1. Give a brief Introduction to technology
floating treatment wetlands or FTWs are a new and powerful tool in water stewardship. They biomimic natural floating Macrophyte Filters to create a “concentrated” wetland effect. Independent laboratory tests showed removal rates far in excess of previously published data: 20 times more nitrate, 10 times more phosphate and 11 times more ammonia, using unplanted islands. They are also extremely effective at reducing total suspended solids and dissolved organic carbon in waterways. FTWs float on top of the water, providing a beautiful habitat for birds and animals. But underneath the surface, a dynamic process takes place. Microbes are responsible for breaking down nutrients and other water-borne pollutants, but to be effective, they need a surface to stick to. The floating island matrix, with its dense fibers and porous texture, is the perfect surface area for growing large amounts of microbes (in the form of biofilm) in a short time. Nutrients circulating in the water come into contact with these biofilms and are consumed by them, while a smaller fraction is taken up by plant roots. Suspended solids slough off into the benthic zone below the island. Organic solids stick to the biofilms and become the base of the freshwater food web. These pathways represent a concentrated wetland effect-nature’s way to clean water. Because FTWs are able to withstand fluctuations in water levels, without becoming stranded or inundated, they are very suitable for the treatment of runoff and drainage , such as urban stormwater, agricultural runoff and other non point-source applications. They can be launched over deep or shallow water, including streams and detention basins, and they represent an inexpensive option to retro-fit to existing systems, such as wastewater lagoons. The sticky biofilm which covers the roots and matrix acts as a mechanical filter for fine particulates, while the island itself provides shade to cool the water, and blocks the light that might otherwise encourage sub-aquatic weeds. Overhanging banks act as wave-breakers and allow passage of fish underneath. In a lake or reservoir setting, the conversion of nutrients to periphyton initiates the food chain and contributes to insect and fish growth, which are the hallmark of a healthy and productive ecosystem.

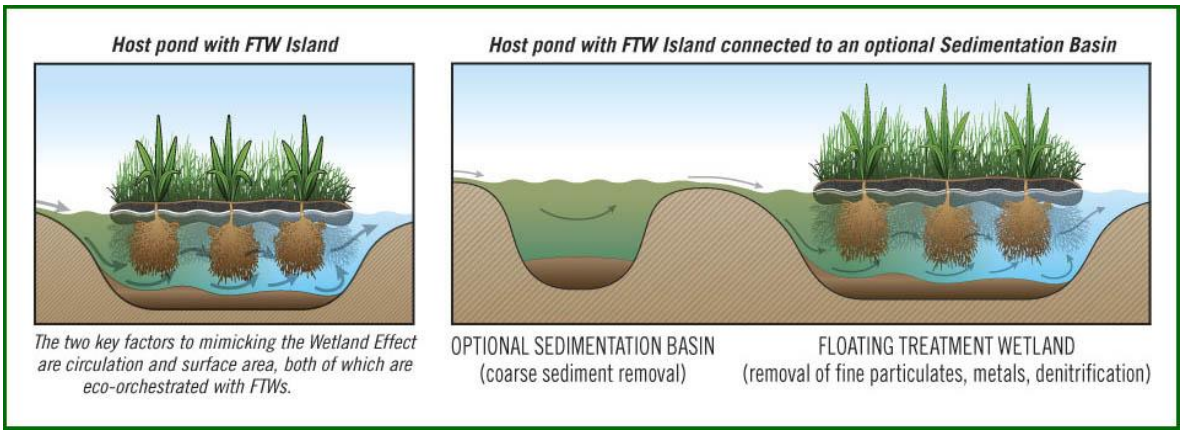
2. Type of waste water the technology can treat?
➔ Black Water, Grey Water , Alkaline Water(Upto Ph-10) , Acidic Water (upto Ph-04) ➔ Municipal sewage treatment (grampanchy at/council/corporations) ➔ Nallah water treatment ➔ Conservation of water bodies by avoiding wastewater disposal

➔ Commercial or public utility spaces (airports, railway stations, complexes)
➔ Food/dairy industry wastewater

3. Explain in detail the design, criteria and kind of conveyance system required for transportation of waste water from source to treatment area?

