

Current Situation and Countermeasures Research of Rural Water Environmental Sanitation in West Sichuan Plain, China

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Geography & importance in Ecological Location of Sichuan

I live in the upper reaches of the Yangtze River
While you live in the lower ones
I think of you every day but cannot see you
Although we drink water of the same river

【Song】Li Zhiyi

■ Located in the upper reach of Yangtze River, Sichuan borders upon the source of Yellow River. As the main body of ecological screen of the upper reach of Yangtze River, it has an important ecological location.

■ Ecological security shall be taken into account as city development along Min River, a key branch of the upper reach of Yangtze River.



Current situation of Rural Water Environmental Sanitation in West Sichuan Plain

- The annual discharge of sewage hits 2.28 billion tons in Sichuan, exceeding 60% of environmental capacity. 30% of river monitoring sections among the five major monitoring drainage areas are under IV.
 - Peasant household drinking water and domestic water are from ground water. Colibacillus and total bacterial flora are impermissibly high in some areas. Millions of people are affected in water security. Conservatively estimated, rural pollution discharge accounts for over 50% of total pollutant.
- Traditional pit-type privies (cesspool, fetor and fly maggot) are commonly used. Non-hazard treatment in Sichuan rural areas is only 10.34%. Urbanization centralized housing, few biomass pools and cesspools and some flushing toilets make water use habits more extensive without drainage collection and treatment system.



The Common Situation of Sanitation



Current Situation of Sanitation and Drainage





Future Water Consumption for Flushing Toilets

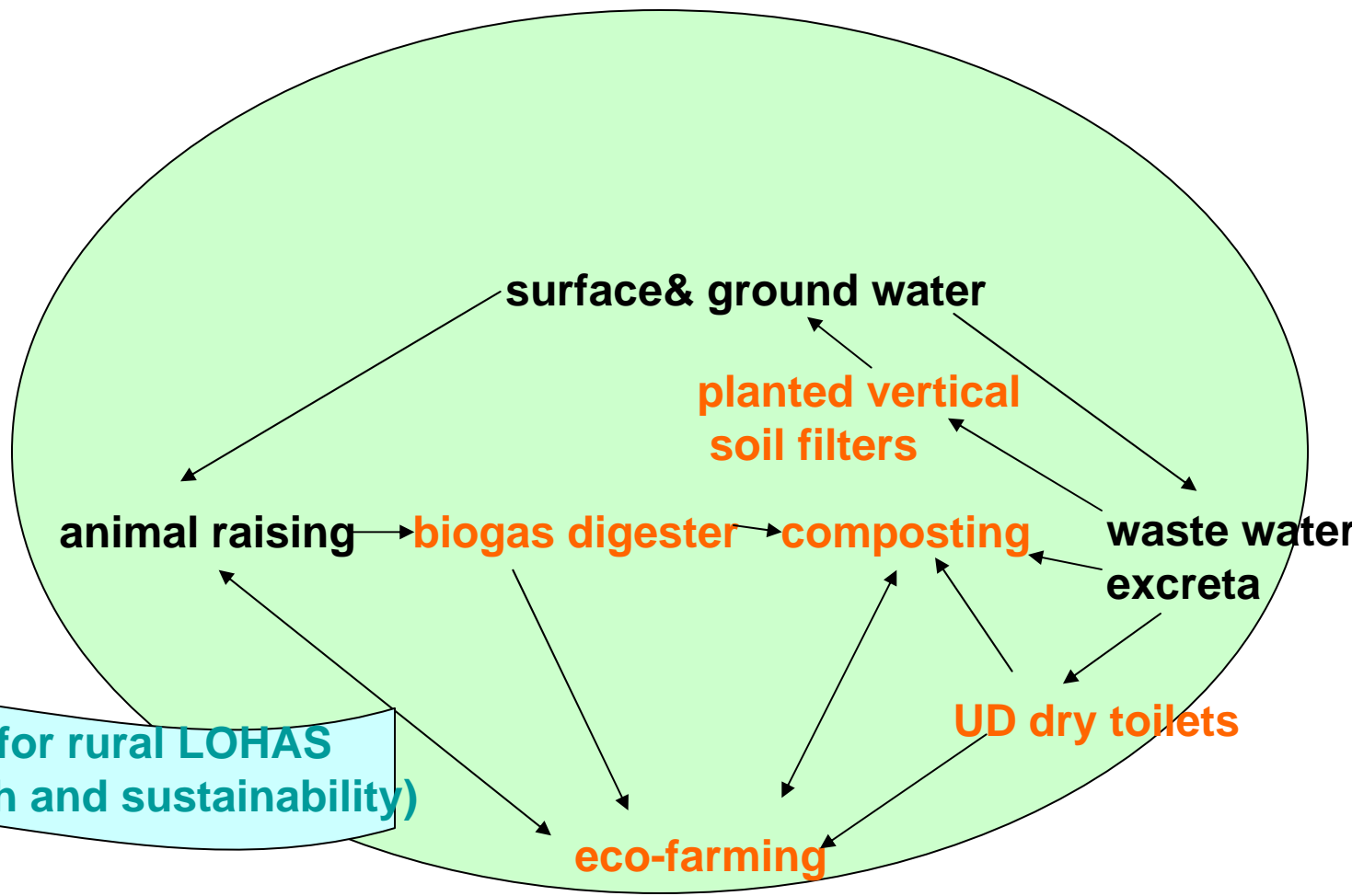
If all the 400 million rural residents use 6 L/time flushing toilets for 5 times per day per person, more than 43.4 billion tons of clean water will be used per year (calculated as 360 days), accounting for 43.2% of rural sewage discharge in 2005.

