

“Project Formulation Survey” under the
Governmental Commission on the Projects
for ODA Overseas Economic Cooperation
in FY2012

Summary Report

Vietnam

Project Formulation Survey for
Small Scale Drinking Water Treatment and Supply Project
Using New Natural Inorganic Flocculants (HOH)

March, 2013

Joint Venture between

HALVO., Ltd.

and

JAPAN PORT CONSULTANTS, LTD.

This report is a summary of a project formulation survey conducted by the contractor, under the Governmental Commission on the Project for ODA Overseas Economic Cooperation, commissioned by the Ministry of Foreign Affairs of Japan in Fiscal Year 2012. It does not necessarily represent the official views of the Ministry of Foreign Affairs of Japan.

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Introduction

The purpose of this study is to formulate small scale drinking water treatment and supply projects in rural areas where people has no access to public water supply system, in anticipation of subsequent Japanese ODA projects. The core technology applied to the water treatment is the special flocculation agent which has been innovated by HALVO Ltd., a Japanese small and medium enterprise. The effectiveness and efficiency of the treatment technology has been verified by the experiments conducted at actual sites in Ha Tinh and Vinh Long provinces in this study. With this result, it is confirmed that HALVO's technology would be used in formulation of future projects in supplying safe water in the two provinces.

I . Current Situation and Development Needs in the Related Sector in Vietnam

Vietnam economy has been growing rapidly with the average rate of 7.26% from 2000 to 2010. On the other hand, it faces challenges such as high inflation, large income gap among people or regions, and environmental damages caused by industrialization and urbanization. Therefore one of the important national goals of the socio-economic development is to increase the living standard of people in rural areas.

The government of Vietnam formulated the development master plan, namely Rural Socio-Economic Development Plan (1996-2000), which gave priority to supply clean water in rural area. However, due to the lack of investment budget, the plan has not been implemented as it was scheduled.

Currently, around 70% of rural population has no access to publicly treated water and is using water which does not meet the basic hygienic criteria and suffers from water related diseases.

II . Applicability of the SME's Products and Technologies, and Prospects for Future Business Development

(1) Core technology of the SME

The name of the flocculation agent produced by HALVO is KIYOMARU, and this agent has following excellent features:

- ① It is made of volcanic sand, inorganic substance, thus it is totally eco-friendly.
- ② It is possible to be produced with specific sand obtained in Vietnam.
- ③ It is an additive agent with very quick flocculation speed (about 5 times faster than popular products being used in Vietnam).

The KIYOMARU can be applied for treating various kinds of water such as industrial waste water, water contaminated with heavy metal, arsenic, or radioactivity.

Using this unique flocculation agent, HALVO invented a new innovative product, HOH, by mixing KIYOMARU with disinfectant agent. In this study, HOH was also used to produce drinkable water from raw water.

(2) Water treatment system

The proposed water treatment system is composed of 3 staged tanks and the HOH additive agent. Raw water is pumped up into the upper tank and the water is agitated together with HOH for flocculation and disinfect. The water without flocculated materials goes down to the second tank for filtration to get rid of micro stuff. Thus treated water is saved in the bottom tank.

These tanks can be manufactured in Vietnam and easily constructed or transferred.



(Treatment facility) HOH (KIYOMARU(flocculation):left, disinfectant: right)

Fig.1 Treatment facility and HOH

(3) Products and effects

HOH treatment has been verified to be effective for making drinkable water from raw water collected from the river, ground wells or rain servers. The water treated with this HOH in the experimental sites have met the QCVN01 (National Technical Regulation on Drinking Water Quality).