No,conveyance system required, Because it can Apply Direct to Existing Drains/Ponds/Lagoons/Lakes/ River Streams etc
Design:

1- FTW Shamli Model 01



Other Natural System
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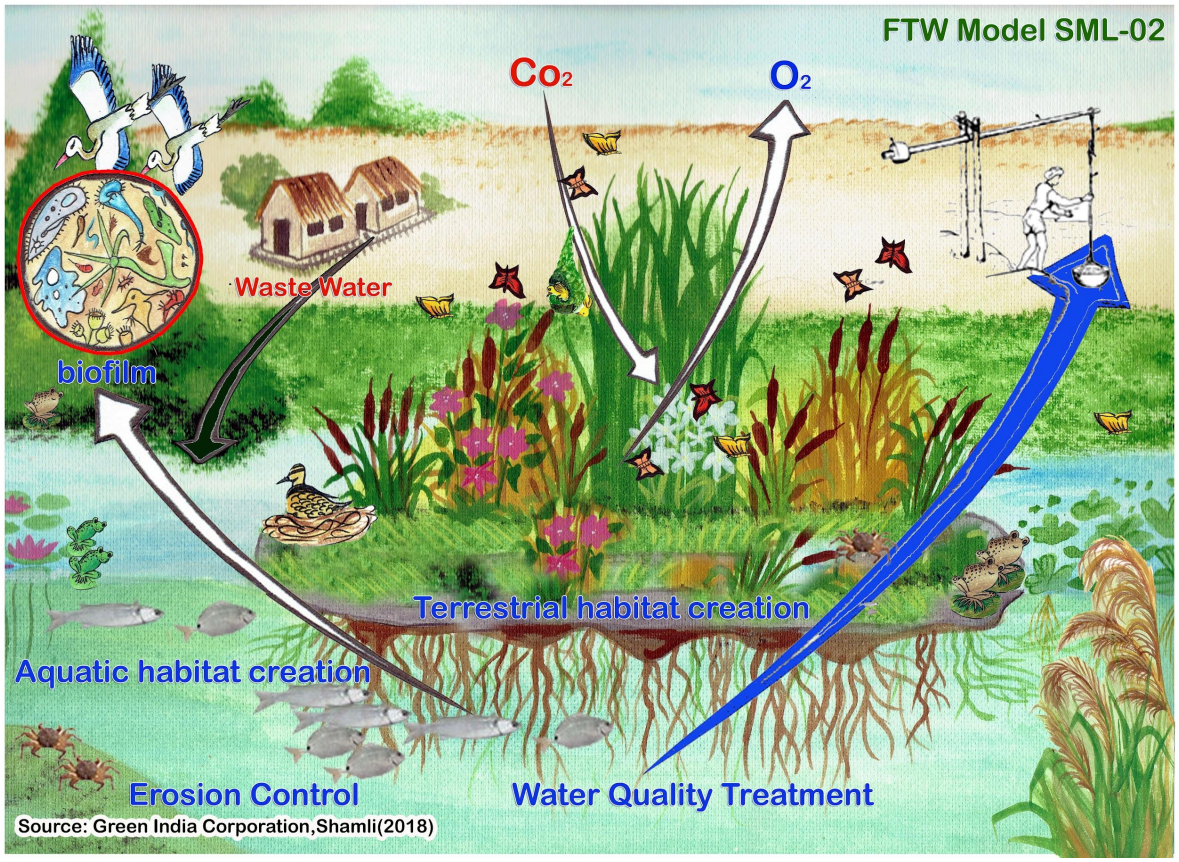
1- FTW Shamli Model 02



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FTW Shamli Model 03

1. Specify space required for the technology for different community size

Population size	
100-500/ village	400 m^2 -2000 m^2
500-2000/village	2000 m^2 -8000 m^2
>2000/village	>8000 m^2