The water supply and displacement of toilets along will double.




Objectives of the Water and Sanitation Project

- Focus on water and explore suitable ways of improving rural sanitation and water conservation in watersheds of the West Sichuan Plain
- To look for a sustainable model of solutions of rural non-point pollution



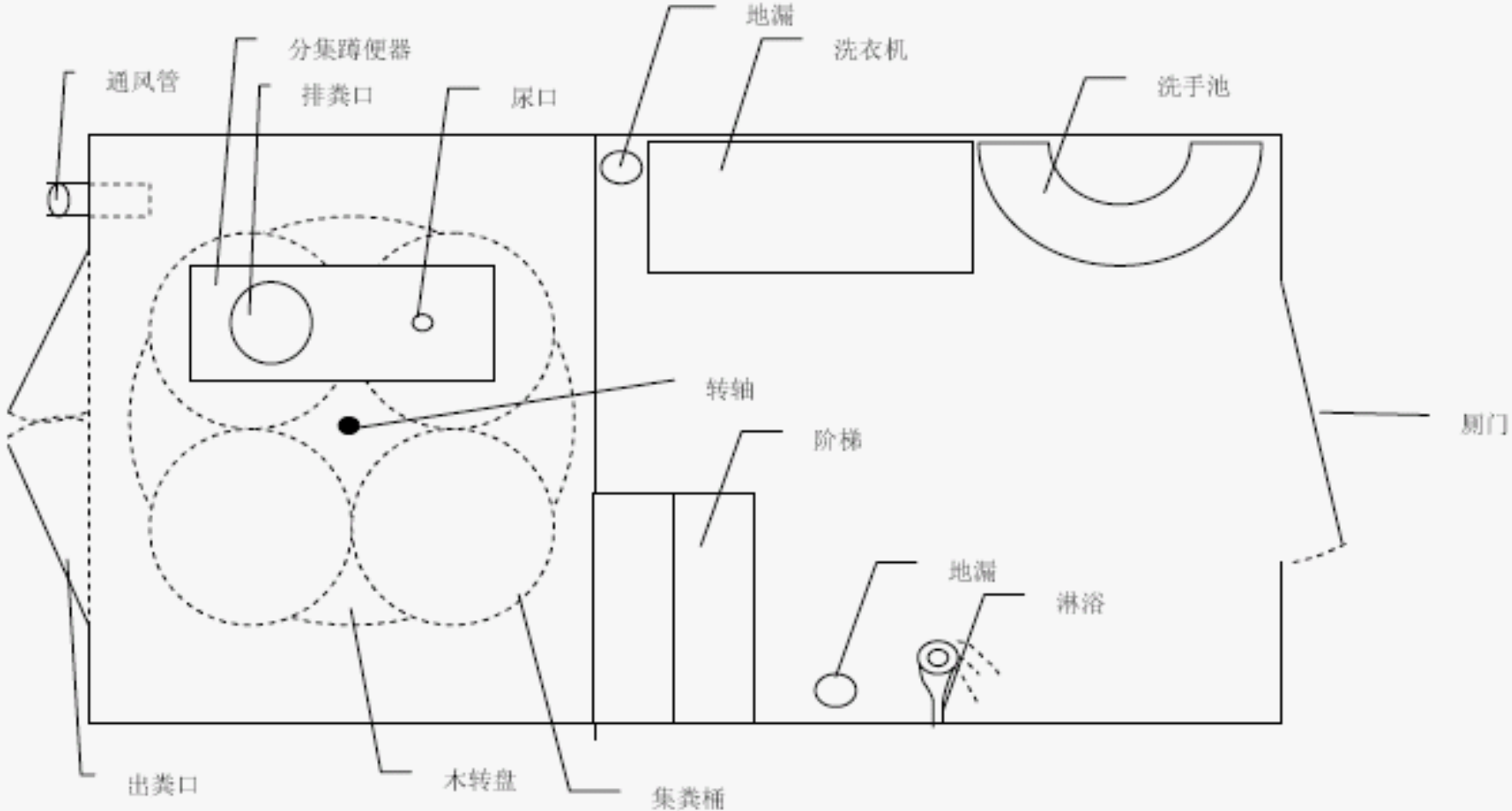
**An alternative for rural LOHAS
(lifestyles of health and sustainability)**

