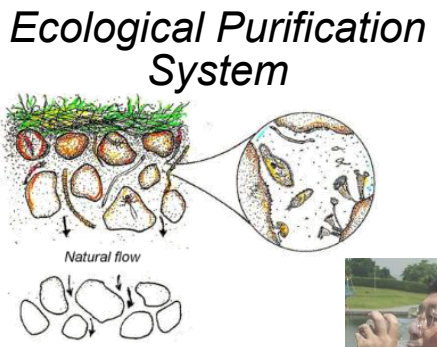
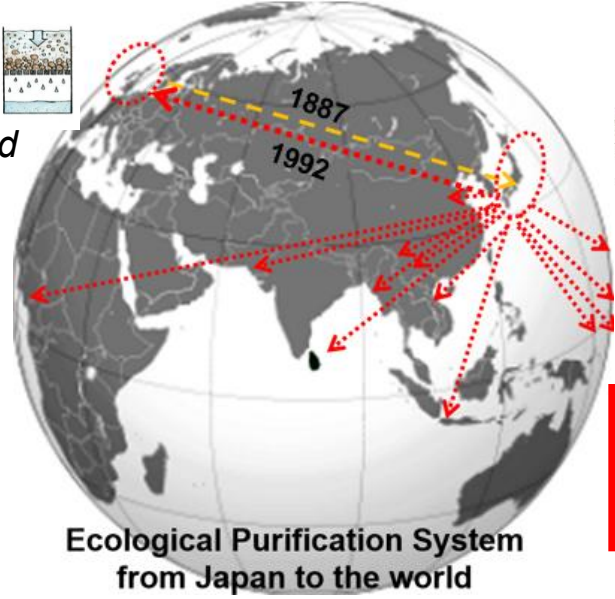
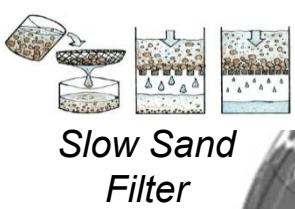
*People always make mistakes.
We think we are lucky if we fail.*

*The experience
of failure gives
rise to a true
understanding
of technology.*



Learning from the mistakes.

Responding to unexpected events.
from Yotaro HATAMURA 2002



**Trust Our
Sense !**



Prof. Dr. Shiba Kumar Rai
Professor & Research
Director at Nepal Medical
College



- Three Points worth to Remember**
- 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.