



ECOLOGICAL PURIFICATION SYSTEM (EPS)

NEW CONCEPT OF SLOW SAND FILTRATION SYSTEM

INTRODUCTION

Ecological Purification System (EPS) is a new concept and a new treatment system to make safe water.

EPS originated from Slow Sand Filter.

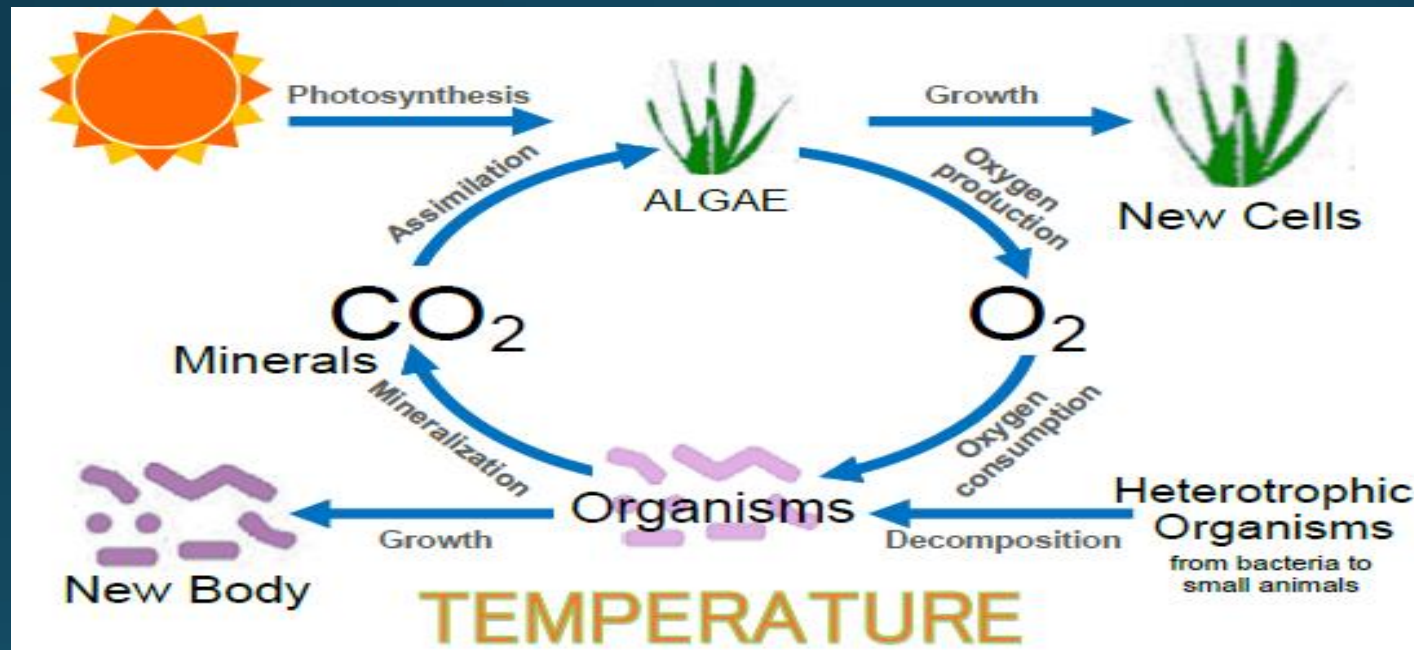
Purification is done through the food chain from microbe to small animals. As the result of ecological processes, undesirable impurities such as turbidity, pathogenic bacteria, other organic matters, bad smell, iron and manganese are removed effectively from the original raw water.

This is a really smart technology for life

ROLE OF ALGAE

In 1970's – Ueda City in Japan, an odour problem related to their tap water disappeared by subsequent algal growth in a filter pond after stopping the use of chemicals.

Algae and Microscopic Organisms associated with algae grow on the surface of the filter sand. These organisms purify the impurities in the water.



Suitable environment for filamentous algae such as slow water flow, warm temperature and enough sunshine for photosynthesis were recognised. Filamentous algae grew on the sand surface.



BIOLOGICAL ACTIVE SITE



Using a microscope, we could see small organisms of algae and small animals. They lived on the sand surface and beneath the surface. Sand was a suitable habitat for them. These organisms removed the impurities. Then the filtrate became clear like natural spring water.