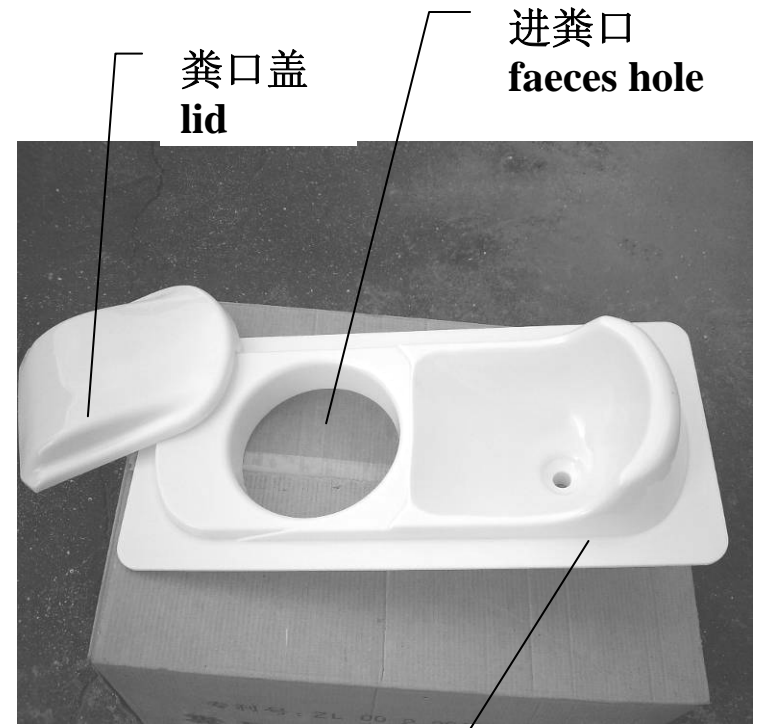
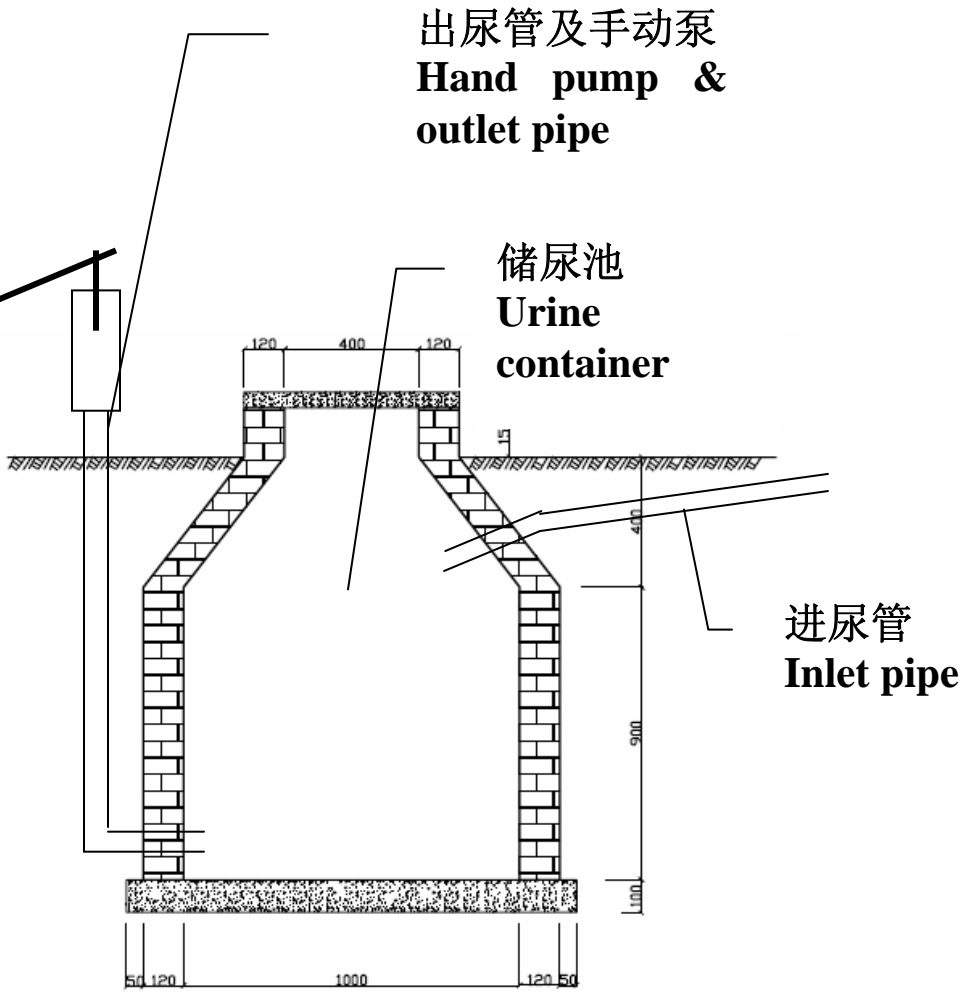
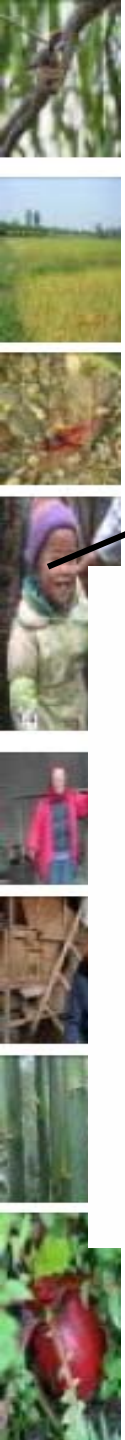


