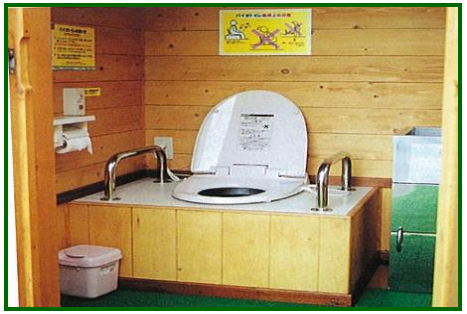
Improving water environment by using distributed waste water treatment system without collecting and mixing stage at World heritage Ha Long Bay










●● February 2014

Chodai Co., Ltd. **Seiwa Denko Co., Ltd.**

Flow of Presentation

Purpose of this Survey

Project Outline

Feasibility of the Realization of this Project

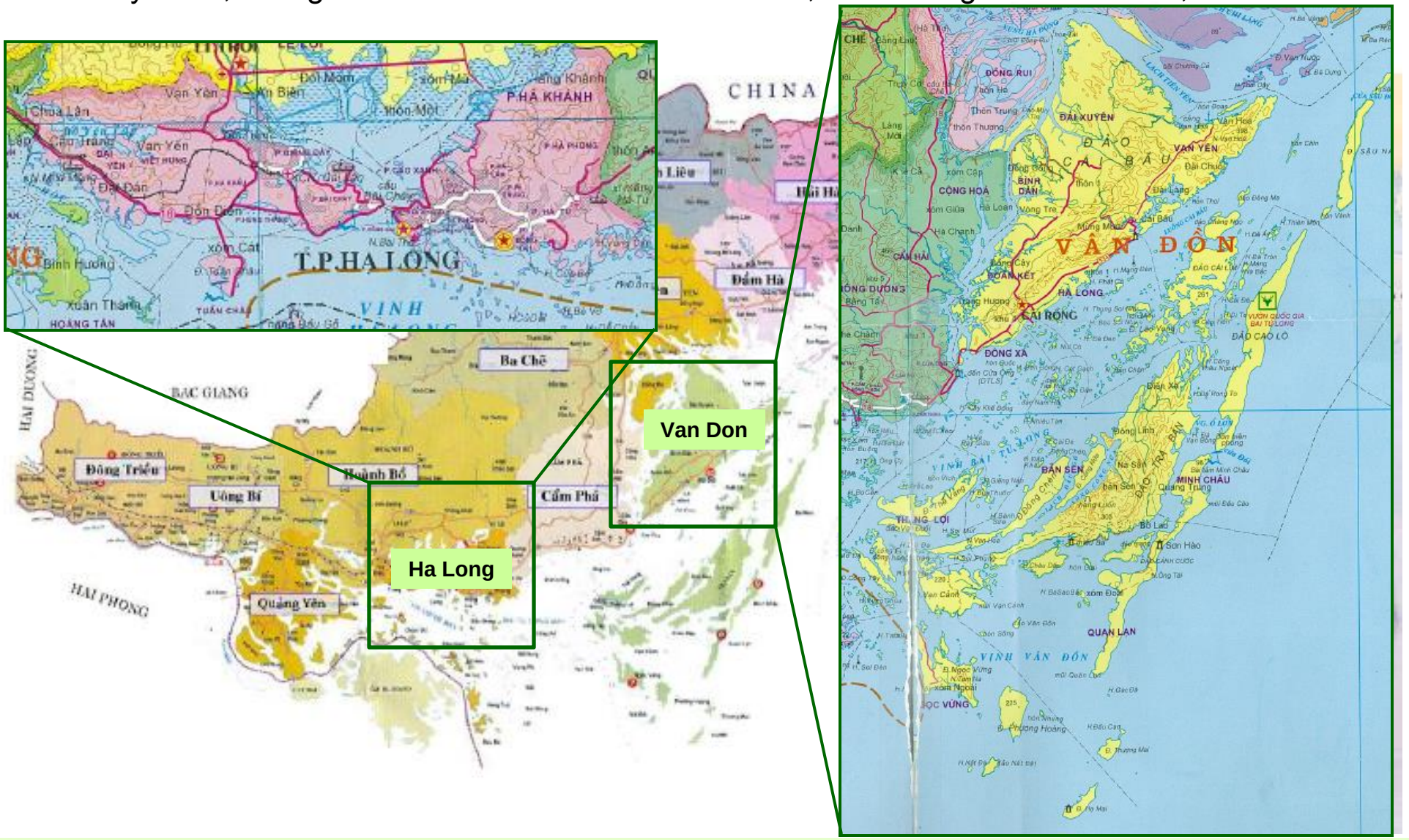
Future Progress

1. Project Outline
   – Background & Necessity for Project
2. Outline of Applicable Products & Technology
3. Survey Details & Results
   – Survey Policy, Survey Items and Survey System / Investigation into Becoming an ODA Project / Investigation into Becoming a Private Project / Results of Investigation Activities into Local Adaptation
4. Effects & Influence of Implementing the Project
5. Future Issues
6. Implementation Schedule

CHODAI CO.,LTD.
CONSULTING ENGINEERS & PLANNERS

Purpose of this Survey

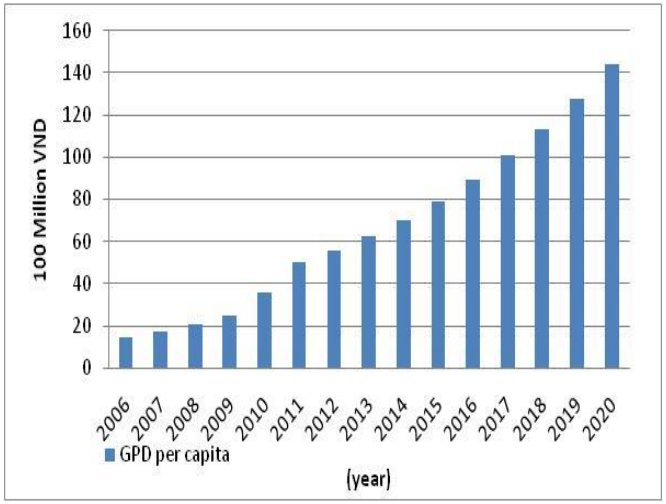
This survey was an investigation into the potential for the introduction of a “decentralized wastewater treatment system”, taking the local environment into account, into Quang Ninh Province, Vietnam.



1.1 Background & Necessity for Project —The Economic Situation in Quang Ninh Province

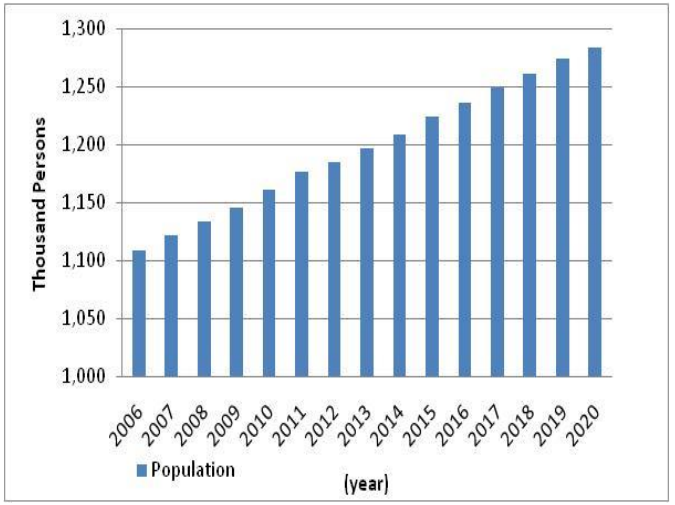
- The GDP growth rate is estimated to be 12.7% per annum between 2012-2020, **indicating that stable financial growth is likely to continue.**
- Quang Ninh Province already has 89 Foreign Direct Investment (FDI) projects, and registered capital has reached 3.75 billion USD. Total investment has reached 804 million USD, marking 21% of total investments. It can therefore be seen that the province is particularly proactive when it comes to attracting foreign companies.
- The population is approximately 11,620,000 people (estimated figures for 2010), and is estimated to increase by approx. 1.01% per year from 2012 onward ("Socio-economic development master plan up to 2020 and vision to 2030"). Population composition is a pyramid, with more people in the younger generations, and will see a population bonus period over the next 20 years, **indicating a long term increase in the production age population.**

GDP Growth Rate Transition (2005-2020)



