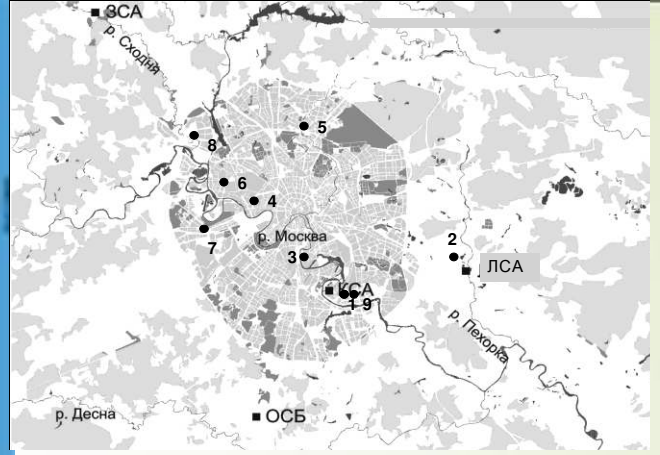

NEW TECHNOLOGY OF WASTE WATER TREATMENT AND WATER MANAGEMENT

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Soil Science Faculty Lomonosov Moscow State University - Russia

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If you are not interested in clean water, you cannot live in the modern world.

- Unfortunately, not always our management structures understand that **clean water in the modern world is very expensive product**. Moreover, water is essential for the life .
- Fortunately, some governments, including **Indonesia and Russia**, began to understand that there is no deficiency of water in general, but there is **only a deficit of clean water**.

And what is the solution?

it is necessary to treat (purify) waste water

Different types of waste water treatment:

Hi-technology

Traditional biological treatment technology

Phyto-technology

Technical method of water treatment

- It is necessary **to utilize** of waste water treatment **units** → increases the amount of **wastes.**
- **The energy consumption in** technical purification method will be the **maximum** → **The cost of production** using clean water (fish, for example) **increases**.
- useful **nutrients** (nitrogen, phosphorus), dissolved in waste water, will be **lost** → **Loss of economic benefit**

