Case study:

Effectiveness waste-water treatment from the Tan Hoa trade village for biogas and irrigation

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Introduction:

Study on estimating effectiveness of treatment technology and waste-water recycle of starch processing for irrigation aiming to find out scientific basic, practice in order to step by step to define treatment technology solutions. Recycle of agro-product processing waste-water for suitable effective irrigation and maybe put into application in wide range to decrease environmental pollution to serve agricultural production and to raise the living standard, protect health of community in argro-product processing trade village in Vietnam rural areas.

Research Methods:

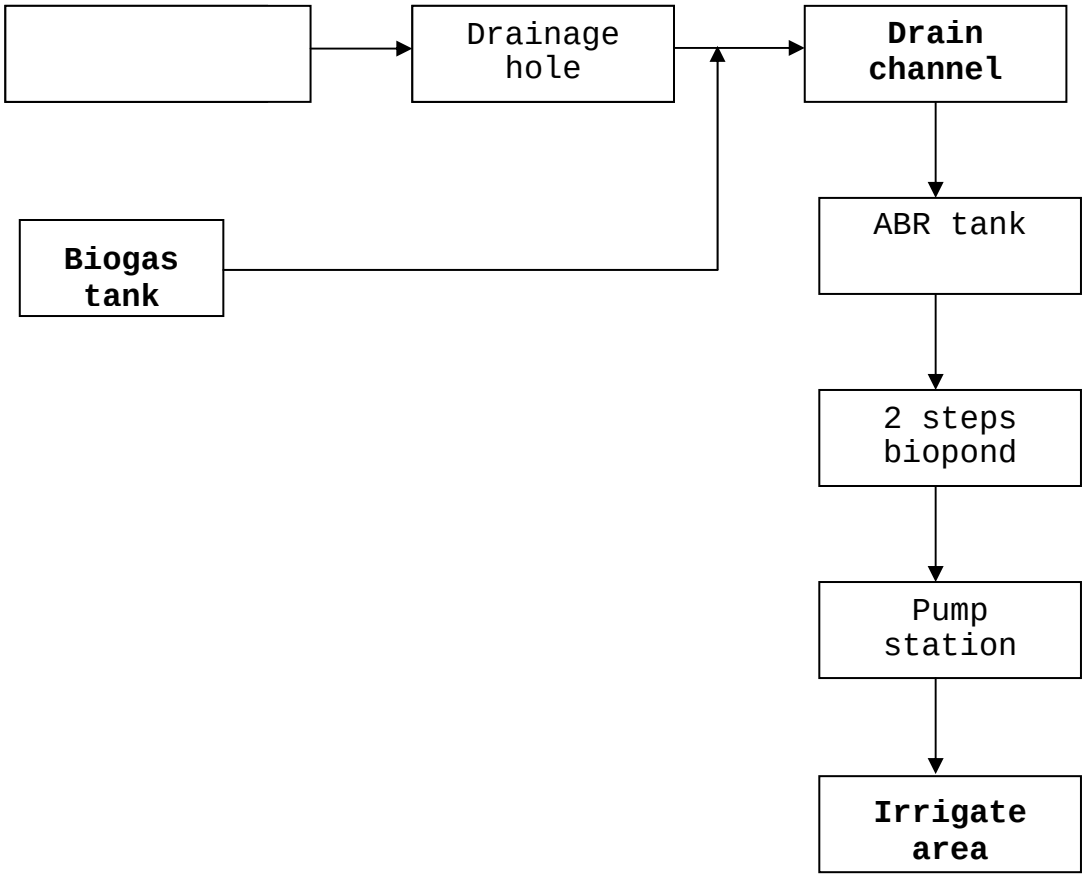
- Collect and analyse documents, research results toward subjects related to treatment technology and recycle of agro-product processing waste water used to irrigation.
- Investigate the field by Rapid rural appraisal method.
- Apply results of starch processing waste water treating technology was realized in laboratory to put into model practise.
- Analysis of soil and water samples in lab.

Effectiveness of technology treatment waste-water starch processing in Tan Hoa.

1. Quality of waste-water

Due to several waster-water by Tan Hoa village undergoes frequently qualitative changes, mainly are production situation, starch processing, inconstant animal husbandry and bad consciousness of community that caurse much waste water.

Diagram of waste-water processing system is following:



Effectiveness waste-water be processed

First, we conduct experiment on recycle of processed waste water to irrigate rice on small area after that experiment will be expanded on paddy fields.