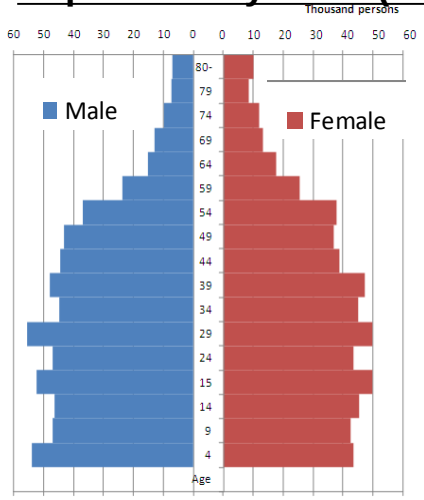
Ref: Created based on the Statistical Yearbook of Quang Ninh
Note: Confirmed values to 2012, estimations from 2013 onward

Population Transition (2005-2020)



Ref: Created based on the Statistical Yearbook of Quang Ninh
Note: Confirmed values to 2012, estimations from 2013 onward

Population Pyramid (2010)



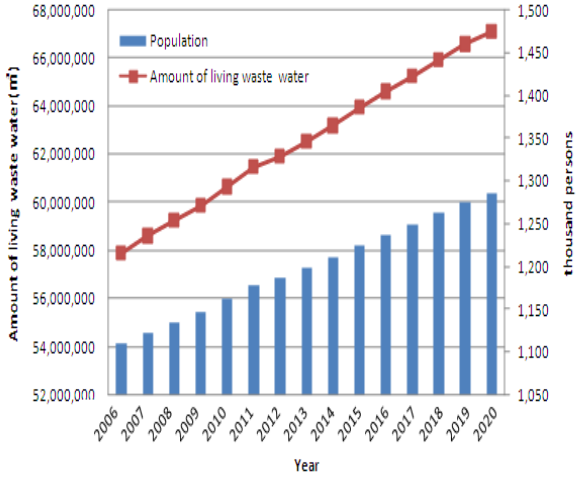
Ref: Created based on the Statistical Yearbook of Quang Ninh
Note: Confirmed values to 2010

Against a backdrop of financial growth and increasing population, the volume of domestic wastewater from each household is also predicted to increase annually

1.1 Background & Necessity For Project —Processing of Domestic Wastewater in Quang Ninh Province

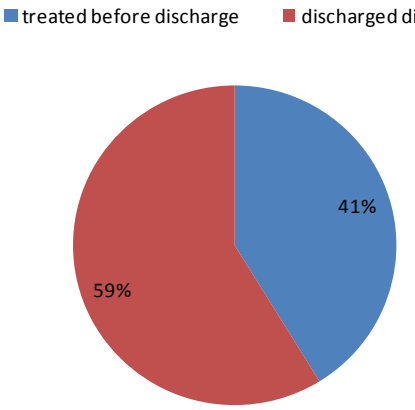
- Drainage Planning and Sewage Treatment in Quang Ninh province by the year 2020 with a vision to 2030 show that: The amount of sewage generated in 2012 is expected by Ha Long city at about 36,640 m3/day.
- In the area of Ha Long city, there are currently 5 urban sewage treatment stations with a total capacity of 15,100 m3/day.night (2 stations invested by the state, 3 ones invested by the investment businesses).
- Based on the amount of sewage generated in Ha Long city, we found that only about 41% of urban sewage of Ha Long city is treated before discharge and sewage is discharged directly about 21,540 m3/day into public water sources.

Transition in Population and Volume of Domestic Wastewater (2005-2020)



Ref: Created based on the Statistical Yearbook of Quang Ninh
Note: Confirmed values to 2012, estimations from 2013 onward, domestic wastewater is estimated on 143L/person/day ("Urban waste water management and septic tank's role: a case sturdy in Hanoi")

Processing of Domestic Wastewater in Ha Long City (2012)



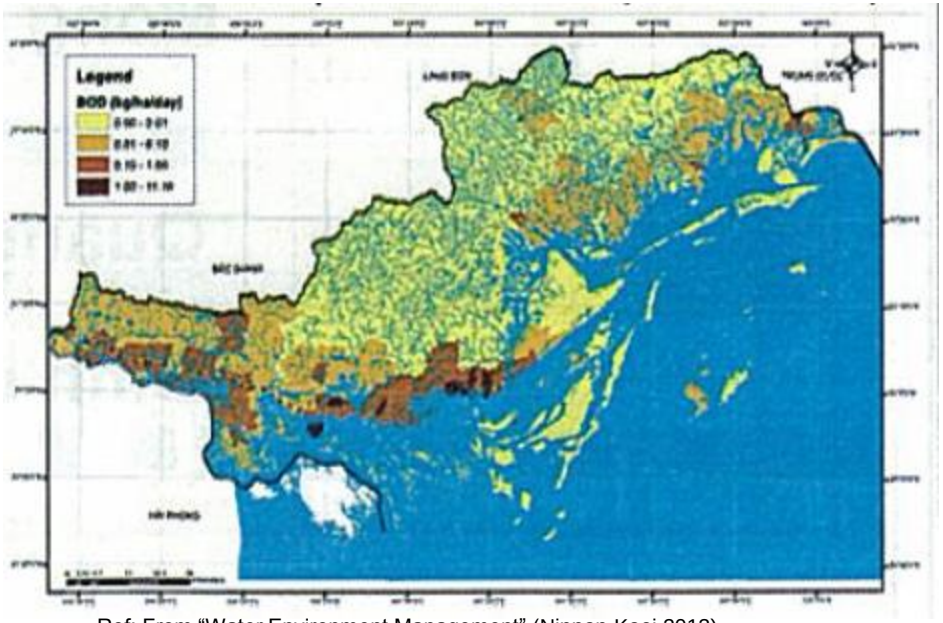
Ref: Created based on the Statistical Yearbook of Quang Ninh
Note: From Quang Ninh Province Department of Natural Resource and Environment materials. "Treated" here indicates primary processing.

New infrastructure is required in order to handle the increase in domestic wastewater

1.1 Background & Necessity for Project —Necessity for the Project

- Ha Long Bay, listed as World Heritage sites by UNESCO in 1994, has peculiar landscape like many small islands and oddly-shaped rock outcroppings. It is major tourist spot in Vietnam.
- On the other hand, drastic development in Ha Long Bay area makes apparent environmental destruction like water contamination problem and environmental degradation.
- There are 600 tourist boats in Ha Long Bay and many floating people live there but not they don't have appropriate treatment system about living waste water. As a result, it caused serious water pollution.
- Because of changing the way of land use with drastic development, it causes biomass disappearance increasing carbon dioxide output. There is an urgent need to repairing land.

Estimated pollution load (BOD 2011)



Ref: From "Water Environment Management" (Nippon Koei 2013)

Selection of Priority Area in Urban Waste water Treatment

Priority Level	City/ District
Ⅰ	Ha Long city
Ⅱ	Mong Cai city, Cam Pha city, Uong Bi city, Van Don district
Ⅲ	Quang Yen district, Dong Trieu District
Ⅳ	Binh Lieu, Tien Yen, Dam H, Hai Ha, Ba Che, Hoang Bo, Co To

Ref: From "Water Environment Management" (Nippon Koei 2013)

In order to improve public waters, and their safety, there is a requirement to introduce a circulatory water environment improvement system.

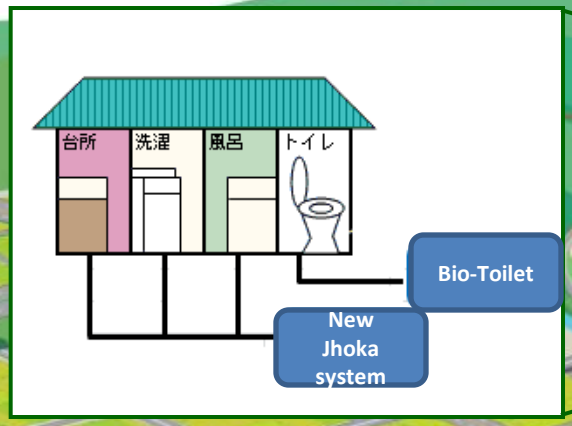
1.2 Location

Survey Area

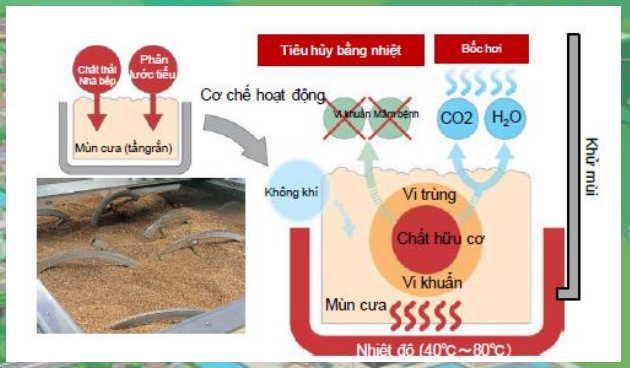
1.3 Project Outline

Aims Locations	Improving the water environment by introducing Japanese advanced technology Target Area: Around Ha Long Bay area(Household/Public Facility/Tourist Spot/Tourist Boat)
Details	Aim: Early improvement of the water environment by using distributed waste water treatment system without collecting and mixing stage
Technology	■ Introduction to around Ha Long Bay area ■ Promotion of fertilizer and energy production from used residues