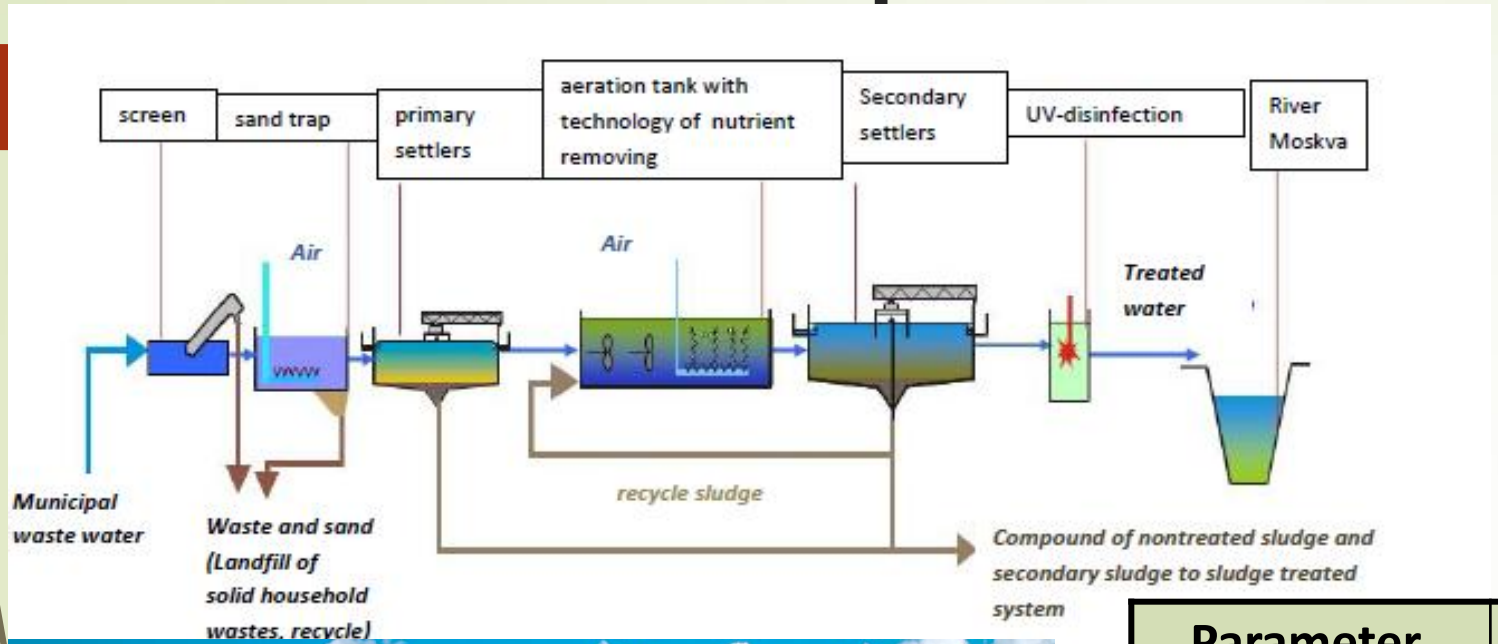
Biological method of water treatment

- **keeps the necessary nutrients** beneficial for the biosphere
- has a **minimum energy consumption**
- has practically **no waste**

Biological method is ideal for Bali

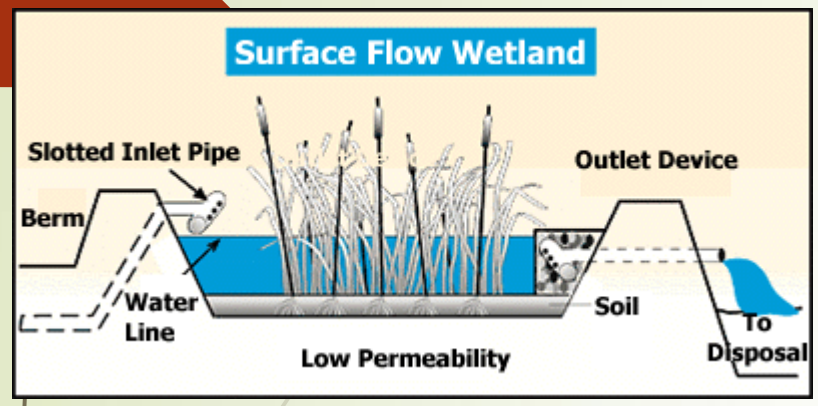
- Consistently warm climate all year with no changes in temperature
- No industrial wastewater toxic substances
- Using just tested technologies.

World best experience: Kuryanovsky WWTP



Parameter, mg/L	Waste Water	Treated Water	Water Quality Standards
Suspended substances	80-110	4,8-7,2	10
BOD_5	80-120	1,2-2,5	3
$N\text{-}NH_4$	17-21	0,2-0,5	0,4
$N\text{-}NO_2$	-	0,01-0,02	0,025
$N\text{-}NO_3$	-	6,2-7,8	9,1
$P\text{-}PO_4$	1,7-2,3	0,2-0,4	0,2

Treatment Wetlands and ReCip (as example)