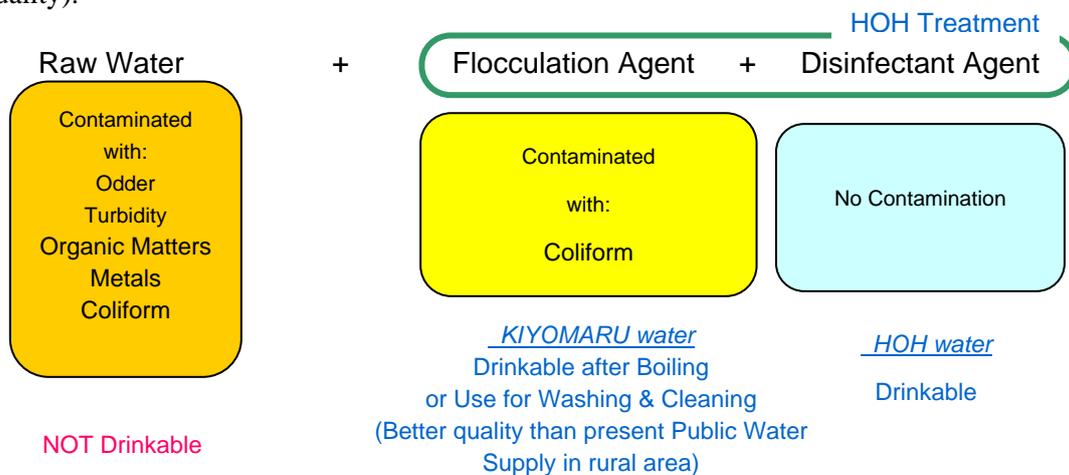


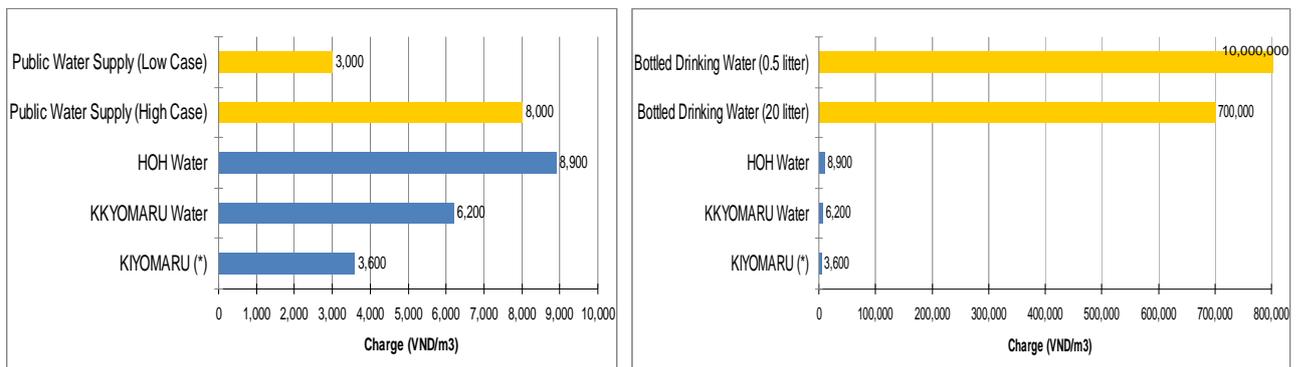
Fig.2 Proposed products (KIYOMARU water and HOH water)

The study confirmed that the two kinds of products will contribute to produce clean water. The first one is HOH to produce drinking water. We call the water treated with HOH “HOH water”. This HOH water does not include any materials which do harm for human health. The second one is KIYOMARU to produce water for daily use. KIYOMARU flocculates almost all suspended particles and get rid of them except for coliforms. Thus treated water with KIYOMARU can be used for washing or cleaning, even though it should be boiled for drinking. Therefore the treated water by KIYOMARU is the second product, which we call “KIYOMARU water”.

III . Expected Development Impact on Business Development of the Proposing SME’s in Vietnam through Proposed ODA Projects

(1) Treatment cost and market price of drinkable water

The costs for manufacturing HOH water and KIYOMARU water are affordable for users in rural area of the provinces, Han Tinh and Vinh Long. KIYOMARU water cost falls in the range of regulated public water charges. Since the quality of KIYOMARU water is confirmed better than public water currently provided at the water stations in rural area, the cost comparison between KIYOMARU water and regulated public water is deemed to be reasonable. As for HOH water, the study compared its cost with the price of mineral water bottles and large water bottles for drinking water servers, and found that the cost of HOH water is much lower than the prices of these water products in the current market. The public facilities such as schools or hospitals now regularly purchase the 20L drinking bottle and use sparingly for the students or staffs. The cost of HOH water as directly drinkable water is very attractive to these facilities.



Note (*): Produced water at an existing public water supply station using KIYOMARU instead of the flocculation agent currently being used.

Fig.3 Treatment cost (HOH water, KIYOMARU water) and current water prices

(2) Improvement needs category

Considering the current situation of water treatment in the rural area, KIYOMARU water and HOH water are applicable for the following three types of water needs:

① KIYOMARU:

As new flocculation agent in place of currently used in the water station. It brings better quality water and sometimes makes their capacity increase due to the high flocculation speed.

② KIYOMARU water:

As domestic water for rural people who do not have access to publically treated water. It increases the people's accessibility to clean water in rural area.

③ HOH water:

As drinking water for public facilities, isolated village, heavily contaminated sites or disaster sites. In these area, the needs for HOH water is very high because the water is obtained at much lower cost than market bottled water and provided very easily corresponding to emergent necessity for drinkable water.