Adapt safe and reliable waste water treatment system in use in Japan to the environment and culture of Vietnam

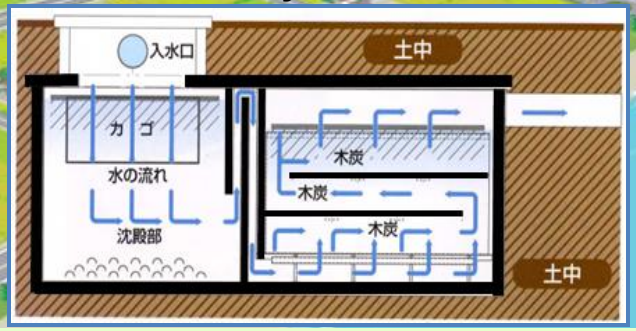


<Bio-Toilet>



<Product & Technological Characteristics>
The tank is packed with material such as sawdust. Waste matter is mixed into this sawdust and then stirred while being heated by an electric heater, activating aerobic bacteria and promoting breakdown of the waste and composting. A reusable compost is produced at the end of the process.

<New Jhoka System>

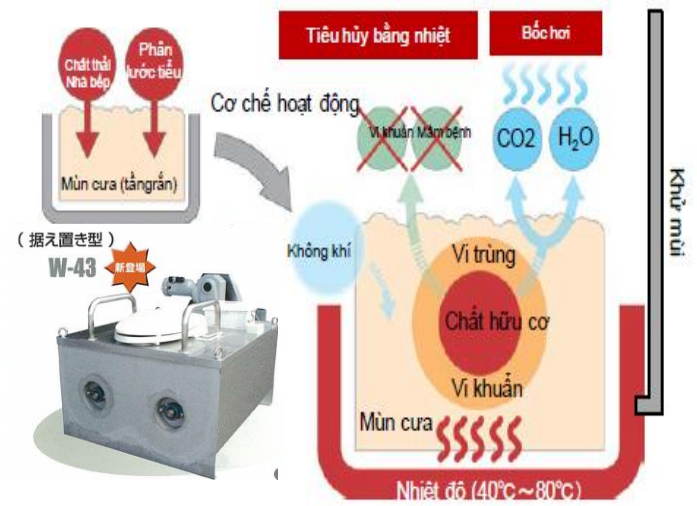


<Product & Technological Characteristics>
The new cleaning system involves a settling tank and five filter tanks connected together. The settling tank removes solid matter, while the charcoal, gravel and small stones built into the filter tanks then clean the dirty water. As “raw sewage” and “domestic non-sewage waste water” are treated separately, no raw sewage ever enters the new cleaning system and so measures to remove Escherichia coli are not required. The nitrates and phosphates created by raw sewage are also processed by the bio-toilet, so no special measures to remove them are required either, and the BOD can be reduced to below 10mg/ℓ.

2. Outline of Applicable Products & Technology —Bio-Toilets

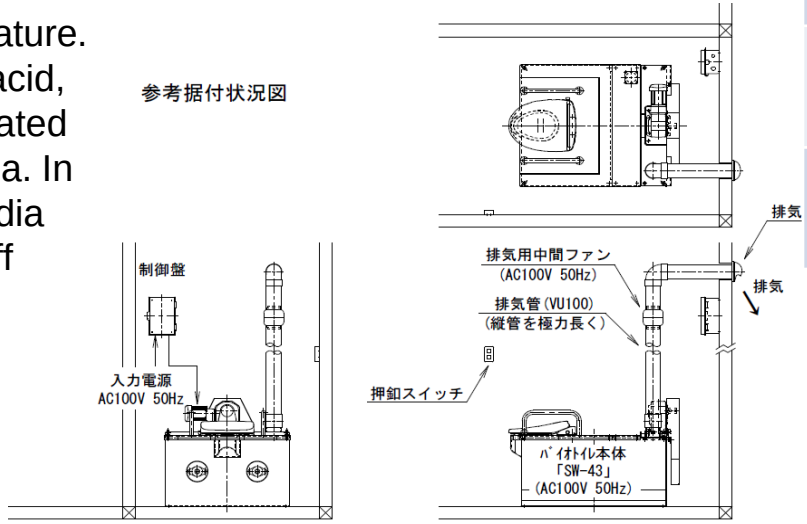
- Human waste is comprised of 90% water. A bio-toilet uses sawdust to absorb this water, which is then heated, mixed via a screw, and finally evaporated off.
- The water content is evaporated away without producing any smell at all. The remaining 10% of solid matter undergoes biodegradation.
- This particular bio-toilet is capable of breaking waste down into water and carbon dioxide without the use of any special bacteria, simply making use of the enteric bacteria found in the waste and microorganisms naturally occurring in nature.
- The mineral elements (Na, phosphoric acid, kalium etc.) in the waste are not evaporated or broken down, and remain in the media. In addition, the sawdust that forms the media itself is gradually broken down, giving off heat as it is broken mainly into CO_2 and H_2O.

Bio-Toilet Diagram



Ref: Created by Chodai

参考据付状況図



Ref: Created by Seiwa Denko

SW-43 Specifications

Item	Value
Width	960mm
Depth	1,212mm
Seat Height	557mm
Weight	225kg
Power	AC 200V
Heater	25Wx16
Motor	200W
Sawdust Volume	0.43㎥
Uses	Approx. 80-100 times

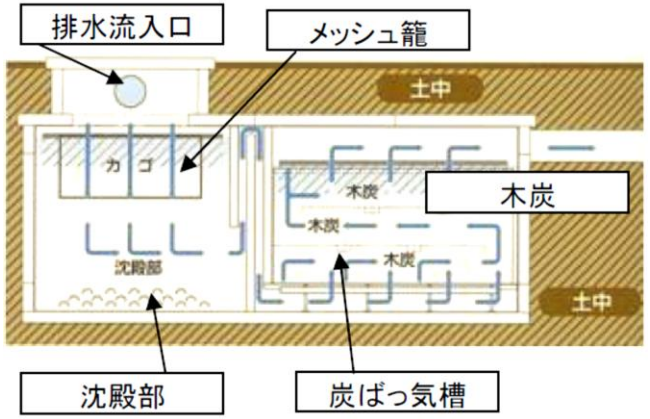
Ref: Seiwa Denko Pamphlet
Note) The product used in the investigation activities into adaptation this time

2. Outline of Applicable Products & Technology —New Jhoka System

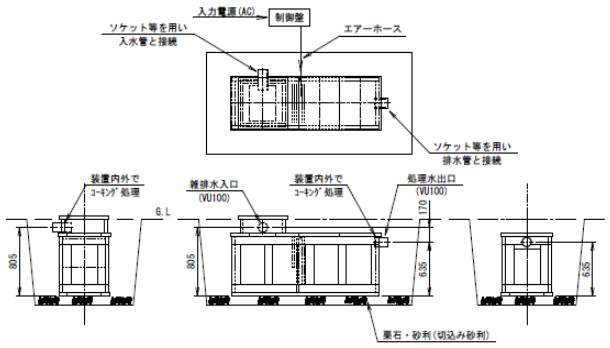
- The new purification system as a device that treats a mixture of standard household waste water, not including toilet waste.
- The system uses the following two types of processing tanks, each functioning differently, in order to purify the water.
  ①Separation of solids and liquids in an anaerobic tank
  - Collects garbage, residual food etc.
  - Precipitation of all residual particles

  ② Aeration tank
  -Absorption using charcoal
- Purification via biodegradation through the use of a biofilm over charcoal is a purification technology focused on the treatment of household waste (domestic waste) that does not include toilet waste. It relies on physicochemical purification action, through the principles of separation of solids and liquids via precipitation and of absorption by charcoal, and organic purification action, through the use of an organic membrane being applied to the charcoal.
- It is characterized by design features intended to keep the water in contact with the charcoal for as long as possible, including use of an upflow water channel and the use of an aeration process across the entire channel in order to provide the oxygen required for the organic processes. The combined treatment of these actions allows organic pollution such as BOD and nutritive salts such as T-N and T-P to be purified simultaneously.