Table 1. Some chemical targets in irrigative water in Tanhoa

Target	**Unit**	**Formula of experiment**			
		1	2	3	Control
pH		7,8-8,0	7,5	7,5-7,8	7,5-8,0

COD	mg/ml	128-226	52-225	45-137	60-97
BOD5	mg/ml	58-160	30-94	25-75	4-65
SS	mg/ml	-	-	-	48,6-235,3
Coliform	MNP/100ml	8.10^2	$>6.10^6$	$>1.10^5$	$3,9.10^3$

The data in table above show that quality of waste-water after treatment to reach with Vietnam standard 6773-1995.

Observing growth and rice productivity as formula we found that rice yield at pre- and post-harvest time showed differently when rice was irrigated by normal water and already treated waste water.

2. Grow, develop, rice plant yield in experiment formula

Observing growth, and rice productivity as formula we found that rice yield at pre and post-harvest time showed differently when rice was irrigated by normal and already treated waste-water.

3. Table 2. Growth and development of rice by different formulas

Target	**Formula**			
	1	2	3	Control
Rice seedling	3	3	3	3
Rice plant height When harvest (m)	0,995	0,99	0,975	0,98
Rice plants in 1 cluster	11	11	10	9
Ears in 1 cluster	7	7	7	6,5

The data in table 2 show that rice plants in formula 1 and 3 were irrigated by waste-water treatmented, average

heigh of plant is (0,99-0,995)m, higher than control (0,01-0,015)m, in formula 2, average heigh plant is 0,975 which approximate to control plant.

Table 3: Rice productivity experiment in different formulas

Formula	Average productivity (kg/m^2)		Average productivity (Ton/ha)	
	Wet	Dry	Wet	Dry
1	1,11	0,92± 0,05	11,1	9,2± 0,05
2	1,01	0,79± 0,02	10,1	7,9± 0,02
3	1,09	0,86± 0,23	10,9	8,6± 0,23
Control	1,08	0,83± 0,16	16,8	8,3± 0,16

Growth and development of rice plants irrigated by treated waste-water. Like rice-field test, in rice-field irrigated by treated waste-water rice plants grow very good. Such as, at point of time of pre-harvest, rice-plants were irrigated differently by normal water and treated waste-water.

Grow and develop of rice plants irrigative by processing waste water. Like rice-field test, rice-field irrigated by processing waste water rice plants growth very good. Such as, at point of time pre-harvest, rice-plant was irrigated by normal water and processing waste water differently.

Targets: Rice seeding, rice-plant height when harvest, rice plants in 1 cluster when harvest, ears in 1 cluster and average yield.

4. Grow, develop, rice plant yield in the field experimental irrigation

Table 4. Compare rice plant irrigate by normal water and treated waste water

Targets	Control		Experiment
Rice seedling	3		3-5
Rice plant height	0,98		0,98
Rice plants in 1 cluster	10		10
Rice ears in 1 cluster	6,5		7
Everage (T/ha)	Wet	-	8,1
	Dry	5,8	6,3

Estimate nutrition recover from irrigative water

Experimental areas in Tanhoa were irrigated three times by treated waste water mixed with normal water following formula as above

Total of irrigative water is 1800 m^3/ha, experimental area irrigated by treated waste water will be supplied with following nutrients:

Table 5. Nutrient N, P_2O_5, K_2O recover from irrigative water

Treatment	N (kg/ha)	P_2O_5 (kg/ha)	K_2O (kg/ha)	Equivalent into manure		
				Urea	Superphotsphate	Kalichloride
1	11,1	17,1	94,5	24,0	103,6	158,0
2	29	29,6	82,5	63,0	179,4	138,0
3	10,5	7,5	79,4	22,8	45,5	132,6
Control	2,5	0,80	28,2	5,5	4,8	47,0

Irrigating by treated waste water reduction environment around, suitable to rural natural condition (narrow land, crowded population in trade village ..., those areas often have many lakes and ponds). Management

of operative work is simple suitable to education level, manufacture conditions of regional people.

Effectiveness of recycle treated waste water t o irrigate rice.

Experiments showed that:

Rice plants irrigated with normal and treated waste water by 100%, 75% and 50% have equally a good results.

Irrigation three times with treated waste water, provided the fields with nutrients equivalent: (10,5-29,0) kg N/ha, (7,5-29,6) kg P_2O_5/ha, (79,4-95,5) kg K_2O/ha.

In Tanhoa, it was realized that when irrigated with treated waste water, rice plants grow better while pests growth was retarded. Rice productivity at formula reached (8,6-9,2) ton/ha higher than control about 4-11%. At formula 2 rice productivity reached 7,9 ton/ha approximate to control formula.

Results on treating technology and recycle of starch processing waste water for irrigation of crop plants as mentioned above promise well.

We hope that our results able to applied to other regions in Vietnam that have the same situation of waste water pollution as in Tanhoa contributing to reduction of environmental pollution and solving irrigative waste water.