

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

Summary Report

Cambodia

**ODA Project Formulation Survey
POU Water Purification System the
Mekong Delta Area**

March, 2013

**Nikken Co.,Ltd. / Kaihatsu Management Consulting
Inc. Joint Venture**

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.

Chapter 1:

Current situation and development needs of Cambodia

The Kingdom of Cambodia, the country that was the focus of this research, continues to have relatively low per capita income compared to other Southeast Asian countries with most of population falling into the level traditionally considered to be BOP while income gaps between households continues to expand and the gap between urban and rural areas remains significant.

In line with such economic conditions, the people of Cambodia largely still suffer from limited access to safe water with only 64% of population using safe water sources. Moreover, the gap between urban and rural in terms of water is substantial with only 40% of the rural population having access to safe water sources with many areas having water sources contaminated with bacteria, heavy metals like mercury and arsenic. This situation is compounded by frequent floods in rainy season, which deteriorate the situation.

This low access to safe water has led to high frequency of water-borne diseases such as dysentery and cholera, and consequently high mortality rates. In Cambodia, more than 5.4% of children still die before the age of 5.

Ratanakiri Province, where the pilot project was conducted, suffers particularly low income, low access to safe water, high water-borne disease rates and high mortality rates. Isolated from the rest of Cambodia geographically, culturally and economically, education and income levels are much lower in the province. Access to safe water is also extremely low, with only 5-6% having access to safe water sources. Severe drought in dry season and floods in rainy season worsen the situation. This low access to safe water is one of the main causes of a serious mortality rate of around 20%, which means approximately one-fifth of children die before the age of 5.

In order to improve this situation, Japanese government and many donors including WB, ADB, UNICEF, EU and others have provided aid for the water sector in Cambodia, though most of the projects have been biased towards water systems and urban areas.

Chapter 2:

Possible applicability of the Nikken's products and technologies, and prospects for future business development

Clinca 205, produced by Nikken, is a sand-like disinfectant composed primarily of silver, copper, silicon dioxide that kills bacteria in water that it is placed in for 3-6 hours, with strong effects proven by a several lab tests. As such, Clinca 205 can provide similar function as chlorine while Clinca-treated water doesn't smell or taste unlike chlorine. Moreover, production

costs for Clinca 205 are reasonably cheap, enabling people to produce clean water at affordable costs, making Clinca 205 a potential, effective solution for improving water-related health problems in Cambodia.

That said, Nikken is a small company without any sufficient resources and capabilities to distribute this effective product to the world that needs it, and it is very difficult for the company to build a sustainable business model in a developing country like Cambodia by itself. That is why this subsidized research can be very valuable, aiming at establishing a business base by conducting feasibility studies, field health studies, business model trials and ODA project development.

<Summary of Feasibility Research>

As mentioned above, this research aims to improve BOP access to safe water source and consequently, improve health problems in Cambodia by making Clinca 205 sustainable as business and consequently available to BOP populations in the country.

1) Business FS

Firstly, the potential market for Clinca 205 in Cambodia has been estimated at around JPY550 million or more. Since people mainly use boiling to disinfect water, which is very costly and time consuming, a cheaper and easier solution has a chance to replace boiling. However, existing solution including bottled water, ceramic water filters, bio-sand filters and chlorine tablets have had only limited market penetration. Hurdles to water solution penetration are assumed to be: i) lack of affordability; ii) lack of effectiveness; iii) lack of acknowledgement; and iv) bottleneck on supplier side including transportation, distribution channels, educational marketing, maintenance etc. Therefore, if Clinca 205 is able to overcome these hurdles, the actual market may be large. Advantages of Clinca 205 include strong disinfection effects, the lack of smell or taste, easy maintenance, easy transportation and low production costs. This mix of advantages can be effective to overcome the issues above if appropriate strategies are taken.

At this stage, possible basic strategies for Clinca 205 are considered to be: i) cost leadership (strategic pricing); ii) differentiation by function (educational marketing); iii) differentiation by function and design (product development); and iv) regional niche market strategy. More specifically, pitcher types of high-end products and Clinca-coated tanks were considered for urban markets though the priority for this is relatively low in Cambodia.