New Jhoka System Diagram



Ref: Created by Chodai



Ref: Created by Seiwa Denko

SG-500 Specifications

Item	Value
Capacity	0.5m^3
Filter	3 cisterns
Power	AC 100V
Air Pump	7W 1 unit
Control Panel	3W or less
Width	710mm
Length	1930mm
Height	940mm
Processing Capacity	5-8 person household

Ref: Seiwa Denko Pamphlet
Note) The product used in the investigation activities into adaptation this time

3. Survey Details & Resut –Implementation Policy, Survey Items and Survey structure

① In regard to the Vietnamese government, Quảng Ninh Province and Ha Long City, analyse regulations relating to the environment and society, the implementation processes, regulations placed on operation of business etc., and remove all risks to the project.

- In Vietnam, it can be considered that, in order to further progress environmental improvements, there is a requirement for a project that can be taken as a national model to be advanced and realized, with the suitability of each process including operation considered as the environmental and social systems are improved, and the results of the project reflected.
- This project will survey and analyze the systems, regulations, methods and organizations within Vietnam from the following perspectives, and make clear the restrictions in place at the time of implementing the project.
  - Confirm compliance with laws, restrictions from related sectors etc., and if any issue do arise work with the Vietnamese government, Quảng Ninh Province, Ha Long City and the Japanese government in order to resolve them.
  - Investigate the required flow so that requests for permission, acquisitions, contracting etc. all proceed smoothly.

② Investigate the creation and maintenance of a divided waste water processing system (a bio-toilet and a new cleaning system) that is acceptable both environmentally and socially.

- The implementation of the pilot study will reveal the requirements for any changes to system specifications, and what changes should be made.
- In regard to the environment in the region, implement widespread collection of information, local surveys and inquires in order to avoid or reduce the effects on human health and safety through the water (underground water, surface water) and animal life, and effects on the natural environment.
- Confirm compliance with laws, restrictions from related sectors etc., and if any issue do arise work with the Vietnamese government, Quảng Ninh Province, Ha Long City and the Japanese government in order to resolve them.

③ Investigate effective usage of the remnants produced by the introduction of the new processing system.

- The introduction of a process to reuse the waste remnants created by the bio-toilets will aid in development into a circulatory society, and including this as an element of this project will contribute to the development of the region.

④ Analyze the business risks and make clear the burden for risks between the involved parties.

- It is vital that the risks related to the progress of this project, in terms of its realization and continuous operation, are investigated, and which party will be responsible for them determined.
- The burden for the risks should be divided up between the involved parties, and their responsibilities and responses made clear.
- A confirmation of compliance with Vietnamese laws and ordinances will be performed, and based on the burden of risk for this project the type of government support, upper limit, conditions and approval process etc. will be collated.

⑤ Create a financial model, and use an accounting analysis to create the most suitable financing structure.

- Perform an accounting and income analysis in order to determine whether the project is financially viable.
- When investigating the possibility of establishing the project, perform an analysis from the perspective of financial and investment organizations.
- Based on the results of the pilot study, implement discussions with affiliated organizations such as the Quang Ninh Provincial People's Committee toward the introduction of the system, and also implement a proposal for becoming an ODA project.

3.Survey Details & Result –Implementation Policy, Survey Items and Survey structure

Survey Item	Outline
Survey into existing infrastructure	State of implementation of infrastructure, survey of resources, meeting to explain the project to residents, surveys relating to operation and maintenance, effective usage survey.
Survey into environmental & social aspects	Evaluation of environmental effects, social and economic trends survey, investigation into effective environment education methods.
Survey into possibility for introduction of divided waste water processing system	Investigation into bio-toilet system, investigation into new cleaning system.
Analysis of business risks	Risk analysis and evaluation, investigation of alternative proposals.
Creation of a financial model	Target, market reception level, market scale, survey into potential for spread of applicable technology, project income simulation, investigation into acquisition of funding, financial analysis, investigation relating to insurance, analysis of examples of ODA projects in target fields in the target country, investigation of turning into an ODA project.
Pilot study	Investigation into the possible applications of the bio-toilet system, new cleaning system and compost. Furthermore, Meisei University will perform an evaluation of the compost and investigation into the divided waste water processing system, the Environmental Technology Research Institute will perform a water quality analysis and analysis of suitability of the microbes in the divided waste water processing system, the Agriculture and Environment Research Lab will perform an investigation into the compost production methods and possibilities for creating compost, and ENVITECH Co. will perform the placement, maintenance, adjustments, repairs and other sundry work on the bio-toilets and the new cleaning system. In the vicinity of Ha Long Bay (the Ha Long City new urban region or the Van Don region etc.), a section of seven standard homes will have a divided waste water processing system introduced to them, comprising a set of a bio-toilet and a new cleaning system (7 sets in total), which will prevent the release of unprocessed or insufficiently processed waste water back into the water system, such as rivers, which has been an unchecked problem up until now. The impact this will have on improving the water environment varies depending on the river and region itself, and can be hard to evaluate. Therefore, a special model flow region will be established, with concrete data collected and used to predict and evaluate the effects it will have on improving the water environment.

3.Survey Details & Result –Implementation Policy, Survey Items and Survey structure

[Japanese Research Organization]

Meisei Univerisity

School of Science and Engineering
Prof.Shuji Yoshizawa

[Japanese Research Organization]

Ocyanomizu University

Graduate School
Prof.Masahiro Otaki

[Japanese Government Organization]

Ministry of Foreign Affaires

JICA

[Vietnamese Government Organization]

Quang Ninh PPC

Department of Natural Resources and Environment

Ha Long city

Van Don District

- Investigation and evaluation of on-site suitability of products & technology from an academic standpoint.
- Investigation into alternatives,

- Offer advice concerning permits, and actually issue them
- Implement policy, regulation etc. for negotiations with residents etc. Act as guides during the FS.
- Provide information and materials required by the FS.

Seiwa Denko Co., Ltd

Chodai Co., Ltd.

- Overall advice on the project.

- All support required by the FS, such as gathering of information and materials locally
- Management Pilot Suryvey

[Vietnamese Research Organization]

Institute of Environmental Technology

Survey about the situation of living waste water

[Vietnamese Research Organization]

Institute for Agricultural Environment

Survey about the utilization of compost

[Vietnamese Corporation]

Envitech Company

Minh Truong Company

Installation work of Bio-Toilet and New Jhoka system

3.Survey Details & Results —Investigation into Becoming an ODA Project

Private Proposals for Spread & Proof Projects

—Verification project for the improvement of the water environment through the creation of a circulatory resources model in Quang Ninh Province.	
Recipients of Benefits	Directly, the region into which the decentralized wastewater treatment system is introduced. Indirectly, employees of the Quang Ninh Province government (300 people), schools (1,000 people) etc.
Current Situation and Issues	● Ha Long Bay, with it's countless bizarre rocks and illusory scenery, is a registered World Heritage site. As one of the most famous tourist destinations in the world, for the still developing nation of Vietnam it represents a piece of coastline that is a major resource for tourism. However, the increase wastewater from tourist ships and hotels in recent years, combined with the outflow into the sea of coal ash from the mines located close to Ha Long Bay, have created a clear decrease in the water quality of the bay. Ha Long Bay is also the site of four "floating villages," villages which are located literally on the water of the bay, and in which approximately 1,6000 people live. These people live almost their entire lives on the sea, and their garbage and wastewater are also contributing to the worsening of the water environment in the region. ● In addition, in the area around Ha Long Bay, rapid development is also ongoing, and the economic growth that accompanies this is intensifying issues relating to destruction of the environment, including pollution of the water and loss of the natural environment. All of the wastewater responsible for these issues is being discharged without any appropriate treatment, and this is leading to serious water pollution. While discussions are currently ongoing with the Ministry of Planning and Investment and other groups in order to introduce an underground sewerage system into Ha Long City, financial issues mean that there is still no timeframe for its realization. Furthermore, the wastewater treatment performed by the septic tanks used by each houseful is insufficient for purpose, with periodical maintenance not being performed, leading to a build up of dirt, and reduced or complete loss of functionality. ● Furthermore, though Vietnam is a nation based in agriculture, the use of human waste as fertilizer is almost unconsidered, and the country has a high reliance on chemical fertilizers. Excessive use of these chemical fertilizers is causing serious eutrophication and water pollution, in particular in agricultural villages.
Issues Made Clear by the Proposal Study	● As part of their measures of improve the ODA of Japan and to stimulate the economy, from 2012 the Ministry of Foreign Affairs of Japan has established this "Proposal Studies Conducted Using Official Development Assistance Overseas Economic Collaboration Project Commissions." Using this project scheme, Seiwa Denko implemented a "Proposal survey for improvement of the water environment in the World Heritage site of Ha Long Bay, by using a "decentralized wastewater treatment system" that does not collect waste, does not mix it, and keeps it separate," making use of bio-toilets and a new purification system. For two months, between December 2013 and January 2014, investigation activities into local adaptation were performed in Ha Long City in Quang Ninh Province, and in the Van Don region. Through these activities, it was almost completely confirmed that the use of a decentralized wastewater treatment system could make a massive contribution to improving the water quality in Ha Long Bay. ● However, this two month period was not long enough to acquire sufficient results to confirm the possibility of our main target, the potential establishment of a complete cycle (circulatory resources model) from "waste" -> "fertilizer" -> "grow plants" -> "eat them." ● In addition, as insufficient explanation and discussion concerning application and retail were provided to Quang Ninh Province governmental organizations and to the private sector, both of which have displayed considerable interest in the decentralized wastewater treatment system, there was not enough time to sufficiently raise awareness of the system.