Design of the Urine-diverting Dry Toilet

- Location: in the yard or next to the farmer's main house
- Squatting type UD-toilet
- Including hand-washing facility, washing machine placement, shower place
- User Friendly: use 4 buckets as containers and put the buckets on a rotatable wooden disk, use one bucket for 1-1.5 months and fill the buckets one by one then take out the first one when the 4th one is filled
- Materials used to cover faeces: plant ash

The Layout of the Toilet Room





粪口盖
lid

进粪口
faeces hole

尿口
urine hole

After Implementation



After Implementation



After Implement



生态卫生旱厕使用说明

Instructions for Use of Eco-Toilets

您好，谢谢使用粪尿分集式生态卫生旱厕！它帮助我们达到健康、环保的生活！

Hello, thank you for using the ecological urine-diverting dry toilet!



- ◆ 小便流进便池前端的小孔里，小便后用一瓢水冲洗便池的小便口
Pee in the small hole; pour a ladle of water to flush.



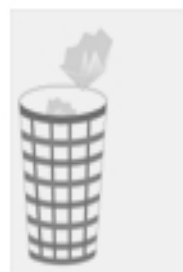
- ◆ 用脚推开便器后部的大便口盖子，让粪便直接落入下面的集粪桶里
Move the lid by foot, defecate into the bigger hole at the back.



- ◆ 大便后加 2-3 瓢草木灰，保证鲜粪被完全覆盖
Add two or three ladles of ash to cover faeces after defecation.



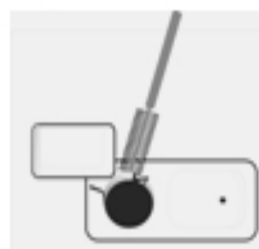
- ◆ 便后用脚将大便口的盖子移回原位，盖住粪口
After defecation, move back the lid to cover the hole.



- ◆ 用过的卫生纸和卫生巾扔进专门的纸篓里
Put toilet paper and sanitary towels into the plastic basket after use.



- ◆ 大便口和集粪桶里**严禁进水**
WATER is strictly AVOIDED into the bigger hole at any time.



- ◆ 如果便池不小心沾上粪便，用刷子蘸上草木灰轻轻蹭掉，不能用水洗刷
If the toilet is stained with faeces, brush it away with some ash.



- ◆ 便后别忘记洗手哦！
Don't forget to wash hands before leaving!

本页插图由志愿者张庆绘制。
Drawn by Mr. Zhang Qing, a volunteer.

谢谢，我们祝你生活健康幸福！ Thank you! We wish you a happy and healthy life!



Further studies on UD dry toilet in West Sichuan Plain

Under the unique custom, economy and climatic condition of West Sichuan Plain, issues such as usage and management method, decontamination of feces effects, fertilizer efficiency and social acceptance shall be further probed and monitored.

Grey Water Treatment of Peasant Family

■ water management

■ waste water collection

Grey
Water
Treatment

■ stabilization basin

■ quick penetration pool of soil

■ effluent utilization



Baseline Monitoring of Grey Water

(compared with The Standard Quality of Irrigation Water (China))

No.		Water Sample	COD _{Cr} (mg/l)	NH ₃ -N (mg/l)	SS (mg/l)	TP (mg/l)	pH	Hg(μ g/l)
1		the mixture of waste water from kitchen, washing and shower	1538	5.85	880	4.1	6.5	1.06
3			2713	36.04	980	18.5	6.5	20.70
4			1635	6.93	728	3.5	6.5	11.49
5			892	7.71	374	2.1	6.5	2.18
The Standard Quality of Irrigation Water (China)			Water Farming ≤80, Dry Farming ≤150, Vegetable ≤80	kjeldahl nitrogen: WF≤12, DF≤30, Vg≤30	WF ≤150, DF ≤200, Vg ≤100	WF≤5, DF≤10, Vg≤10	5.5-8.5	≤1



■ **Gray water of peasant family:**

The daily displacement of kitchens, cleaning and washing for a 3-5 persons family is about 60-300 liters. COD, SS and Hg seriously exceeds.