Meanwhile, for rural markets, where Clinca 205 can leverage its advantages, effective distribution channels seemed to be the key and it was focused upon in the FS. Main distribution channels (or customers) were considered to be: i) NGOs (non-commercial); ii) NGOs

(commercial) / social enterprises; iii) social entrepreneurs; and iv) communities. Among these, non-commercial NGOs and communities were considered in the ODA project development, and social entrepreneur channels were examined in the business model study in the pilot project as explained later. As for commercial NGOs / social enterprises, wide and strong interest was shown during the FS. Among them, discussion and progress were achieved with Hydrologic; a social enterprise. This enterprise produces and sells ceramic water filters and is probably the only social enterprise that has been successful in a commercial model in water solution sector in Cambodia. The key is that it has built a countrywide distribution channel, focusing on direct and educational marketing. “Behavior change” is one of the keys to penetrating water solution technologies though cost and time investment is necessary to hire and train staff appropriately. Since this is exactly what Nikken needs most to distribute Clinca 205 in Cambodia, Hydrologic is likely to be one of the best potential partners. An agreement was made between Hydrologic and Nikken to start joint test marketing in March and to consider a more specific business alliance if good results are achieved.

Finally, potential needs from emergency aid were examined. During the FS, strong interests in Clinca 205 were shown from some Western aid agencies. Clinca 205 is not as advantageous as chlorine in instant effects and price competitiveness, if you expect only short duration of use, though it is much more advantageous for longer-term use. With more detailed health data and international certifications from WHO and other organizations, this potentially large demand for emergency aid will be targeted.

Elsewhere, it was concluded that production should be made in Vietnam at the initial stage rather than in Cambodia, because Nikken’s production plan in Vietnam is making progress and it seems easier and cheaper to import from Vietnam.

2) Pilot Project

a. Health Study

As a part of the pilot project, a field health study was conducted, aiming at around 4,000 households in Ratanakiri Province. This was assisted by IPHA (Indigenous People’s Health Association), a local NGO, who distributed Clinca 205 to around 2,000 households, around 12,000 people. This covered around 6% of the whole population of Ratanakiri Province.

Although the project duration was short with only 3 weeks, significant health improvement was observed for Clinca-distributed households. Time prevalence of diarrhea for households provided with Clinca 205 only (not provided with education) was estimated to be 56.5% lower than that for controlled households provided with neither Clinca 205 nor education.

Meanwhile, the effects of education turned out to be negative unlike expectation. It is possible that repeated instruction of Clinca 205 usage affected negatively in the context of the

villages observed. Elsewhere, water source and ownership of ceramic filters didn't give any significant impacts on the prevalence rate. The field study was elected to extend until April 2013, aiming at more convincing and higher quality data on the effectiveness of Clinca 205.

b. Business Model Study – Social Entrepreneur Model

As a part of the effort to build a sustainable business model for Clinca 205, a small water production system was examined in several villages in Ratanakiri Province. In this study, social entrepreneurs of each village built the system with support from the Indigenous Peoples' Health Action (IPHA), a domestic NGO based in the province, in order to produce Clinca-treated water and sell it to villagers at a discretionary price. As a result of the project's short duration of 3 weeks, additional time will be necessary to definitively establish a solid business model. That said, the feasibility of the scheme was confirmed and Clinca-treated water was highly appreciated by consumers.

In consideration of these results, as explained later, IPHA will be applying for a subsequent Grant Assistance for Grass-Roots Human Security Projects in June 2013. Moreover, the scheme will be packaged as "Clinca 205 social entrepreneur / community water selling model" to be introduced to a wider range of social entrepreneurs and communities.

Chapter 3:

Expected development impact and effect on business development of Nikken in Cambodia through proposed ODA projects

Finally, potential ODA projects using Clinca 205 were examined. MDGs and CMDGs have targets for access to safe water, respectively. Water and hygiene are important for human lives and remain as important development subjects. The Cambodian government has established the CDMs, which is MDGs specified for Cambodia, and aims to increase the number of people who can access to safe water to 50% in rural areas and 80% in urban areas. However, there is a need for additional measures to be taken to achieve this goal. The government has cited as its strategy to increase the safe accessing to the water as; promoting the participation of the private sector; strengthening the ability of human resources; developing and strengthening the governance; and improving technology effectiveness.