3. Survey Details & Results —Investigation into Becoming an ODA Project

Highest Target	To obtain data that verifies improvement in water quality through use of a decentralized wastewater treatment system, while promoting the creation of a new “eco-sanitation” model through circulatory use of resources to the two communities that for the sites for this project.
Project Targets	● An improvement in the water environment and hygiene environment through the introduction of the products (bio-toilets and new purification system) to public facilities and multiple communities. ● To foster an awareness of hygiene among the local residents, through environmental education and awareness campaigns in schools and multiple communities. ● In order to further spread the decentralized wastewater treatment system, an approach that both creates a system and enhances technology locally would be the most effective. Therefore, in terms of creating the overall system, a foundation will be established in order to determine the goals, planning and system that will best allow for effective use of the decentralized wastewater treatment system, along with exposing the environmental risks it raises and providing measures against them. On the other hand, support for enhancement of technology will be implemented alongside local counterparts and plate steel factories, from the perspective of a sustained local spread of the technology, and involving the transfer to them of technologies and creation of specifications. ● Installation of the decentralized wastewater treatment system in the communities in the target sites, allowing for the appropriate treatment of wastewater, and securing access to safe water (particularly for drinking). ● Furthermore, 5-10 people at 1 site, so 10-20 for 2 sites, will receive training in maintenance and operation, enhancing their capabilities in this area. This will not only allow wastewater to be correctly treated, but also create maintenance personnel rooted in the local region, creating a more sustainable business model. ● In addition, confirming the potential of each technology proposed by the Proposal Survey (decentralized wastewater treatment technology, compost technology), will allow for the creation of a foundation for a circulatory model that organically links each technology together.
Expected Effects	● The introduction of a decentralized wastewater treatment system into Ha Long City and the Van Don region should verify the system’s improving effect upon the water and hygiene environments. This contribution to the resolution of the water environment issues in the target regions will create social understanding among the residents of the region. ● The decentralized wastewater treatment system contributing to the resolution of the water environment issues faced by local counterparts and others in the Quang Ninh Province will promote understanding among governmental bodies, such as the Quang Ninh Province Department of Natural Resource and Environment. ● Focused in Quang Ninh Province governmental staff, a number of engineers will be educated with the knowhow to operate and maintain the decentralized wastewater treatment system. ● Creation of usage standards, an operation manual etc. for the decentralized wastewater treatment system. ● Based upon demand for water and volume of wastewater, a more suitable decentralized wastewater treatment system model can be developed. Making the design and initial investment clearer will link to a more sustainable business model. ● Promoting compost agriculture will stimulate organic farming, not only creating value-added agricultural products but also creating a new stream of revenue for farmers.

3. Survey Details & Results —Investigation into Becoming an ODA Project

Period of Implementation

From October 2014 to March 2017 (30 months)

	Year	2014			2015								2016									2017		
	Month	10	11	12	1	2	3	4	…	…	…	12	1	2	3	4	5	…	…	…	12	1	2	3
Prepare for Verification Project		■	■	■																				
Verification Project Phase 1 ・Verification of the Decentralized Wastewater Treatment System					■	■	■	■	■	■	■	■												
Interim Evaluation													■											
Verification Project Phase 2 ・Verification of the Decentralized Wastewater Treatment System ・Verification of the Circulatory Resources Model														■	■	■	■	■	■	■	■	■		
Final Report																							■	■
Environmental Education / Awareness Campaign Phase 1			■	■	■	■	■	■	■	■	■	■												
Environmental Education / Awareness Campaign Phase 2														■	■	■	■	■	■	■	■	■		
Support Project for Creating System and Technological Enhancement Phase 1								■	■	■	■	■	■	■	■									
Support Project for Creating System and Technological Enhancement Phase 2																	■	■	■	■	■			
Invite to Japan															■									

Main Activities

① Verification Experiment for the Decentralized Wastewater Treatment System (Verification of improvement in water quality)

- Multiple decentralized wastewater treatment system units, modified to reflect the requirements highlighted by this survey and the wishes of local counterparts, will be introduced into Ha Long City and the Van Don region, and operate for 12 months from January 2015. Along with periodic inspections, and maintenance such as the changing of media, a verification project will be performed that includes the following activities.
- As model cases, units will be placed in public facilities (schools, docks) and in multiple communities. (Survey includes records of usage, operation costs, and satisfaction of users)
- An interim evaluation will be performed, with adjustments to the plan and improvements to the product made based on becoming more suited to the local environment.
- Under the above conditions, the verification project will proceed, and a suitability assessment be performed, including from business and economic perspectives.

② Implementation of Environmental Education & Raising Awareness Campaign

- The current reason for the lack of an awareness of hygiene lies in insufficient environmental education, based in environmental conservation. In order to resolve this, collaborations will be enacted with youth alliances, women's alliances, local medical associations and pediatricians associations etc., targeting the local residents, and implementing environmental education relating to the importance of improving the water and hygiene environments.
- Furthermore, an awareness seminar that includes a demonstration of the actual product will be held for governmental bodies (such as the Quang Ninh Province Department of Natural Resource and Environment), schools, and the general public, with the intent of promoting further understanding of the decentralized wastewater treatment system. Along with promoting the overall excellence of the system, this opportunity will be taken to perform an interview survey, including questions about intent to pay for a maintenance service.

③ Implementation of a Support Project for Creating System and Technological Enhancement

- A training program in Japan (training at the Ministry of the Environment etc. related to waste water treatment system management, training about city development by Asahikawa City, etc.)
- Creation of all required regulations, implementation of dispatch of specialists in areas such as use of the decentralized wastewater treatment system.
- With the goal of achieving on-site manufacturing, implementation of creation of prototype bio-toilets and new purification systems through technological guidance.

④ Verification of a Circulatory Resources Model

- In order to improve the water environment, lifestyle environment and hygiene environment through the spread of the decentralized wastewater treatment system, local resources will be used at each phase, including creation of the products themselves, their retail, management and promoting their spread. Furthermore, there is a requirement to create a circulatory resources model through the advancement of using the leftover media from the bio-toilets as a compost.

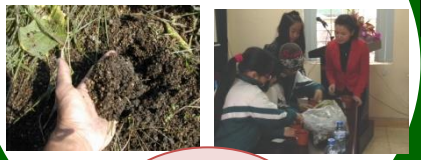
3. Survey Details & Results —Investigation into Becoming an ODA Project

Use of a Decentralized Wastewater Treatment System

Improvements in the water environment, lifestyle environment and hygiene environment

Product Development Phase
Awareness Promotion Phase
Retail Phase
Manufacturing Phase
Local Community
University Research Organization
NPO & NGO

Manufacturing Phase
Quality Control Phase
Retail Phase
Awareness Promotion Phase
Maintenance and Management Phase
NPO & NGO
Local Community



Outline of Value Chain Model

3. Survey Details & Results —Investigation into Becoming an ODA Project

Implementation System and Roles	① Japan Side ・ Seiwa Denko: Investigation into bio-toilet and new purification system technology. [Use of External Personnel] ・ CHODAI: Support for creation for system / support for invitations to Japan. ・ University Research Organization: Evaluation of decentralized wastewater treatment system / Evaluation of compost / Evaluation of secondary infections risks / Evaluation of circulatory resources model. ・ NPO: Environmental education activities. ② Vietnam Side ・ The People's Committee of Quang Ninh Province: Product approval. ・ Quang Ninh Province Department of Natural Resource and Environment: System creation / product evaluation.
Investment	Total of approx. 100 million yen ① Japan Side ・ Provision of bio-toilet and new purification system for verification purposes. ・ Creation of verification project plan and support for its implementation. ・ Provision of resources for promotion activities. ・ Provision of resources for training of personnel toward creation of system and enhancement of technology. ② Vietnam Side ・ Operational costs for the bio-toilet and new purification system.
Points of Concern	From the results of the investigation activities into adaptability, the following concerns remain in regard to the implementation of this project. ● There is insufficient basic data, such as the operational rate of sewerage treatment facilities in Quang Ninh Province. It would therefore be desirous for a baseline survey to be implemented in the target regions during the initial stages of the project. ● In accordance with becoming an ODA project, there is a need have a full understanding of current water resource development plans, and act with a constant awareness of the needs of local counterparts, also important for the project to take root as a sustainable business. Any issues that may arise during the implementation of this project must be made clear, and a stance of feedback and cooperation maintained with the Quang Ninh Province Department of Natural Resource and Environment. ● As maintenance and management are expected to be performed by multiple organizations and residents, smooth operation will only be achieved by making it clear where the responsibility for each party lies, and forming a system of collaboration between them.