1. Specify standard design size of technology for different treatment capacity at community level with schematic representation

Population size	

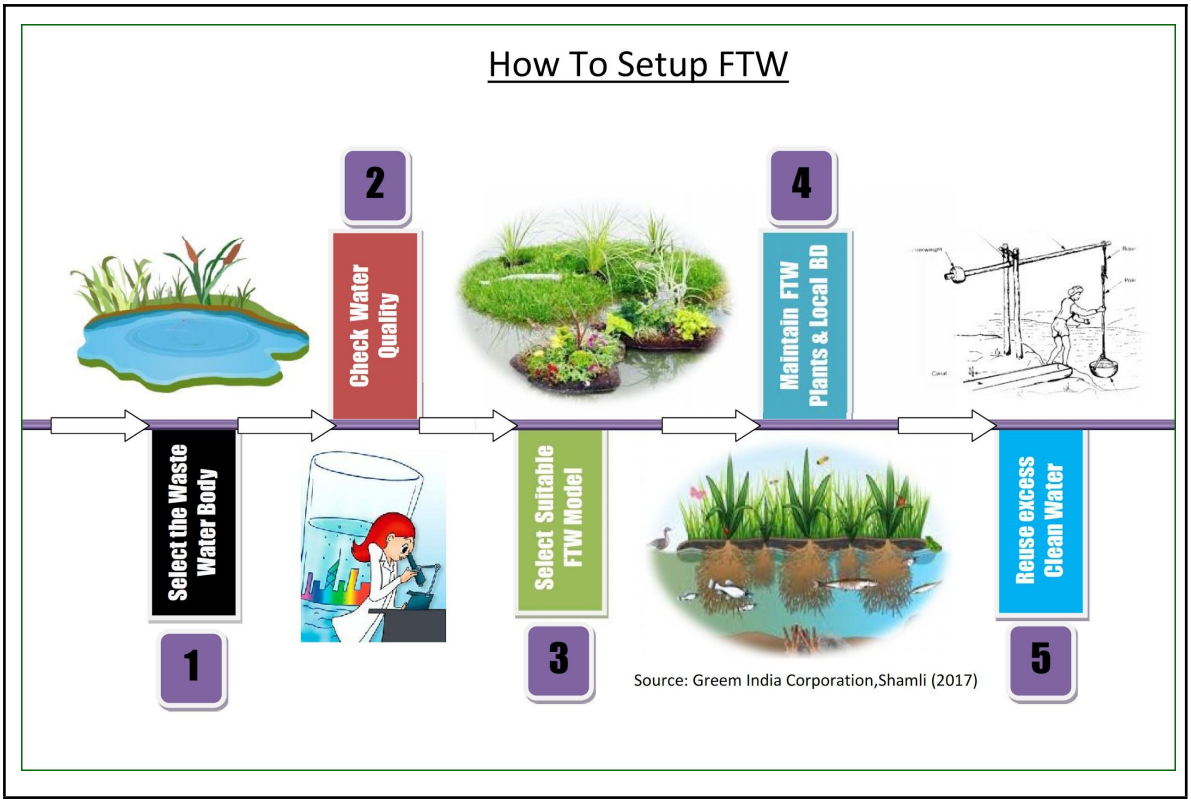
100-500/ village	no specific design required, Design Finalised by Villagers Under Biodiversity Management Committee(BMC) Guidelines as available Natural Resources. only Size is Important i.e 400 m^2 -2000 m^2
500-2000/village	no specific design required, Design Finalised by Villagers Under Biodiversity Management Committee(BMC) Guidelines as available Natural Resources. only Size is Important i.e 2000 m^2 -8000 m^2
>2000/village	no specific design required, Design Finalised by Villagers Under Biodiversity Management Committee(BMC) Guidelines as available Natural Resources. only Size is Important i.e ->8000 m^2

6. Specify different raw/construction material required to set up technology
1. Stones/Bricks 2- Planting Material- Water Roses (*Var. -gic01 for For Normal Ph, Var.-gic02 for Ph-4 to 8, Var.- gic03 for Ph 6 to 10 or Locally Available Varieties)* Bamboo/Common reed/cattails/Elephant Ear/Napier Grass/Lemna and other locally available Macrophytes 3-Rubber/ Cotton/ Bamboo/ Common reed or any local eco-friendly Nets , Cages & Floating Mates. 4-Planting & Harvesting equipments. 5-Biogas Plant, if budget is available. 6- Small Boat, if budget is available.

