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

Summary Report

The Republic of Kenya

Community-based
Water Treatment & Supply System
Using Solar Energy

March, 2013

Joint Venture of Wellthy & Japan Techno

Introduction

I. Description of the current situation and development needs of the concerned development issues in the surveyed country(ies)

II. Possible applicability of the SME's products and technologies, and prospects for future business development

III. Expected development impact and effect on business development of the proposing SMEs in the surveyed country(ies) through proposed ODA projects

IV. Proposals for formulating ODA projects

Attachment : Outline of the survey

SUMMARY

The feasibility study was conducted to form future Official Development Aid (hereinafter, ODA) projects in the Republic of Kenya (hereinafter, Kenya) by introducing the proposed product of Wellthy Corporation (hereinafter, the Company) to the country as a solution for its developmental issues. To be more specific, this survey covered rural villages without electrical grid under Athi and Tanathi jurisdictions to install water treatment system equipped with solar panel, therefore to provide with clean drinking water. It was conducted as preparatory studies for launching ODA project(s) after completing the survey.

Chapter 1 of this report probes about the situation and needs of developmental issues in Kenya.

First of all, the current government has politically stabilized in the past few years and the economy has grown well. However, the confrontation between the parties of majority and minority in 2007 to 2008 after President Kibaki was reelected in December 2007 showed the seriousness of discord between the tribes, which had been strongly persisted after independence of Kenya in 1963, resulting in an immense disorder with casualty of 1,200 and IDP of 500,000. Although the up-coming Presidential election in March 2013 is seen as relatively tranquil-to-be, yet it is necessary to pay attention to the safety information around end of February to beginning of April 2013 in Kenya.

As a result of economic activities based on the long-term strategy announced by the Government of Kenya in June 2008, Kenya has kept growing economically by approximately 5% per year and is proceeding to achieve the Vision 2030, the long-term developmental strategy to create a globally competitive and prosperous nation with a high quality of life by 2030.

The reality of developmental issues is, on the other hand, only 59% of all population has access to clean drinking water source; specifically 82% in the urban and 52% in the rural areas in 2010, and the percentage reached only 19% for tap at each household. The amount of water resource per head is 647 m^3/year, which is far less than water poverty criterion of 1,000m^3/year. Moreover, assuming that the population growth of 3% will stay as it is, the per-capita amount of water resource will decrease to 235 m^3/year by 2025. In fact, in dry seasons, those in the rural areas have no choice but to spend a few hours to gain domestic water from un-hygienic water spots or surface water, causing waterborne diseases and severe water shortage and therefore, reserving clean water is the utmost issue.

The commercial electric power as the necessary infrastructure for water supplying system is also severely restricted; the percentage of electrification in the rural was 10% as of 2009, and even if the goals set for the Rural Electrification Master Plan (2009-2018) were fully achieved, it is predicted that the rate will only reach up to 40%. It was indeed revealed in the result of this survey that, as a means to solve rural electrification and water issues simultaneously, the business utilizing water treatment and supply system operated by solar power was highly demanded.

Chapter 2 covers survey of the possibility of utilizing proposed technology and perspectives of future business operation.

The Company's product is the community-based water treatment system with membrane, equipped with solar panel. Generally, such water supply system is mainly used for small-scale water supply area or population, such as community or specific facility, and thus has different features from large-scale water treatment facilities operated by water works.

As for its water treatment part, it uses membrane separation technology together with pretreatment process so to enable removing impurities, viruses, bacteria, chlorine-resistant protozoan pathogen, iron, manganese and so on. To reduce the concerns about durability and frequency of parts exchange, it utilizes the Company's own technology, such as adopting physical and chemical treatment, slow/rapid sand filtration, activated filtration and so on, according to the characteristics of raw water. It is also possible to operate by parts and materials that are locally available.

In terms of its operation and maintenance, the water treatment system basically operates automatically and continuously, except for a regular maintenance once a month. It is predicted to be not so difficult to maintain the system, transfer the technology or develop human resource, and therefore, it is expected that this will be an effective solution for securing clean water.

When it comes to transferring the raw water to drinking water, reliability in maintenance and water quality analysis is indeed required; thus, the Company is planning a business model that includes maintenance and water quality analysis. The effectiveness of water treatment technology and its implementation are already established, for the Company has more than 900 installation records in Japan ever since the installation of first system in 1997. Compared with its competitors in Japan, the Company is estimated to have 60% market share. Its operation know-how accumulated over the experience is well-contributable to solve developmental issues

in Kenya.