3. Survey Details & Results —Investigation into Becoming an ODA Project

Environmental Education Activities

- When conducting educational activities in a developing country, it is important to deepen understanding of issues such as “population increase,” “issues with poverty” and “short-sighted development,” while also paying attention to the relationship with developed nations. Furthermore, rather than just implementing problem resolution based education, focused on nature such as water and the air, and then science, more rounded, fully-fledged education is required, bringing in elements of human development (in regard to the economy and development of society), with an awareness of social reform and the empowerment of individuals and groups.
- Therefore, the hygiene environment education activities that we will be implement this time will not stop as simply commercially based activities, with the intent of introducing bio-toilets and the new purification system, but will place the focus on “realization” and “improvement,” including an overall enhancement of the local resident’s awareness of hygiene. Furthermore, working in cooperation with the Quang Ninh Province Department of Natural Resource and Environment, the hygiene environment education activities that are currently under way are intended to continue beyond the end of the Proposal Survey, making use of the bio-toilet and new purification system. In order to implement these activities, Mr. Tastuma Ozawa has been sent to the Quang Ninh Province Department of Natural Resource and Environment from the Japan Overseas Cooperation Volunteers.

The results and understanding obtained from these continuing activities are as follows.
The implemented program can called revolutionary, based on three points. (1) It involved collaboration with a variety of stakeholders. (2) It involved debate, discussion and field surveys. (3) It involved investigation into a foundation for hygiene environmental policy, working alongside the residents of the region while also bringing in the Quang Ninh Province Department of Natural Resource and Environment. In order to get the local residents involved, not only was a relationship of trust forged by allowing representatives from each community to exchange their opinions, but meetings prior to the project taking place sought to aid the local residents in understanding the need for a hygiene environment policy. In regard to language, both English and Vietnamese were used, with great pains taken to allow communication in the different languages to proceed smoothly. Having a variety of stakeholders involved in the activities also created opportunities for them to understand the position each other is in, as well as sharing terminology, ideas and their vision for the future, and aiding in the networking. This program needs to continue to be implemented, so that everything learnt from it can be fed back into all actions taken onsite.

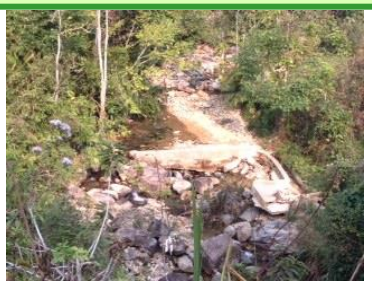
Technical Cooperation at the Grass-roots Level Project

Project Title	Project to Raise Awareness of Hygiene in Ha Long Bay
Counterparts	Residents: Local community representatives (including natives), NGO/NPO, Medical Cooperative etc.
Goal	Establishment of a private participation resources circulation system.
Targets	Aim to provide suitable processing of waste water and an improvement in the hygiene environment, while aiming for the establishment and spread of a divided waste water processing system.
Proposed Project	・Environmental awareness activities through private participation in water quality monitoring. ・Development of leaders for environmental activities. ・Effective use of the remnants generated by bio-toilets (use in forestry or agriculture)
Project Length	3 years

3. Survey Details & Results —Investigation into Becoming an ODA Project

Survey into Potential for Realization of Ecotourism

- While bio-toilets are extremely effective even when used alone, creating a proposal centered entirely around them is also very difficult. Taking this point on board, discussions were held with the Quang Ninh Province Department of Natural Resource and Environment on how best to proceed with spreading their usage.
- According to the Quang Ninh Province Department of Natural Resource and Environment, approximately half of the minority groups in Vietnam live in Quang Ninh Province. While the development of tourism based around ocean resources such as Ha Long Bay is proceeding apace, development of tourism relating to land resources remains insufficient. Therefore, Quang Ninh Province seeks to advance development of both land and ocean based tourism, in particular focusing on their minority groups.
- Many of the minority groups living in Quang Ninh Province live in the mesomountainous regions, where basic infrastructure is sadly lacking. Therefore, while a large number of development projects have been approved in Quang Ninh Province, they are not going ahead due to lack of finances. How much investment can be brought in from overseas is therefore becoming a major issue.
- Taking these points on board, we have set our sights on adding an element of the “environment” to “tourism”; the concept of “ecotourism.” The originator of ecotourism in Japan is Masanori Shintani (Ecologic), and though discussions with him, a Potential Study was investigated. Furthermore, through discussions with the Quang Ninh Province Department of Natural Resource and Environment, a survey of intent to develop ecotourism was conducted in the north-east, Tien Yen region of Quang Ninh Province.

- A thorough and comprehensive survey was implemented, as described above, into the natural resources of the Tien Yen region, and the potential that might be found in the lifestyle of the people living there. The targets for the natural tourism resources survey were divided up unto six categories, and the survey implemented accordingly. The categories were (1) Natural resources (plants / animals special to the region, special terrain or geology, attractive scenery), (2) Cultural resources (traditional culture, religion, unique customs, regional legends), (3) Historical resources (historical episodes, manufacturing constructions, cultural assets), (4) Industrial resources (products / production methods unique to the region, cultural assets), (5) Activity resources (places uses for outside activities), (6) Famous people (people possessed of traditional skills or arts unique to the region). Furthermore, in order to sustain the operation of eco-tours, there was the requirement to fully take into account the marketability of the target region. The marketability of the target region has to be understood from the perspective of volume, and the perspective of quality. This survey, due to restrictions of time, was only able to evaluate the quality of the market.
- Through discussion with the government in the Tien Yen region, it was confirmed that they have the desire to develop ecotourism in the region, and it was also confirmed overall that this region has a lot of potential for ecotourism, including meeting almost all of the above survey categories, and interviews with the local residents revealing them to be keen to obtain new sources of revenue through the use of their regional resources in tourism.

**Development of “Ecotourism”
making use of “Technical Cooperation
at the Grass-roots Level Project”
↓
Realization of implementation of ecotourism
and enhancement of environmental conservation
based lifestyle in which regional residents
are the key element**

3. Survey Details & Results —Investigation into Becoming a Private Project

Elements of the Divided Waste Water Treatment Project

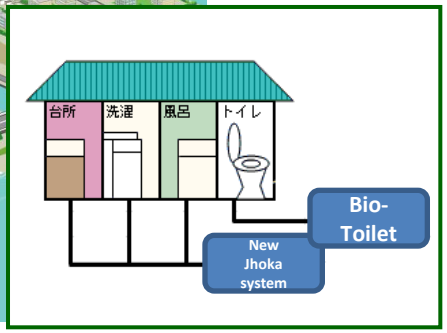
Concept Making

Master Plan

Cultivation of Human Resources

Construction

Maintenance & Management



In each element there exist many fields in which the strengths of Japanese company's can be used