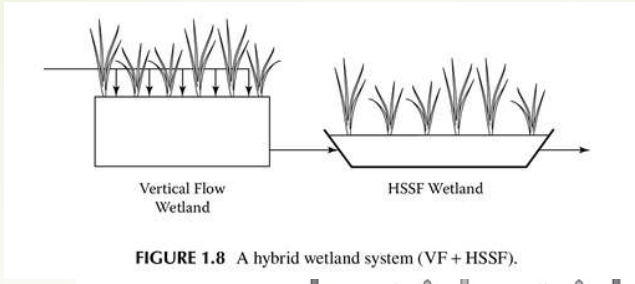
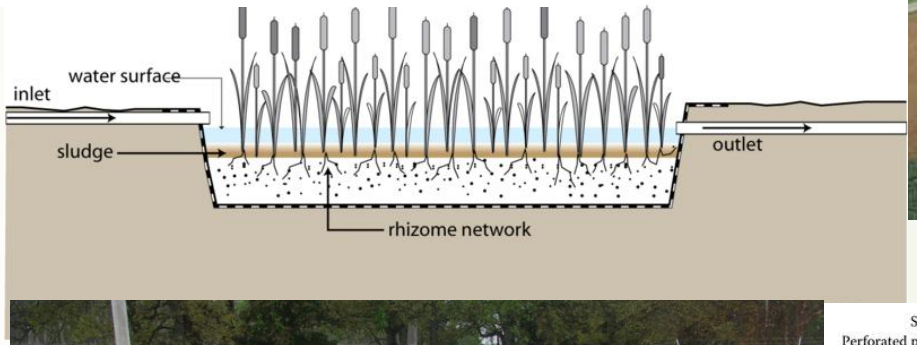
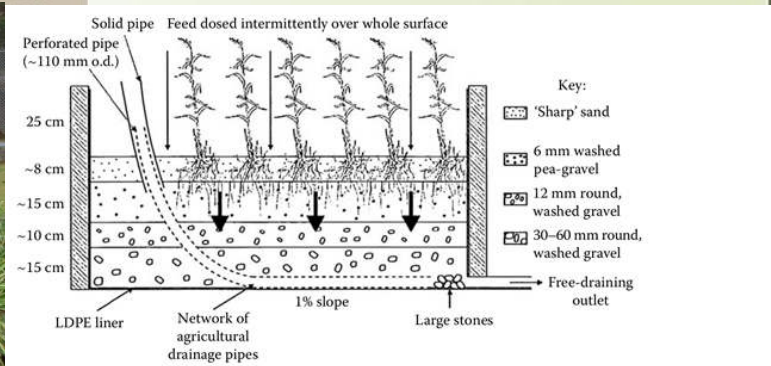


FIGURE 1.8 A hybrid wetland system (VF + HSSF).





arrangement of a VF constructed wetland. (From P.F. Cooper *et al.* (1996) *Reed Beds and Constructed Wetland*
t. WRc Publications. Swindon, United Kingdom. Reprinted with permission.)

Adaptation of biological water treatment for local environmental system

Scope of concerns for different groups of water consumers (tourists, inhabitants, governmental structures):

Is tourist business interested in having the **blue flag of UNESCO be in Bali**?

Tourism (quality of beaches)

Plant production

Organic farming can not be developed if farmers use contaminated water for irrigation

If people drink contaminated water, they get sick

Human health

Waste water treatment

Fishery

Fish farming is very promising for Bali and can be implemented only in

The problem of polluted water is the problem of water management and culture of water using

- The culture of water consumption

when all sectors of society understand that clean water is expensive product

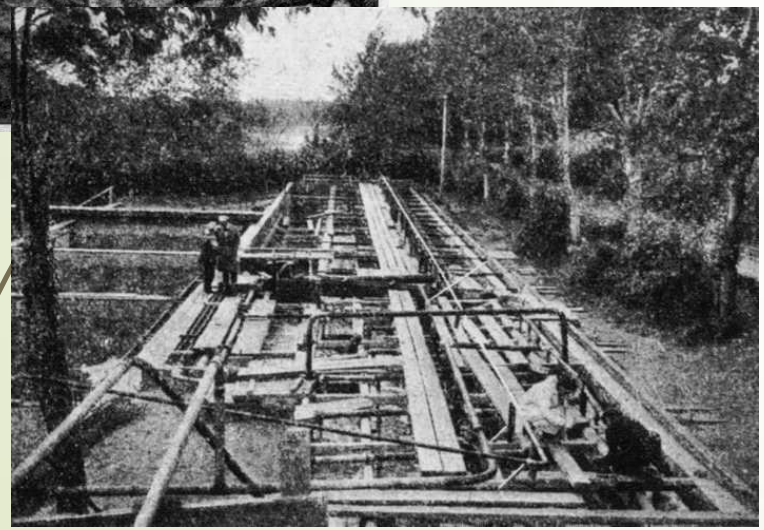
“polluter pays”