■ **Gray water treatment: planting type soil quick penetration**

pool--packed bed consists of soil and filling (such as gravel), the waste water flows between filling gap in the packed bed and aquatic plants (such as bulrush) can be planted on the surface of the bed.

■ **Action Principle:**

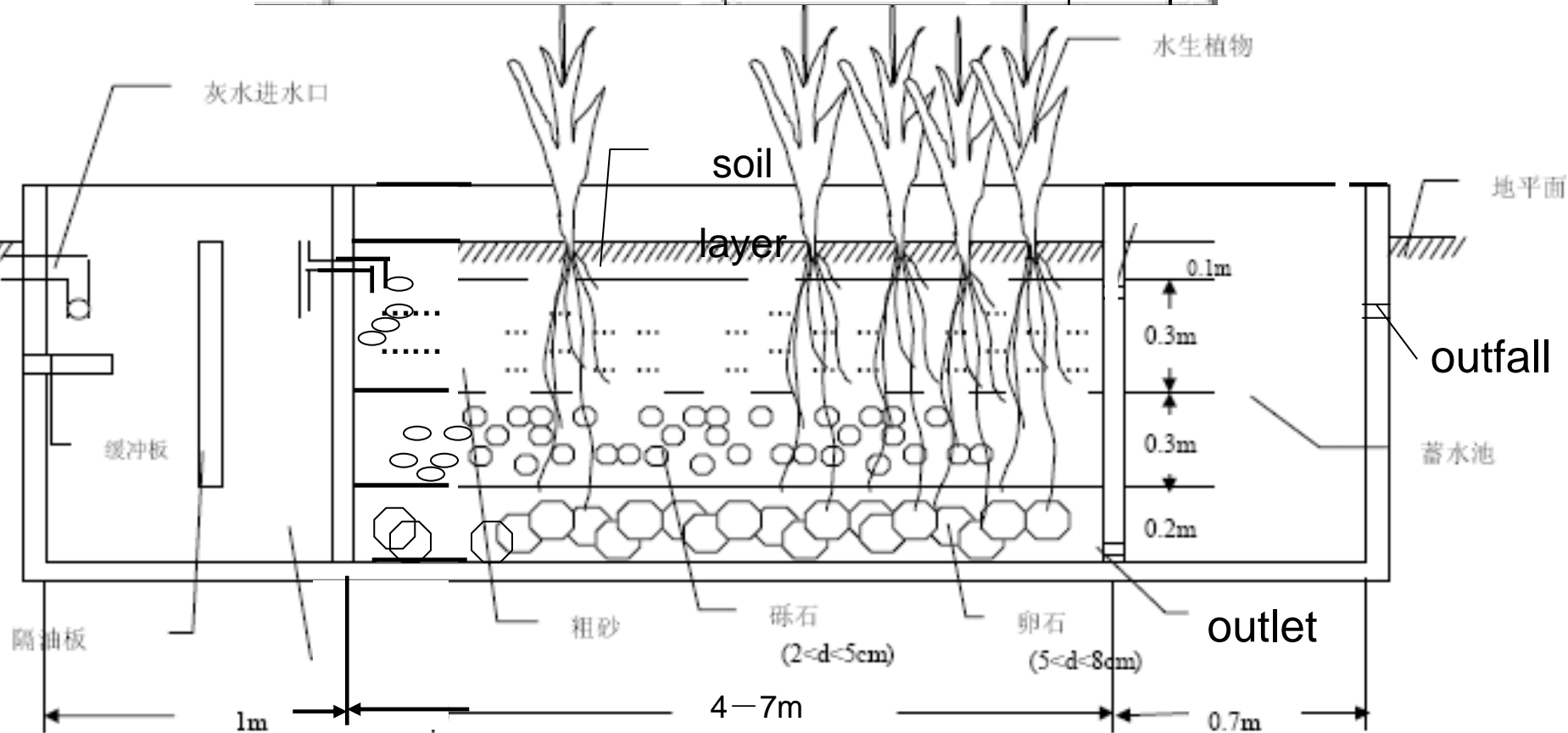
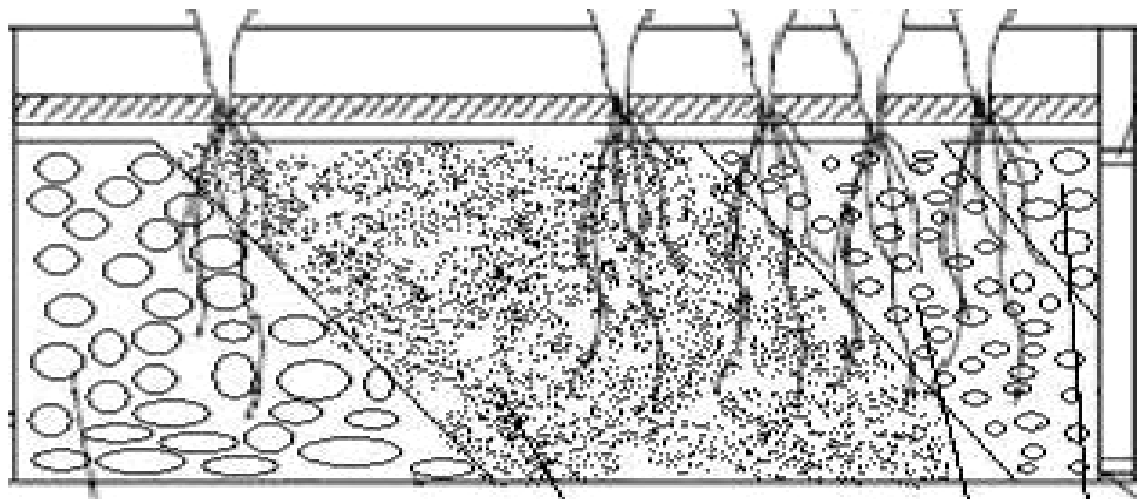
— — Infusible organic substance will be trapped and utilized by microorganism after deposit and filtration.

