

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

Summary Report

Tunisia

Fresh Water Production from Municipal Sewage
Water with RO Membrane Technology

March, 2013

Nihon Pure Water Inc , Accenture Japan Ltd
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.

Research for examining the feasibility of NPW's products as ODA projects

Executive summary

Introduction

Under ODA scheme, the project aim to introduce “Fresh Water Production from Municipal Sewage Water with RO Membrane Technology in Tunisia” provided by Nihon Pure Water, Inc. (NPW)

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

Tunisia is under shortage of water supply, especially in central and southern area. In near future, accessing potential water resources will be more difficult under the affection of global warming or population growth. It is concerned that existing water resources, surface water (rivers, lakes) and ground water, will be no longer sufficient to meet water demand. As the public sewage corporation in Tunisia (Office National de l'Assainissement, ONAS), mentioned that water resources in Tunisia will be in considerable danger before 2030, new water resource is being developed.

At present, Tunisia's economy foundation mainly depends on agriculture. Although there are many farmers with great specialty, on the other hand, they have difficulty in sustainable production and supply of crops or other farm products, due to small amount of water used in agriculture. In response of this situation, The Ministry of Agriculture (Ministère de l'Agriculture, MA) confirmed strong need of building sustainable water supply scheme by developing water with low salinity, which is suitable for agricultural use. Also, Tunisia is focusing on industrialization, in addition to agriculture development, to realize national economic growth and employment creation. They intend to develop high-value added industry domestically, not only by facilitating domestic companies but also by attracting overseas ones. Therefore, as high-quality water for industrial use is essential, The Ministry of Industry (Ministère de l'Industrie, MI) also confirmed need for sustainable water supply scheme.

Moreover, supplying more water in Tunisia, Tunisia national government confirmed the compatibility of a strategy of waste water treatment for ONAS, with the existing strategy of sea water desalination for the public waterworks corporation in Tunisia (Société Nationale d'Exploitation et de Distribution des Eaux, SONEDE).

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

As central and southern areas obviously are suffering from water shortage, SONEDE has clearly announced that they will promote the seawater desalination plan. However, as water production cost of sea water desalination is high, it is assumed to be extremely difficult to make it profitable. Since processing municipal sewage through RO membrane costs much less than seawater desalination, it can possibly expand water supply with reasonable cost, by using municipal sewage processed water for agricultural or industrial use and preferentially providing existing water resource for drinking. Of course, operating cost of municipal sewage processed water is higher than existing water resource such as surface water or ground water. Nevertheless, considering SONEDE's prospect of seawater

desalination, municipal sewage processing has considerable possibility of cost efficiency merit of substituting seawater desalination. NPW especially has strength in customer-made design of small scale, municipal sewage processing plants to meet water quality needs. Also, as NPW has sophisticated maintenance technology, it can provide professional training and technology transfer to maintenance staff in Tunisia. Hence, NPW has a capability of provide total municipal sewage processing service, matching various needs (both quality and quantity) in Tunisia. NPW develops the business model of providing pure water, cooperating with ONAS, and that has gained the acceptance from SONEDE.

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

Although NPW has the high technology and skills, that is to build and manage a pilot plant utilizing RO membrane technology to process municipal sewage, and verify feasibility of using municipal sewage processed water, there were not enough chances for NPW to show such high technology and skills to Tunisian national government, etc. According to the management performance in pilot plant, we promote utilization of municipal sewage processed water in the future, leading to cost efficient solution for water sewage issue. With the evidence of provided water quality and actual cost, there will be the possibility of reaching ODA loan scheme.

Promoting utilization of municipal sewage processed water for agricultural or industrial use in ODA scheme can make it possible to preferentially supply existing water resource or desalinated water for drinking, contributing to whole Tunisia's wealth.

By leveraging from experience in Tunisia, it is possible to accelerate business expansion to other water scarce area in Africa or Southeast Asia.

IV. Proposals for formulating ODA projects

In Phase1 we propose the construction of a pilot plant in order to build the install base for expanding NPW's business in Tunisia, verifying the quality of providing water from municipal sewage and examining the cost effectiveness. As this project would be quite easy to be quickly launched in Tunisia, we expect to use new special ODA scheme, under which the project can be started sooner If difficult, existing ODA technical cooperation would be expected to use.

i. Providing a small scale plant for feasibility verification with technical cooperation purpose (new special ODA scheme or existing ODA technical cooperation)

- Constructing a small scale plant processing municipal sewage to train technical specialists
- Business size: 60 million JPY + 20MM (assumed)

Also, proposal of one scheme in phase 2, after NPW's business model will be proven to be beneficial and feasible in pilot plant phase, building and managing a large scale commercial plant would be expected under ODA loan scheme. It definitely can solve the

critical water shortage situation in Tunisia.

ii. **Building a large scale commercial plant with ODA loan**

- Encouraging Tunisia national government and etc. to understand the advantage of municipal sewage processed water by establishing and managing pilot plant in Tunisia
- Afterward, utilizing municipal sewage water in large scale across central and southern area with ODA loan
- Business size: 7,000 million JPY
10 water plants (10,000m³/day) 700 million JPY for each
- Assumed sales: 2.16 billion JPY /year
(when 10 water plants run)

<Project Formulation Survey> Tunisia, Fresh Water Production from Municipal Sewage Water with RO Membrane Technology

SMEs and Counterpart Organization

- Name of SME : Nihon Pure Water. Inc (NPW)
- Location of SME : 1-1-34, Ekinishi-Honmachi, Kanazawa, Ishikawa
- Survey Site • Counterpart Organization : Tunis/Gabes, National Sanitation Office (ONAS)

Concerned Development Issues

- Tunisia is under shortage of water supply, especially in central and southern area. It is concerned that existing water resource, surface water and ground water, will be no longer sufficient to meet water demand.
- MARH* is showing a strong interest in developing new water resource for agriculture.
- Tunisian government considers that the treated fresh water from municipal sewage water is appropriate for agricultural and industrial water, if the water quality is suitable.

Products and Technologies of SMEs

- NPW is a total engineering company for water treatment which has expertise in membranes (RO, NF, UF, MF).
- The technology level of NPW to manage plants with membrane is equal to or higher than large global enterprises.

Proposed ODA Projects and Expected Impact

- Establishing and managing pilot plant with grant aid to prove a high quality of the treated fresh water from the municipal sewage water. Applying the treated fresh water to plant factory with solar power generator.
- Establishing and managing sewage water treatment plants in large scale across central and southern area with ODA loan to preserve water resource.

Future Business Development of SMEs

- By establishing and managing municipal sewage water treatment plants in this project, Japanese companies will have chances to expand their business in Tunisia and other African countries.



*The Ministry of Agriculture and Hydraulic Resources