7. Specify different Local materials which could be used as alternative for the construction material mentioned above
Locally available Stones/bricks /nets/boats & Macrophytes & other Planting Material can be used

8. Provide capital cost break up for the technology implementation
Capital Ex -Rs 400-500/- Per Square meter for Floating Cages & Planting Material etc Drain/Ponds Digging cost not included (this work done by MGNREGA or other Scheme) Boats & Biogas plant cost not included (by Own GP Funds or other schemes)

9. Explain in detail, the procedure to set up the technology with pictorial representations



10. Explain Manpower requirement for setting up and operating the technology?
Civil work manpower is required for setting up. Expert advice and guidance required for design and commissioning. Unskilled manpower is sufficient for operation.

11. Describe in detail type of operation and maintenance required to run the technology

No specific operation and maintenance is required. Overgrown plants need to be harvested every 15-30 days,
Regular monitoring of water levels and treated water quality mechanism required

12. Mention annual O&M cost required to run the technology

Rs 300/- to 400/- O&M cost per square meter

13. Explain feasibility of technology under different soil condition and specify any modification required in technology under specific soil type

	Feasibility	**Modification**
Alluvial soil	Feasible	nill
Black cotton soil	Feasible	nill
Arid soil	Feasible	nill

Saline soil	Feasible	nill

14. Explain feasibility of technology under different terrain conditions and specify any modification required in technology under specific terrain

	Feasibility	**Modification**
Hilly	Feasible	nill
Dessert	Feasible	nill
Coasts	Feasible	nill
Flat plateau	Feasible	nill
Hard rock strata	Feasible	nill

15. Explain feasibility of technology under different ground water level conditions and specify any modification required in technology under specific water table

	Feasibility	**Modification**
High water table (0-5m)	Feasible	nill
Medium water table (5m-20m)	Feasible	nill
Low water table (>20m)	Feasible	nill

16. Explain in detail periodic management of Sludge/Biomass under operation and maintenance of technology?

Plants need to be harvested every 15 to 30 days. Sludge from settler tank need to be removed every alternate year.

17. Specify merits and demerits of the technology

Merits	Demerits
● Low O&M makes technology more applicable in rural and peri urban setting besides Urban settlement ● no use of electricity ● No chemical additions ● Unskilled manpower required ● Resembles garden and therefore add to aesthetics ● Aquatic Habitat Creation. ● Terrestrial habitat Creation ● Help to Co2 Reduction ● Biomass Can be Used direct As Fuel, or Biogas Production or Manure.	● Requires larger space ● Rehabilitation of biodiversity is a Big task

1. Specify Do’s and Don’ts of the technology

Do’s	Don’ts
Use Biocontrol methods to control the population of water mites or other insects Harvest mature plants regularly Separate floating solid waste using filter bed or screens Regularly check water quality Regularly monitor water level	Don't use any chemical insecticide Stop solid waste dumping on banks of water bodies Never culture exotic species in pond

19. Specify successful case studies of the technology
This Technology Successfully implemented in District Shamli (U.P.) INDIA, by Green India Corporation & HIFEED Team.