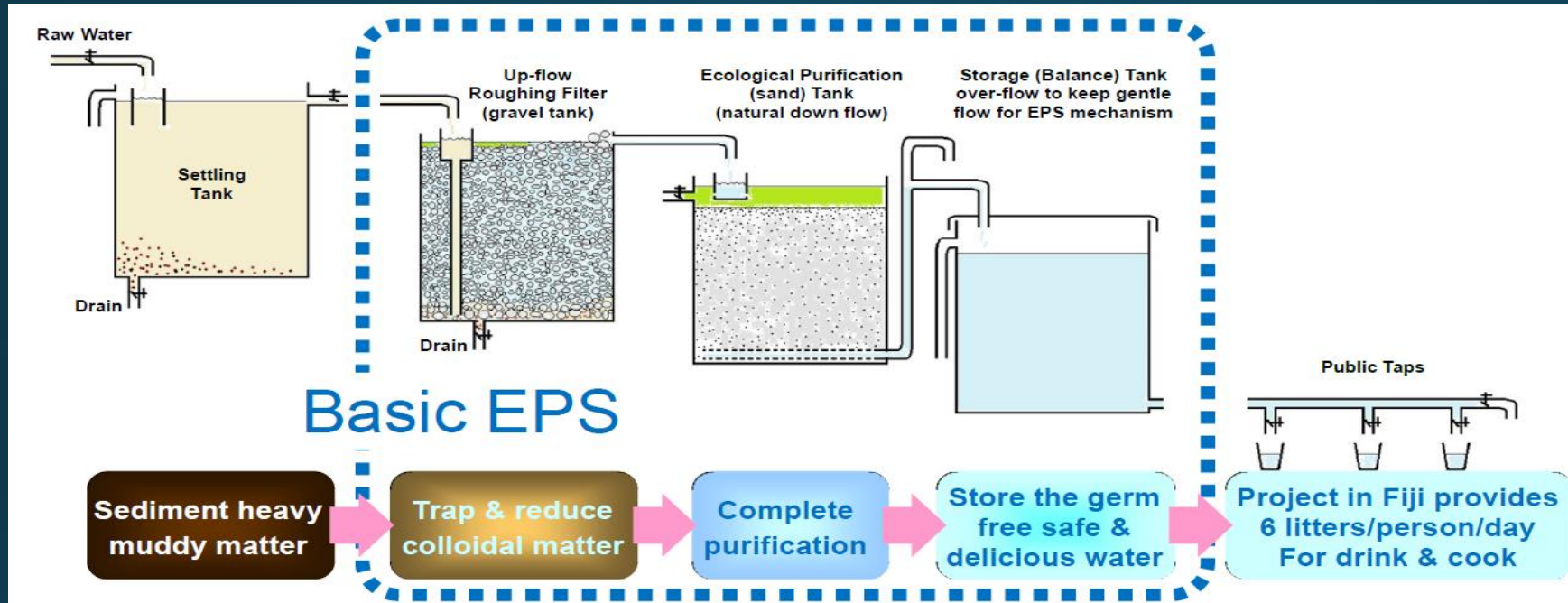
Thin active layer is only at the top of sand layer

Why EPS System is Better

- 1) LOW COST & AFFORDABLE
- 2) SIMPLE MECHANISM TO IMPLEMENT
- 3) EASY AND MINIMAL MAINTENANCE IS REQUIRED
- 4) TREATMENT SYSTEM IS ENVIRONMENT FRIENDLY – No chemicals required
- 5) FLEXIBILITY – Can supply any demand



How the System Works



A set of three tanks such as Up-flow Roughing Filter (URF) Tank, Ecological Purification (Down-flow Tank) and Storage Tank is the basic structure of EPS. Settling Tank and another URF Tank(s) could be added if necessary. It depends on the quality and condition of water source.

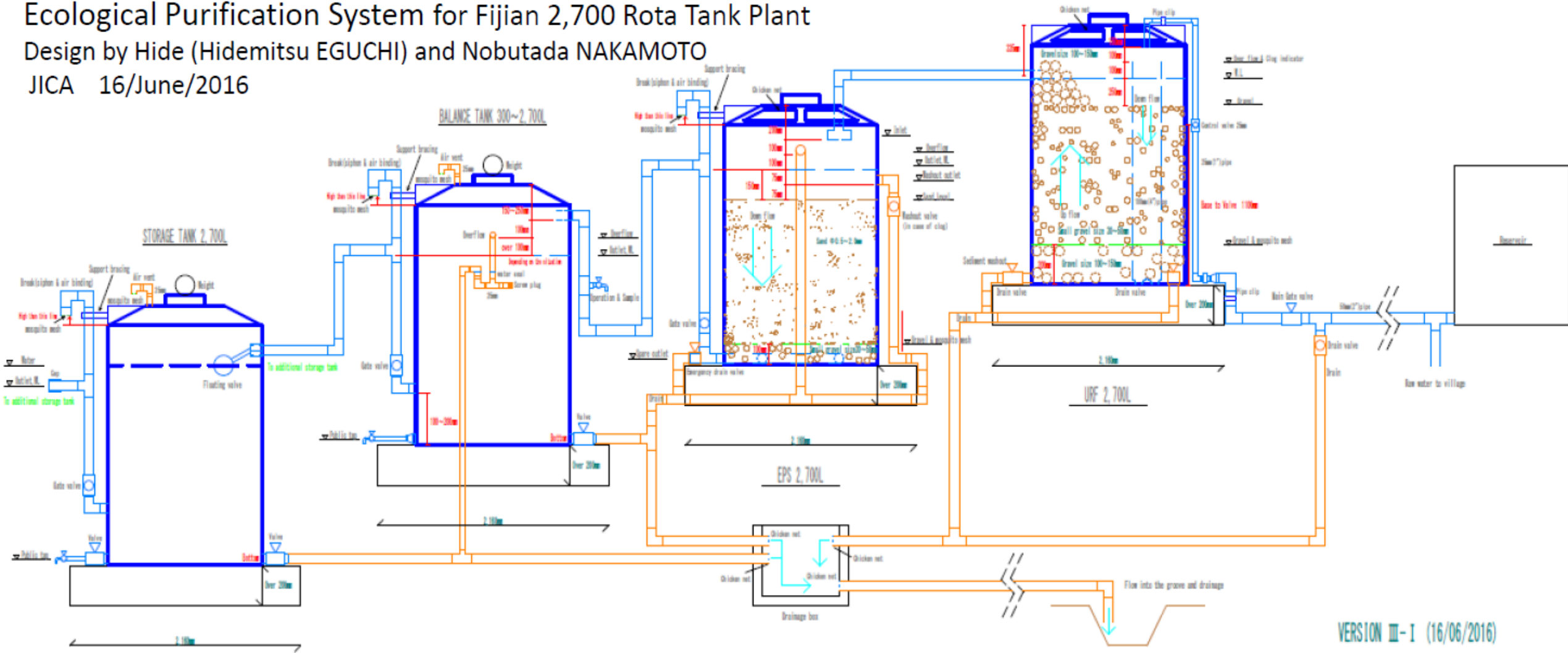
As it is the natural water pressure and gravity, there is no need of electricity, and in Fiji, its construction cost is approximately FJ55,000 (USD26,000).