The Clinca 205, with its proven effects for sanitation and people's health, its features of no smell or taste as chlorine or any effect on human bodies, and being affordable and easy to use, has its advantage to be used in rural areas and low income population. Clinca 205 can be considered as an effective solution for Cambodia's developmental issues, with its ability to increase people's access to the safe water and to decrease the number of water-borne diseases.

Meanwhile, for small companies like Nikken, to get a positive reputation in a market is very important to develop their business, especially in developing countries like Cambodia, though in many cases it is very difficult. In this context, if Clinca 205 is used for ODA projects, it could greatly contribute to a positive reputation and brand recognition; an acknowledgement of both the company and the product. Especially, it would appeal to: i) emergency aid agencies, ii) major international NGOs; and iii) potential business partners.

Chapter 4:

Proposals for formulating ODA projects

After discussions with a number of NGOs and examining various ODA schemes, it has been agreed that the Clinca 205 is suitable for developing small-scale water treatment facilities and direct distribution to households. As to Technical Cooperation Projects, although many organizations showed their interests in Clinca 205, no specific Japanese organization has been identified during the study. As to Grand Aid, since IPHA has high interest, intensive discussion was held and project framework to apply for the Grant Assistance for Grass-Roots Human Security Projects was formulated. Below is a summary of the planned project for application.

- Proposed ODA scheme: Grant Assistance for Grass-Roots Human Security Projects
- Objective of Project: To supply safe water produced by Clinca 205 to rural and remote areas and improve health measures and to establish a sustainable business model and improve the income status of people.
- Beneficiaries: 85 villages and around 50 thousand people to be covered. This accounts for around 30% of population of Ratanakiri Province.
- Expected Developmental Impact: i) people's access to the safe water will be considerably increased in the province with the lowest access to the safe water in Cambodia; ii) as the result, the water-borne disease will be decreased; iii) and households expenditure on boiling water and health will be lowered.
- Expected Business Development: i) Clinca 205 will be proved as the effective water solution in the rural area creating more marketing opportunity; ii) SEM will be established with detailed actual back-up data.
- Planned activities: i) conduct baseline survey; ii) develop SEM marketing model; iii) develop plan for management of SEM model by community initiatives; iv) conduct ToT for SEM trainers; v) set up Clinca water purification system; vi) conduct endline survey.

Project Formulation Survey in Cambodia

POU water purification system in Mekong Delta Area

SMEs and Counterpart Organization

- Name of SME: Nikken Corporation/ Consultant: Kaihatsu Management Consulting
- Location of SME: Higashi Kanagawa, Kanagawa ku, Yokohamashi / Minamiazabu Minato ku, Tokyo
- Survey Site ▪ Counterpart Organization: Rattanakiri Province, Cambodia, IPHA (Indigenous People's Health Association)

Development Issues

- Poverty—Approximately 4 million people (29% of population) live under USD 1.25 a day, 9 million people live under USD 2 a day
- Access to safe water—Only 64% has access to the safe water in Cambodia, and 22% in Rattanakiri, leading to very high water borne disease rates.
- Floods—Floods have been occurring frequently, worsening the poverty situation in rural areas

Products and Technologies of SMEs

- Clinca 205 developed by Nikken Corp. is a sand like disinfectant comprised of silicon dioxide, [silicic acid](#) aluminium, silver, copper, and silican sand
- Simply put 25g into 1 L of water and leave it for 3-6 hours. It kills E-Coli, Staphylococcus aureus, Legionella.

Proposed ODA Projects and Expected Impact

- MOFA Grassroots Grant—IPHA will apply for the MOFA grassroots grants to expand the Social Entrepreneurship/Community Model water supply system utilizing Clinca 205. It aims to provide the safe water to 35% of whole Rattanakiri population (50,000 people) that has the lowest access to the safe water in Cambodia
- Flood/Emergency Aid—Clinca can be "low cost and continually usable" solution in flood/emergency situation

Future Business Development of SMEs

- Sales to bilateral/multilateral agencies as the water solution in cased of emergency /floods
- Sales to NGOs/Social Entrepreneurs that are providing water solutions to the people
- Sales to local commercial companies such as water tank manufacturers