20. Challenges to effective O&M:
No major challenges, except ingress of solid waste to be avoided.

21. List of experts or organisations for the technology

List of experts/Organisation	Research area	Contact details
Prof . Mohd Umar Saif CEO-Green India Corporation,Shamli	Eco-Restoration/SLRM	+91-9837334033 drumarsaif@gmail.com
Himalayan Institute for Environment,Ecology & Development(HIFEED)-Dehradun (Uttrakhand)	SLRM /RD/Ecology & Environmental Eng./Natural Resource Conservation Management	+91-9412984030

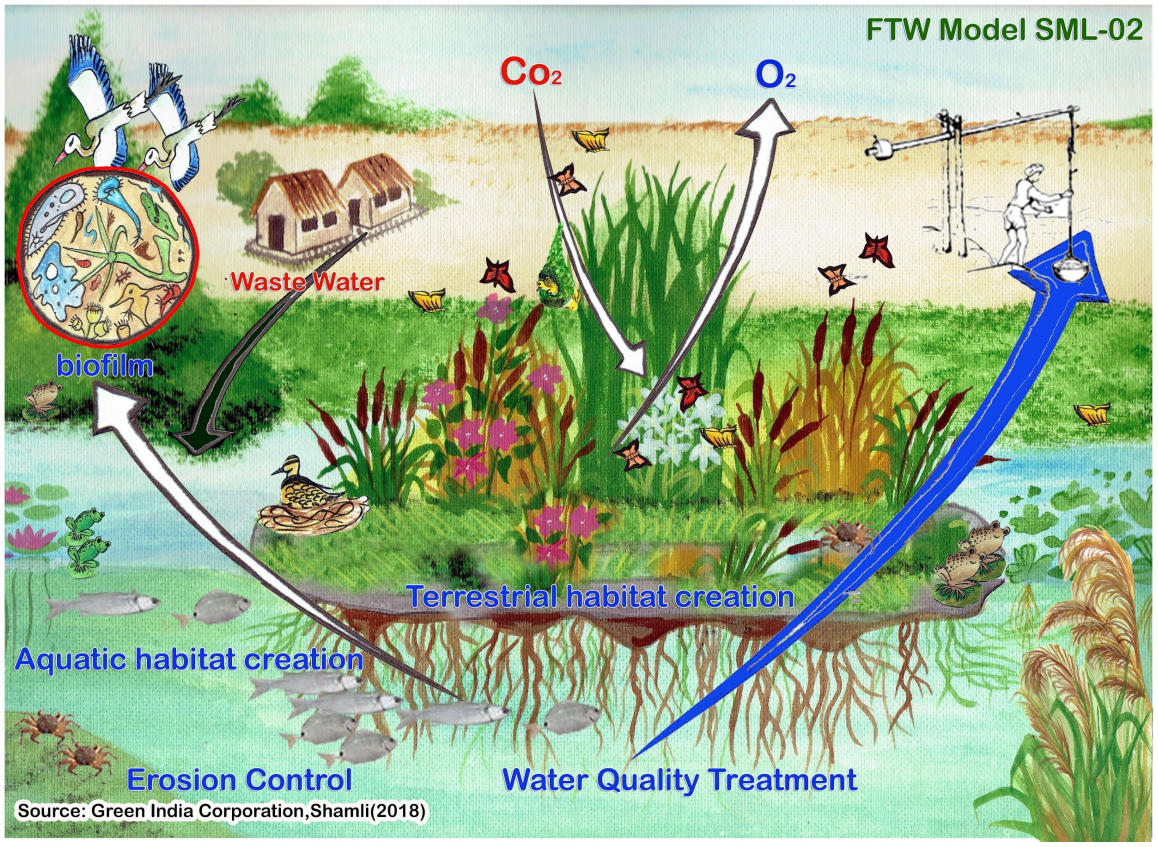
22. CPCB standards for the outputs from the technology

The system can be designed to meet CPCB standards for disposal and reuse.

23. Potential funding schemes for the above technology at village level

1-SBM(G)-SLRM
2-MGNREGA
3-14th Finance Commission
4-State Finance Commission
4-CSR
5- PPP mode

24. Films, Books, Posters etc. related to the technology



25. Other Information

Other Natural System
Floating Treatment Wetlands Technology