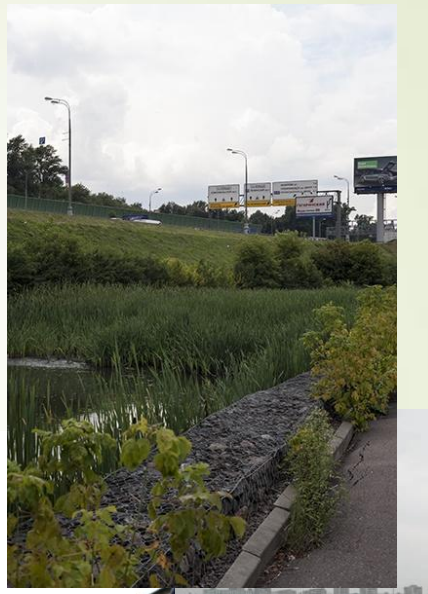
Environmental water standard in Indonesia

WWT

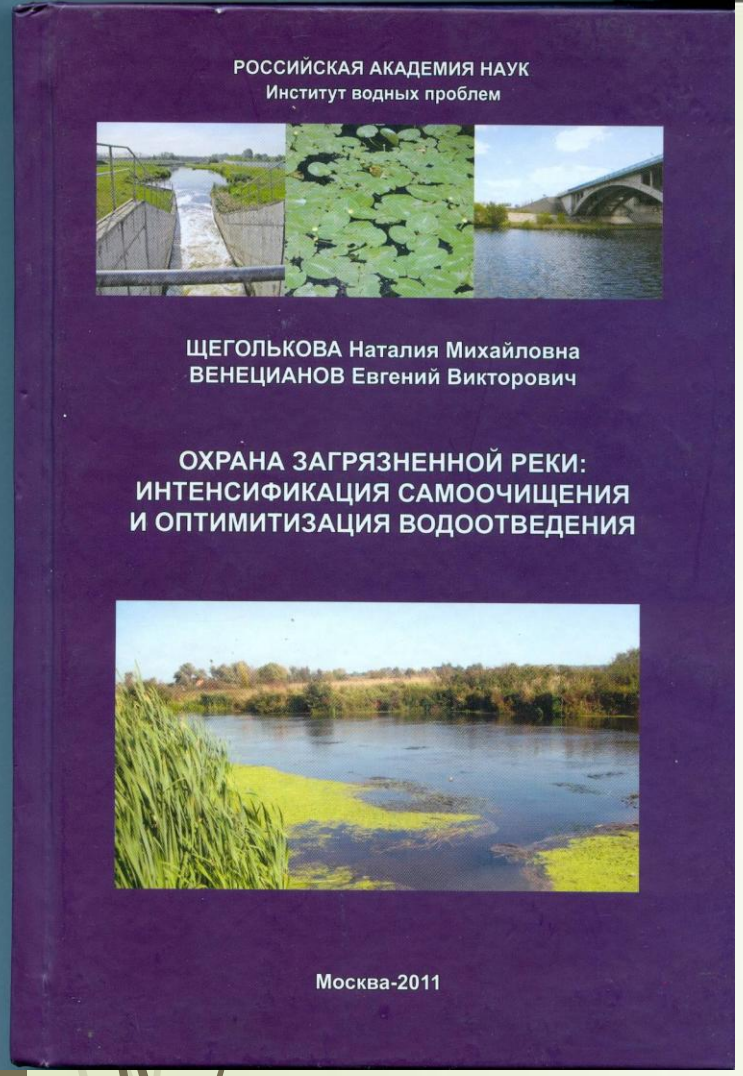
Water quality index	Class I: domestic water supply.	**Class II: Recreation, fresh water fishery, animal husbandry for sensitive fish and crops**	Class III: Fresh water fishery, animal husbandry, irrigation for semi tolerance fish and crops	Class IV: Irrigation for tolerance crops.
BOD, mgO/L	2	**3**	6	12
COD, mgO/L	10	**25**	50	100
N-NH_3, mg/L	0.5	(-)	(-)	(-)
N-NO_3, mg/L	10	**10**	20	20
P_{total}, mg/L	0.2	**0.2**	1	5

In Russia the first treatment plants were created in 1898, more than 100 years ago.