TYPICAL EPS DESIGN

Ecological Purification System for Fijian 2,700 Rota Tank Plant

Design by Hide (Hidemitsu EGUCHI) and Nobutada NAKAMOTO

JICA 16/June/2016



VERSION III-I (16/06/2016)



Pacific Community
Communauté du Pacifique

EPS in Fiji

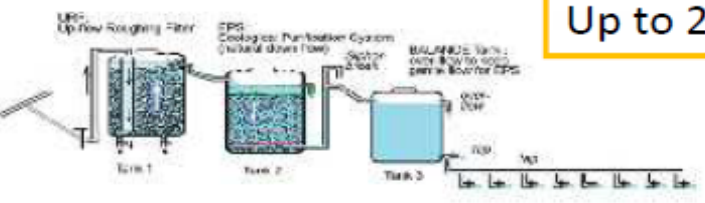
EPS implementation scheme is a part of the “Rural Water Supply Programme” which has been run by the Water Authority of Fiji (WAF). DWS and WAF have driven the scheme since its beginning, and so far more than 80 Ecological Purification Systems have been constructed in Fiji.

No complaints regarding the quality and the amount of clean water produces from the EPS System.

Comment on more use of EPS water in a village

from Nakamoto 7/7/17

Up to 200 persons in a village



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

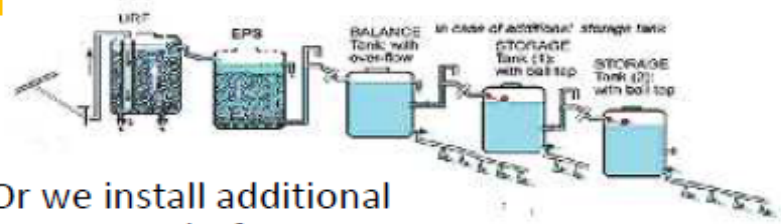
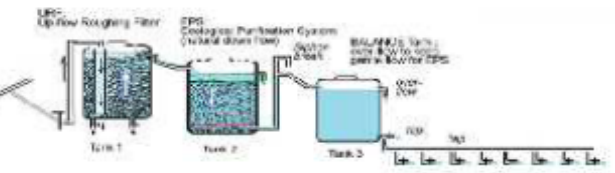
If there is no leak problem, we may connect to present distribution pipe in case of a small village. But this is risky. I cannot recommend this connection.

Modification of Navatuvula EPS system as a model distribution system is difficult. Then, I recommend to make a model EPS system to supply EPS water to every house in a small village.



200 to 500 persons in a village

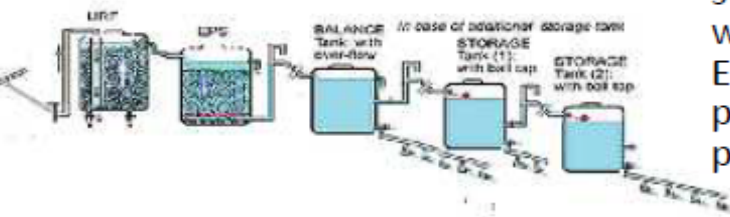
We supply EPS water by new EPS pipe line with many public taps.



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

1. Select a small village (not so far from Suva) as a model EPS water for every tap.
2. Install new EPS system like Kalokolevu. (URF, EPS, small balance tank)
3. Install additional storage tanks to make brock distribution system.
4. Connect EPS stem pipe line for public taps or kitchen taps in a house.

More 500 persons in a village



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