The Company's business plan in Kenya is not only about selling water treatment systems, but its scope of business includes supplying clean water or water required for certain usage, such as industrial water, with community-based water treatment systems and related tasks such as system maintenance, water quality analysis and engineer training. The basic concept of business using community-based water treatment systems is as shown below.

In terms of the prospect of future business, the team has surveyed several potential sites together with water services boards (AWSB and TaWSB), and has ensured some sites with high profitability. The team has decided to prepare for the actual business by identifying specific issues in launching it, let alone taking the risk hedge on financial aspects into consideration, and conducting further survey, detail design and pilot test necessary for installation of the system in the potential sites with stable quantity of supply water, established billing system, rigidity of operation organization and so on.

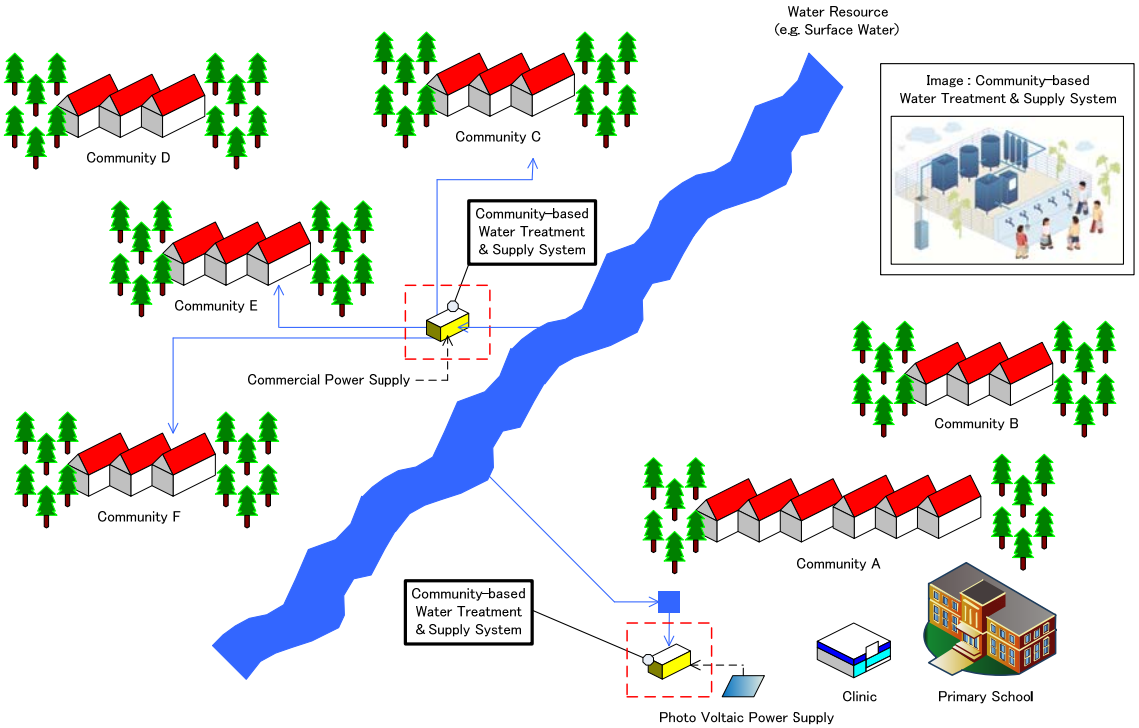

Fig. Concept of Community-based Water Treatment & Supply System

Chapter 3 discusses and sorts out the result of examination on developmental effects of ODA project formulation and effects of proposed company's business.

The proposed product/technology is a community-based system that provides solution to areas deficient of large-scale infrastructure with smaller installation costs and less payback period compared to large-scale centralized systems. Because of these features, it is presumed very effective as a means of supplying clean water in Kenya, where large amount of investment for water works facilities is not easy. The features of easiness to maintain and ability of self-energy-supply with solar electric system enables the product to supply treated drinking water in non-electrification areas. In fact, it is as effective as supplementary water source in such environment that practically lacks access to clean water due to electrical power deficiency, less capabilities of treatment works and etc.

Possible developmental impacts that directly come with the spread of community-based water treatment systems in Kenya are increased rate of water supply and reservation of clean water. Especially, it is rather effective in rural communities where untreated water has been used for the large-scale water works is not suitable for the size. It will also have a dramatic impact on improving shortage in electricity that limits on the system coverage, or not the coverage itself but the capacity, operation hours or the final water quality that might have been problematic due to the electricity.