KIYOMARU	⇒ Quality improvement and Capacity Increase for water station
KIYOAMRU water	⇒ Increase of accessibility to publically treated water in rural area
HOH water	⇒ High needs for economic or emergent needs for drinkable water

Current Treatment System		Residential Area	Public Facilities	
			Schools	Hospitals
Urban water system				
Rural supply	Water station	KIYOMARU	HOH water	HOH water
	Individual treatment	KIYOAMRU water		
	No treatment	KIYOAMRU water		
Isolated, heavily polluted, disaster area			HOH water	

Fig.4 Needs category for KIYOMARU related products

(3) Treatment demand

It is probable that the treatment technology proposed in this study will be applied at all sites regardless of qualities or kinds of raw water since the flocculation effect is strong. Then potential demand for this treatment is expected to be high in the whole area of provinces.

1) Treatment demand in Ha Tinh province

① KIYOMARU water in the rural area

Around 1,058 thousand residents (211 thousand households), who have no access to public water system (urban tap water, water station) in Ha Tinh province rural area are expected to use this KIYOMARU water. The treated and supplied volume is 63,500m³/day and KIYOMARU consumed is 19.0 t/day.

② HOH water at public facilities

Around 247,000 students at 776 schools and 7,543 staff and patients at 483 hospitals in Ha Tinh province are expected to use this HOH water. The treated and supplied volume for both facilities is 384 m³/day and HOH consumed is 0.227 t/day.

2) Treatment demand in Vinh Long province

① KIYOMARU water in the rural

Around 761 thousand residents (152 thousand households), who have no access to public water system (urban tap water, water station) in Vinh Long province rural area are expected to use this KIYOMARU water. The treated and supplied volume is 46,650m³/day and KIYOMARU consumed is 14.0 t/day.

② HOH water at public facilities

Around 165,000 students at 361 schools and 4,104 staff and patients at 117 hospitals in Ha Tinh province are expected to use this HOH water. The treated and supplied volume for both facilities is 249 m³/day and HOH consumed is 0.156 t/day.

Table 1 Demand estimation for KIYOMARU related treatment

Improvement		Demand Volume				
		Beneficiaries		Treatment Volume (m ³ /day)	HOH (KIYOMARU) consumption (m ³ /day)	
KIYOMARU (agent)	Alternative to current treatment	Residents	Hatinh	26,000 households 130,000 persons	56 Water stations 22,800	14.4 t (KIYOMARU)
			VinhLong	58,279 households 285,665 persons	106 Water stations 22,800	
KIYOMARU wa	Supply of domestic water (No access area to public treatment water)	Residents	Hatinh	211,671 households 1,058,355 persons	Domestic water 63,501	33.0 t (KIYOMARU)
			VinhLong	152,167 households 760,835 persons	Domestic water 46,650	
HOH water	Supply of Drinking water	Schools	Hatinh	776 schools 246,890 persons	373 (0.47/school)	0.37 t (HOH)
			VinhLong	361 schools 165,149 persons	248 (0.68/school)	
		Hospitals	Hatinh	483 hospitals 7,543 persons	11.3 (0.02m ³ /hospital)	0.013 t (HOH)
			VinhLong	117 hospitals 4,104 persons	10.8 (0.09m ³ /hospital)	

IV. Proposals for Formulating ODA Projects

Projects proposed to relevant organizations in both provinces are summarized in the Table 2. These are unit projects from which provinces will choose the desirable units considering their priority on sites or facilities.