Strengths of Japanese Companies

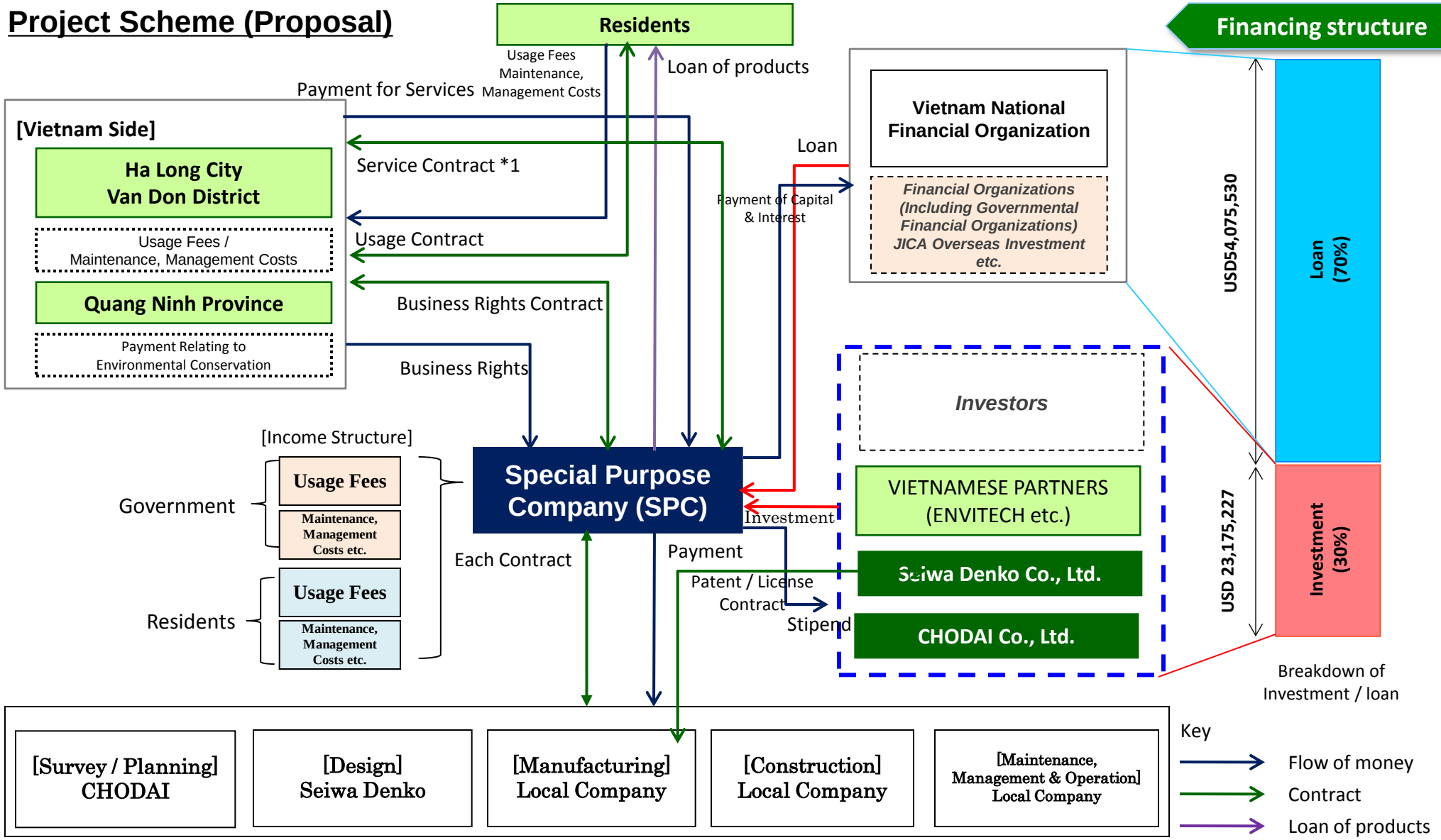
Technical Competitiveness	・Improved efficiency ・High specs ・Highly reliable ・Longer life ・Precise delivery date management
Price Competitiveness	・Excellent cost performance over long life cycle
Experience with Overseas Orders	・Partner companies with rich experience with overseas orders ・Local companies have high trust and expectation for Japanese companies
Financial Power	・A wide variety of financial players

A research project that makes use of a Privately Proposed Project for Proving Spread of Technology

High possibility of participation of Japanese companies in this project

3. Survey Details & Results —Investigation into Becoming a Private Project

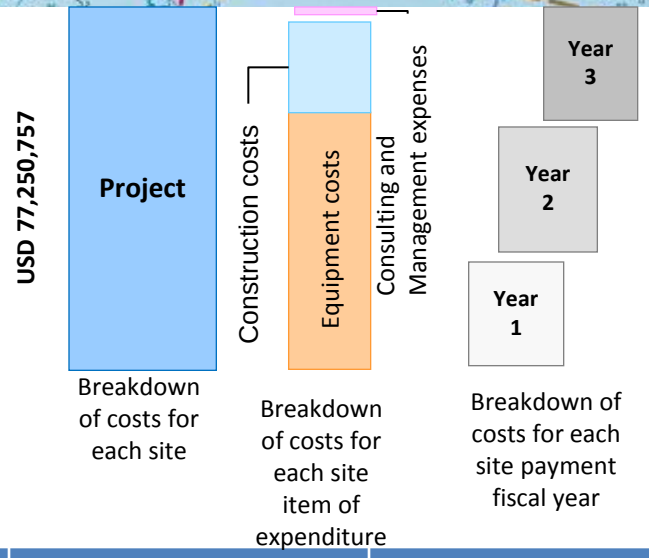
Project Scheme (Proposal)



3. Survey Details & Results —Investigation into Becoming a Private Project

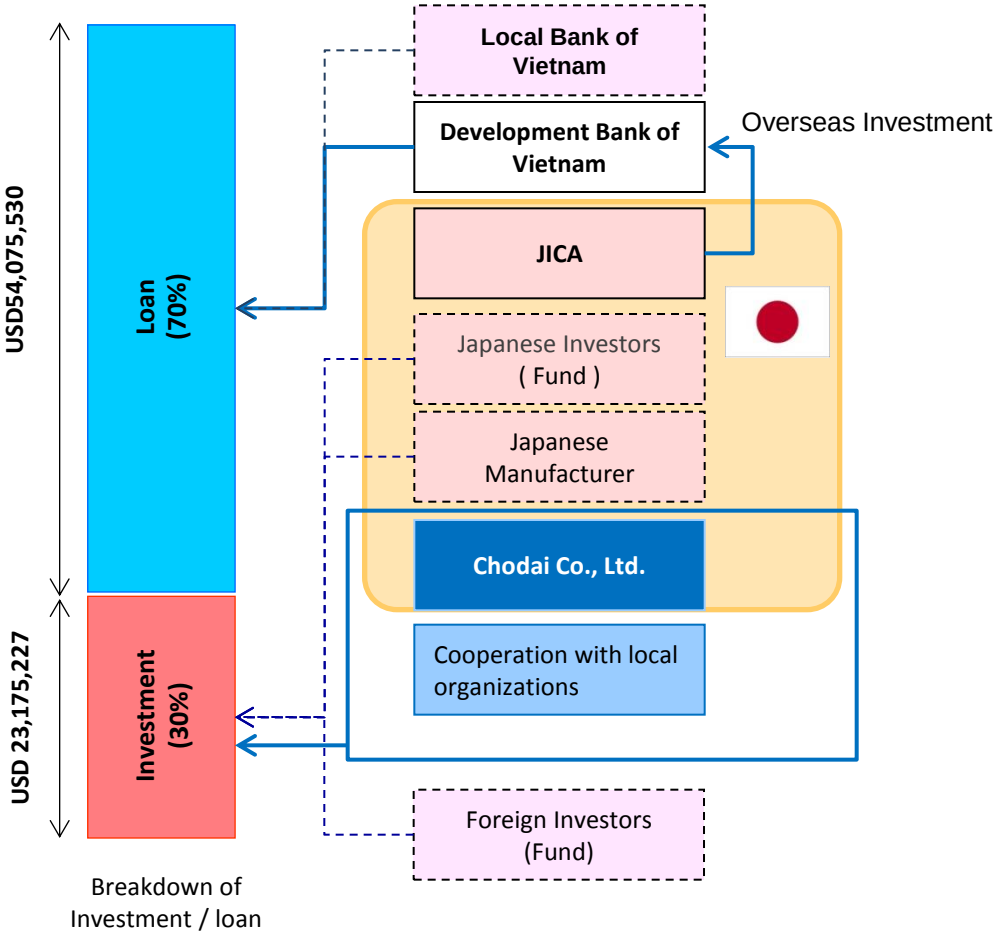
Project costs = the amount needed for funding

Area of Consideration



	In case of Sewage Plant		In case of Distributed waste water treatment system
Initial Cost	92.7 Million USD	-17%	77.25 Million USD
O&M/year	3.14 Million USD	-70%	0.93 Million USD