With the improvement in supplying clean water, it is highly presumed that waterborne disease will be reduced. This survey has revealed that there are many areas where untreated surface water is used for drinking, and in most of them, E. Coli and bacteria were inspected. If the proposed product were to be introduced to such areas, the health issues that residents have would definitely be improved. Furthermore, this will help reduce medical costs at household, which in turn reduces costs for social welfare such as medical insurances for the government.

The developmental impact that is brought about by above developmental effectiveness, for example, is that lessening the time for water carrying and reduction of waterborne diseases will help promoting in increasing the opportunity in education, training and work. It is extremely contributable to empowerment of women and children, those who are said to be the main workforce for water carrying and, at the same time, vulnerable to waterborne diseases.

As for effectiveness on business side, it was found out in the survey that the proposed product /technology is an valuable solution for the issues of water supply in Athi and Tanathi WSB

jurisdictions. Actually, most of the water samples taken and analyzed in the course of survey were found possible to improve the quality using the proposed treatment system, both theoretically and practically in the scope of pilot test done in Japan.

However, due to the restrictions on survey span and budget, the team had not conducted a certain period of pilot test with the system installed in the field. Also, there is neither enough nor certain information on potential targets, for example the number of potential sites with profitability and so on, or those that are necessary for the Company to decide its commencement of business in Kenya. Moreover, in order to make the business in Kenya valuable for investing human resources and opportunity costs, it is indispensable to accelerate localization by cutting the manufacturing cost, then reducing installation cost and increasing profit at site; however, these have to be done with further feasibility studies and developing local partners.

One of the features of the Company's business model in Japan is the reliable maintenance. This maintenance business ensures stable profitability for the Company as well as raises customer satisfaction. To establish a similar business structure in Kenya, maintenance technology has to be transferred to potential local company, and it is hardly realized to achieve in a short period of time by the Company itself.

Therefore, if the Company is able to conduct a broad feasibility study or disseminating activities as Japanese ODA for the first 1 or 2 years of its business commencement, the network with governmental organization, such as WSBs, and local partners, such as WSPs, private enterprises, NGOs and so on, can be built promptly and smoothly, let alone reduce the costs. Specifically, with the new scheme to demonstrate and disseminate business for small-medium enterprise ("SMEs Pilot Project Support"), a project that will provide operational technology in water quality improvement business by adopting a community-based water treatment system, presuming the Company's product, is proposed. This project will aim to transfer knowledge and technology to the government of Kenya, such as MoWI and WSB, and to develop and stabilize their organizational, institutional capacityies. The knowledge and technology include identifying sites, forming business schemes and those necessary from installation to operation and maintenance. In order to achieve this goal, the work flow from finding and identifying potential site, conducting a field survey, designing, installing system to operation and maintenance will be applied to several model cases that will be picked up from all over Kenya. If employees of the Company were to be allocated as Japanese project members, then the Company will also achieve effect of initial marketing survey. In one of the potential sites, Mataara District under the jurisdiction of AWSB, a pilot test can be carried out before picking other sites throughout

the country. It is assumed that the system which will be installed and the structure of operation and maintenance will be considered as demonstration of local business by the Company and will be fully utilized in dissemination and promotion activities afterwards.

In the phase for commencing business followed by the initial marketing, the Company will run the business of selling and maintaining the system with the budget of the government including WSBs and communities. However, although the operation and maintenance phase is seen as achieving both the client's cost effectiveness and the Company's profitability, there is a case where local needs are not met due to the impossibility of installing the system for immense initial costs to equipment and training.

The Company is not positioning ODA project as the key factor for its business development at this phase. However, it should also be considered as an idea if applying Japanese ODA can fill the gaps between the developmental issues and the necessary funding for installation.

The Grant Aid, presuming JICA and inclusive of the new scheme for SME, may be applied for sites where initial costs cannot be covered by profit making business but the political priority and needs for fund as well as developmental needs are high, and also if it corresponds with Japanese government's aid policies and plans. This will enable to accelerate solving developmental issues and developing the Company's business.

To ensure sustainability of effectiveness in development brought about by the proposed system and technology, one of the challenges will be the beneficiary's affordability on operation and maintenance. As a private company's strategy for market expansion, it is necessary to explore business model to collect equipment cost as well as maintenance cost from beneficiary.

Chapter 4 proposes formulation of ODA projects.

As per the examination over Chapters 2 and 3, what the Company proposes for the formulation of ODA projects are (1) conducting local pilot test (and mid/long-term demonstration) on the performance evaluation of proposed system, and (2) finding and surveying other potential sites, grasping specific market volume, promoting to local partners including WSBs, private enterprises, NGOs, community organizations and etc. and conducting a certain period of preparatory marketing focusing on feasibility of each business model using proposed system.