Water treatment plants cannot function without specialists



Nataliya Shchegolkova is the expert on WWTP:

Chief Specialist, Kuryanovsky WWTP – 15 years,
PhD, Prof. , Lomonosov Moscow State University – 4 years,
Leading Researcher, Institute of Water Problems of RAS,
member of International Water Association

http://www.iwp.ru/person/schegolkova-nm

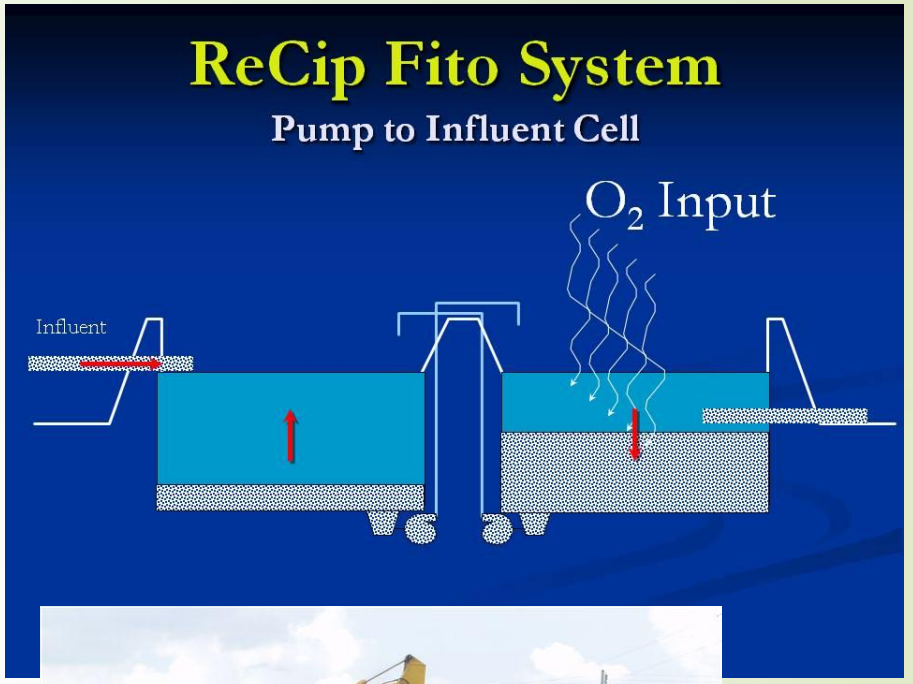
https://www.youtube.com/watch?v=_-N_r_8UBQw&index=9&list=PLjbb2xLcvG19cte6dUEPsi1111hHR0Srx

http://www.watertec.ru/razdel.aspx?id=350

Protection of polluted rivers: the intensification of self-purification and optimization of wastewater treatment, Moscow, 2011.

Suggestions for Lagoon:

- Today: water quality worse than class IV
- Tomorrow with ReCip : **class 4 is improved to class 2**



BOD_5 = 3 mg O^2 / L
Total N = 10 mg / L
N-NH4 = 0,4 mg / L
Suspended solids = 10 mg / L
Total P - 2 mg / L
TCB = 500 CFU / 100 ml

Additional bonuses of biological WWT technologies

- Water treatment systems can be intoduced into Bali ecosystems as their complementary parts
- Nutrients from waste water can be used in agriculture (sewage sludge).
- greenhouse gases will be assimilated by components of water treatment systems: plants and microorganisms

Our suggestions:

- Bali needs to develop the concept of water management: development of local standards for waste water in Bali.
- To develop System of encouragement and fines for purification / non -purification of waste water.
- To create an experimental polygon in Lagoon to test Treatment Wetland systems in Bali
- Further implementation of biological water treatment technology and cooperation with interested customers (Hotels, Resorts, Shopping Centers, Fish Farmers)

Thank you for attention!