Financing structure and Expected participation player

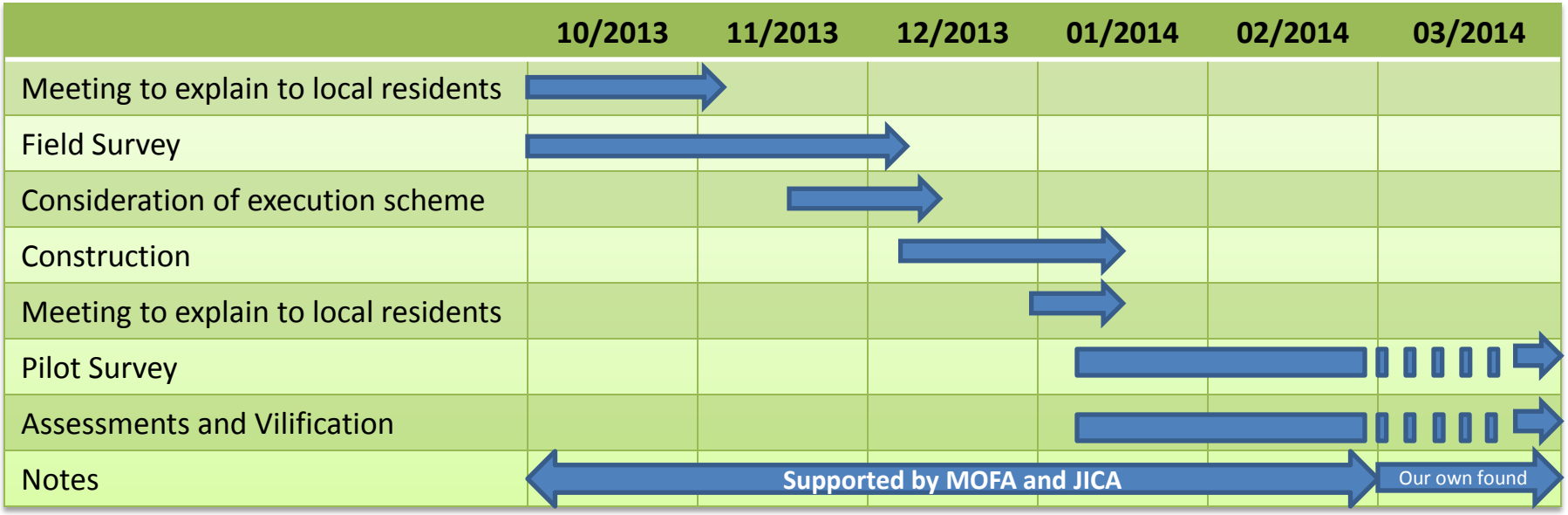


3. Survey Details & Results — Results of Investigation Activities into Local Adaptation

Purpose of Pilot survey about distributed waste water treatment system(Bio-Toilet and New Jhoka system)

- By deploying dispersion-type sewage treatment systems for parts of residential zones (about 4-5 sets of bio-toilets and new purification systems) and public institutions (bio-toilets in tourist sites and schools) in Ha Long Bay and its surrounding areas, sewage that had previously been reentering the water system without being treated sufficiently will stay out of the water system. In doing so, the impact of the effects of the improved water environment will be difficult to assess accurately due to the differing characteristics of each river and basin.
- Therefore, here we use real data to predict and evaluate the effects of an improved water environment.

Schedule of ●●



3. Survey Details & Results — Results of Investigation Activities into Local Adaptation

Situation of Construction work

Vinashin Port


Survey


Construction of base


Construction of base


Accomplishment

Ha Long city


Survey


Construction of base (Bio-Toilet)


Accomplishment


Construction of base (New Jhoka System)

Van Don district


Construction of base (Bio-Toilet)


Accomplishment


Construction of base (New Jhoka System)


Construction of base (New Jhoka System)

4. Effects & Influence of Implementing the Project

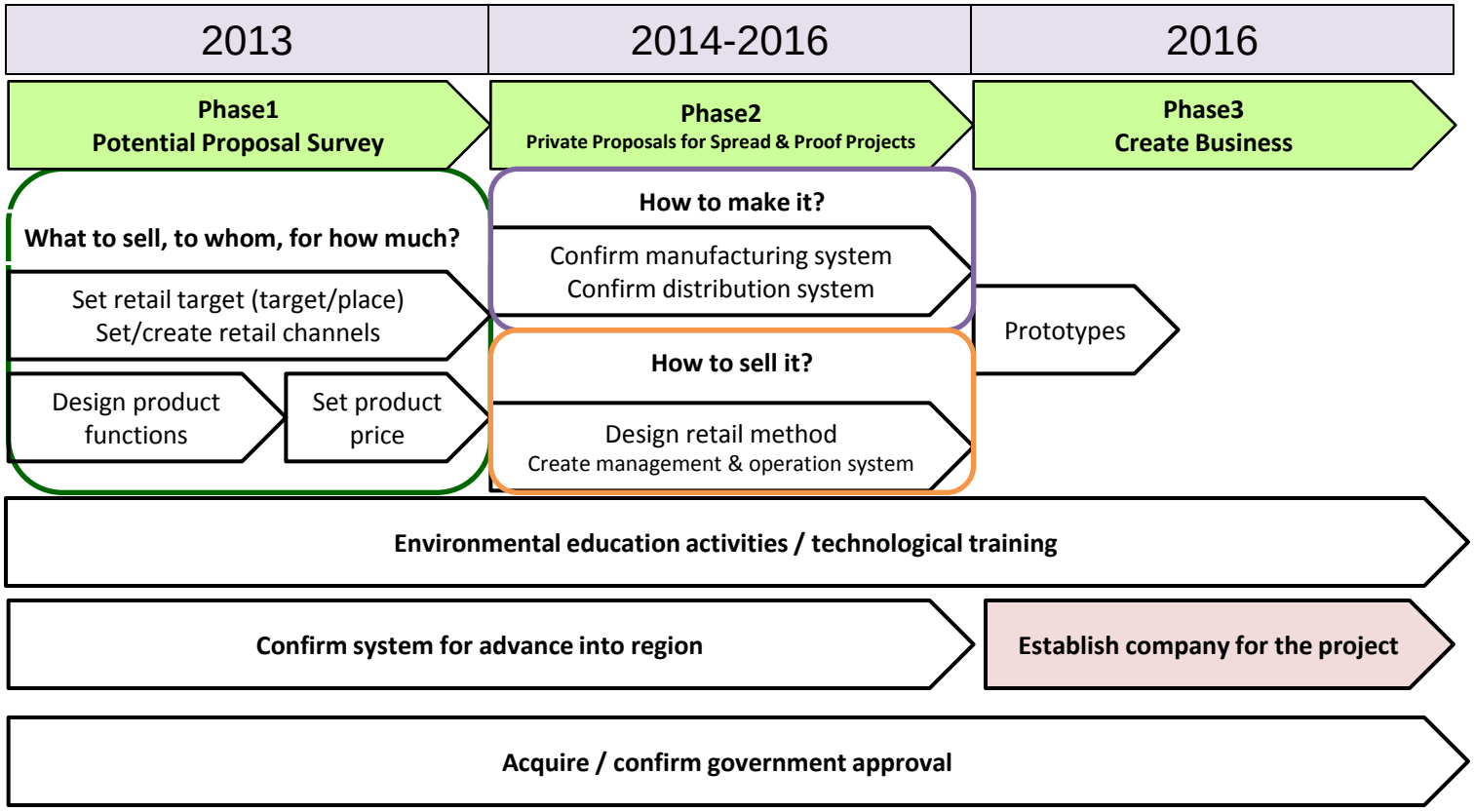
Item	Effects & Influence
Effects & influence brought directly to the region	➢ Realization of **suitable domestic wastewater treatment** in the target region. ➢ The supply of a decentralized wastewater treatment system, though use of ODA, will not only allow for it's smooth introduction, but also make a large contribution to the improvement of the environment in both the target region and Ha Long Bay, with ODA funds attracting **further private investment, and giving a further push to attracting overseas companies**. ➢ The construction, operation & management will **create employment opportunities**. ➢ The development of ecotourism taking advantage of bio-toilets will **increase the lifestyle level** of minority races. ➢ All of these elements will **contribute to the economic development of the region**.
Effects for improvement of the environment	➢ When compared to an underground treatment system, a decentralized wastewater treatment system can realize the **same degree of improvement at a cheaper price**. ➢ Contribution to **prevention of global warming**.

5. Future Issues

In order to work toward the realization of this project, after conducting this survey there is a requirement to perform an additional detailed analysis for each of the following points.

- **An investigation into the basic design for a decentralized wastewater treatment system that is suited to the local environment.**
- **A survey of the sites etc. required by the system.**
- **Investigation of concrete measures that might be taken against potential risk.**
- **Toward realization of the project scheme, investigation into financial burden to be undertaken by the government in Quang Ninh Province etc.**
- **Based in the above detailed investigations, a close investigation into costs, and a financial & economic analysis. Etc.**

6. Implementation Schedule



Thank you for listening