Specifically, by applying the scheme to demonstrate and disseminate business for small-medium

enterprise (”SMEs Pilot Project Support”) as mentioned above, a project that will provide operational technology in water quality improvement business by adopting a community-based water treatment system, presuming the Company’s product, is proposed.

In the phase for commencing business, presuming the business sourced from the Kenyan governmental budget, the Company will also consider “Public Private Partnership” approach, only if the local needs and Japanese aid policies match, for site that is hard to cover by initial costs under the business frame. In this case with ODA, the public sector will cover the initial costs for equipment and training, while operation and maintenance will be privatized.

To be more specific, designing and installation of the proposed system will be carried out in several sites by utilizing the Grant Aid, presuming JICA and inclusive of the new scheme for SME. Simultaneously, supplementary soft components will help WSB and WSP to develop capacity for operation and maintenance and establish users’ association and conduct technical instruction.

It is expected to have synergetic effects for both if it is possible to cooperate with ongoing JICA project. For example, with JICA’s F/S project “National Water Master Plan 2030 (2010-2013)”, the Company is able to grasp the issues of water quality and quantity of exiting water source all over Kenya, inventory data on existing facilities and the order of priority on plan implementation, while this project benefits from grasping effectiveness and possible solution using community-based water treatment system, which will raise flexibility of the master plan, especially on rural water supply. In Mataara, there is a possibility of extending water supply area with new pipes by JICA’s Grant Aid. If this is implemented, the number of beneficiary for clean water will increase with the Company’s water treatment system, at the same time the profitability of the Company improves.

Moreover, the Company is promoting BOP business integrating agricultural instruction, installation of drip irrigation system and supplying clean water using slow sand filtration system in Kenya and is conducting a pilot test in Growing Sustainable Business project scheme funded by other donor. It is expected that operation and maintenance will be reliable and their costs be reduced if a local partner for operation and maintenance of the membrane filtration system, as targeted in this survey, can also take charge of servicing slow sand filtration system in emergency. It is also possible to provide WSBs with slow sand filtration technology. Sharing the superiority and inferiority of each technology will help installing the proper technology -membrane filtration or slow sand filtration- to the proper site. Also, if agricultural instruction

and introducing drip irrigation system of above BOP business improve beneficiary's income, then it will be expected to have improved effects on billing system, with application and dissemination of knowledge acquired in the BOP business, in the area where membrane filtration system is installed.

The Company has been preparing with Athi WSB, one of the local counterparts in ODA formulation, since last year for investigating and installing water treatment system using solar panel for rural water supply in order to promote supplying clean water. During the discussion held in the survey, AWSB has agreed upon the Company's request for continuous cooperation for its mid-long term business operation, including ODA project, in Kenya as well as technical support in Grant Grassroots project, which is one candidate of ODA formulation. The base of local partnership has been built for future business promotion also with Tanathi WSB, who has mutual understanding about potential sites for ODA formulation and will cooperate for further data collection and any necessary application. It is recognized that this is not an exception for the scheme to demonstrate and disseminate business for small-medium enterprise (”SMEs Pilot Project Support”) which will developmentally implement above schemes.

END

Type（Project Formulation Survey）
Kenya, Water Treatment & Supply System using Solar Energy

SMEs and Counterpart Organization

- Name of SME：WELLTHY CORPORATION
- Location of SME：11th floor,4-8-1 Kojimachi, Chiyoda-ku,Tokyo,102-0083,Japan
- Survey Site・C/P Organization：Thika/ Mataara, Athi Water Services Board; Machakos/ Mamba, Tanathi WSB

Concerned Development Issues

- Only 19% of the population have access to piped water at home.
- People depend on un-hygienic water sources for domestic water including drinking water.
- Due to deficiency in power supply, many areas lack enough power for water treatment.

Products and Technologies of SMEs

- Provision of design, procurement, installation, sales and maintenance of community-based water treatment and supply system.
- Possible to remove impurities, bacteria, virus, iron, manganese and so on.
- Technology of combining solar energy and membrane separation enables water treatment in non-electrification areas .

Proposed ODA Projects and Expected Impact

- To contribute to the improvement of water supply service of Water Services Boards that cover Nairobi and its suburbs, by introducing community-based water treatment and supply systems and by developing their capacity for operation and maintenance, through the effective utilization of SMEs Pilot Project Support and Grant Aid Cooperation schemes .

Future Business Development of SMEs

- Localize its business by identifying local partners for material procurement and marketing.
- Reduce sales cost so to expand its business to WSBs other than Nairobi and private enterprise.