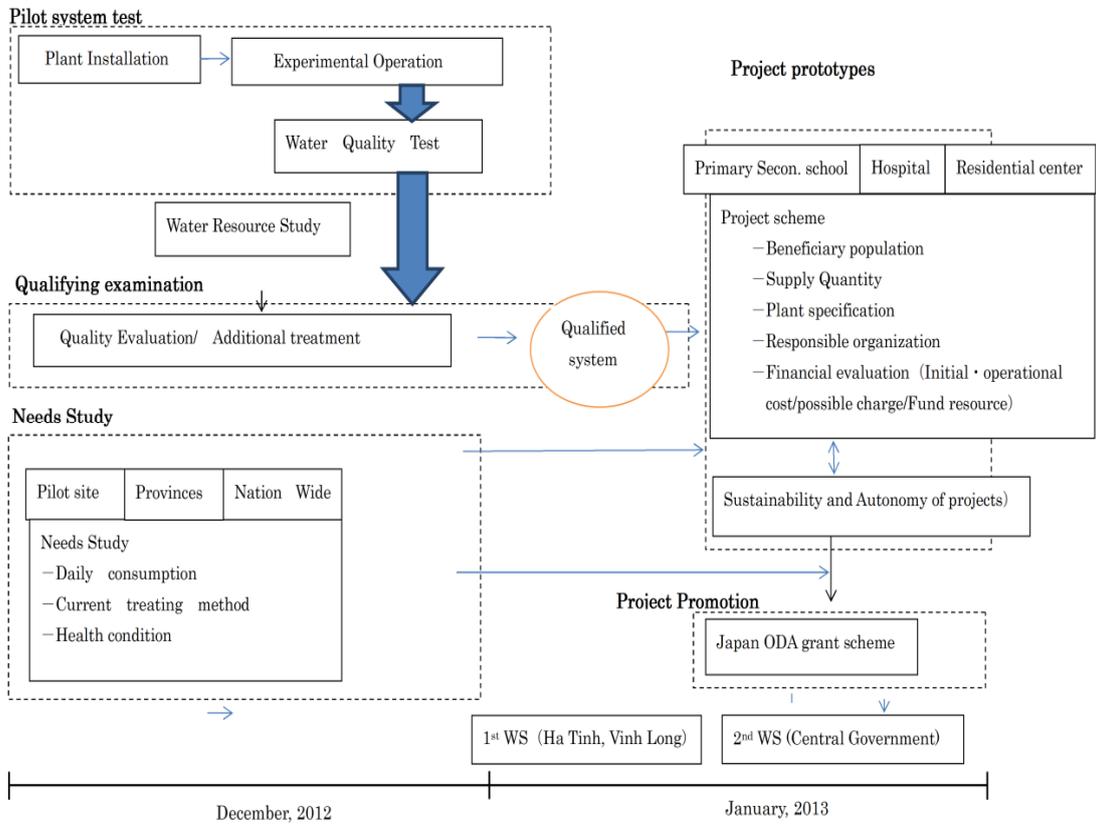
In every unit project, the treatment equipment is constructed and operated as an water distribution center where users bring back home or consume directly. Each organization itself takes care of daily operation. The treatment volume and beneficiaries are based on the number of the people who come to the center and use these treated water. Initial investment is done by provincial governments or organizations with their public budget and users are charged for their use.

These project unit schemes are generally agreed by the members participated in the work shop held in both Ha Tinh and Vinh Long provinces, with some adjustments which they asked to their requirements.

Table 2 Summary of proposed projects

Beneficiary	Commune	Primary/Secondary School	Hospital
Supply System	Center>Vicinal Resident	Center>Student	Center>Staff
Supply Volume (m3/day)	30	0.75	0.23
Water Use (m3/day)	Domestic Use	0.75:Drinking 9.25: Domestic Use	0.09:Drinking 9.91: Domestic Use
Population Supplied	500 person (100 household)	500 person (students)	150 person (staff, patients)
Supplier	Province	School	Hospital
Operator	Resident Leader	School Master	Hospital Staff
Cost Payer (Installation)	72 Mil. VND by Province	75 Mil. VND by School	75 Mil. VND by Hospital
Cost Payer (Operation)	22.3 Mil. VND/year by Commune	School users	Hospital users
Possible ODA Scheme	Grant (Installation Cost and Operation Training)	Grant (Installation Cost and Operation Training)	Grant (Installation Cost and Operation raining)
Potential Site	30 sites in disaster/ contaminated area	30 sites in disaster/contaminated area	30 sites in disaster/contaminated area

Attachment: Outline of the Survey



Project Formulation Survey

Viet Nam, Project Formulation Survey for Small Scale Drinking Water Treatment and Supply Project Using New Natural Inorganic Flocculants (HOH)

SMEs and Counterpart Organization

- Name of SME : HALVO., Ltd.
- Location of SME : 11675, Kaseda Uchiyamada, Minanisatsuma-shi, Kagoshima, 897-0004, JAPAN
- Survey Site ▪ Counterpart Organization :

Concerned Development Issues

- Overcome of negative side effects of economic growth (Rapid Inflation, Income gap, Environmental damage)
- Raise of living standard in local area
- Sufficient supply of clean water in rural area

Products and Technologies of SMEs

- KIYOMARU
- KIYOMARU water
- H•O•H water

Contaminated with:
~~Odor~~
~~Turbidity~~
~~Organic Matters~~
~~Metals~~
~~Coliform~~
 etc.

Raw water
 NOT Drinkable

Contaminated with:
~~Odor~~
~~Turbidity~~
~~Organic Matters~~
~~Metals~~
~~Coliform~~
 etc.

KIYOMARU water
 Domestic water
 Drinkable after Boiling

No Contamination

HOH water
 Drinkable

Proposed ODA Projects and Expected Impact

- Grass-roots grant aid for the water treatment equipment and technical transfer for its operation
- Potential Demand for the treated water in Hatinh province and Ving Long province [Rural residents : 1,818 thousand people(364 thousand households), school:412 thousand students(1,137schools), hospitals 12 thousand staff and patients (600 schools)]
- ODA projects [Set up of water distribution center with the KIYPMARU treatment in villages, schools or hospitals in rural area]

Future Business Development of SMEs

- Domestic (Drinking) water treatment ⇒ Industrial wasted water or urban sewage disposal ⇒Purification of public water space (rivers, lakes, sea)