— — Infusible organic substance will be decomposed by biomembrane adsorption and microbial metabolism.

■ Gray water treatment pool is 80cm in width while the length of plant

Design

Water treatment



Quick Penetration Treatment Pool of Gray Water and Outlet



The treated water





Promoting EcoSan in communities

Base on communities and
cooperate with communities to
promote the peasant families to
accept ecosan system
spontaneously



Approaches of promoting EcoSan in West Sichuan Plain



Actual demand and desire of peasant families

+

Environmental protection/mission of nongovernmental organization of help peasants

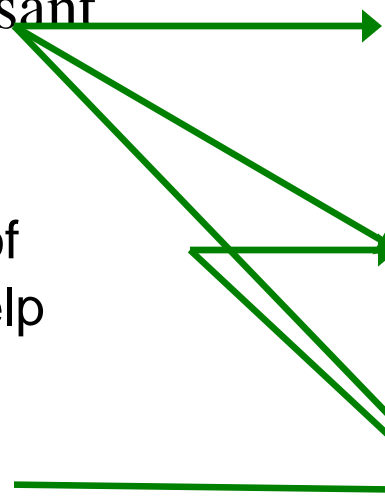
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Governmental environmental/sanitation/agriculture objective

Actual alteration and action of Families

Cooperate with
To form a mode

Replicate production
produce efficient





Thank you!

Chengdu Urban Rivers Association

www.rivers.org.cn