

英文要約

Needs Survey under the Governmental
Commission on the Projects for
ODA Overseas Economic Cooperation
in FY2015

Summary Report

Kingdom of Morocco

Needs Survey for
Environment/Energy/Waste Management,
Water Purification and Management,
Education

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Earth and Human Corporation / Sano Planning Co., Ltd.

The content of this report is a summary of the Needs Survey under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY2015, which is commissioned by the Ministry of Foreign Affairs of Japan in the FY 2015 and was carried out by Earth and Human Corporation / Sano Planning Co., Ltd. It does not represent the official view of the Ministry of Foreign Affairs of Japan.

Summary

1. Introduction

This needs survey has been conducted to study the effective use of products and technologies, etc. of Japanese SMEs in solving development issues in Morocco. With the hope of examining ODA projects that contribute to achieving this goal, the needs of this developing country and the possibility of using said products and technologies have been surveyed. The targets of the survey are the three sectors of environment, energy, and waste management; water purification and treatment; and education.

2. Overview of the Target Country

Located in the northwest portion of North Africa, the Kingdom of Morocco (hereinafter called “Morocco”) gained independence from France in 1956. It is a constitutional monarchy, and Mohammed VI has ruled as the king since he ascended the throne in July 1999. The predominant religion is Islam, and the King is also considered a religious leader. However, the practice of other religions such as Christianity or Judaism is not prohibited. The total population of the country is 33.84 million, of which approximately 65% is of Arab descent and 30% of Berber descent. The remainder of the population is Jewish or black from Sub-Saharan Africa.

Geographically, the country borders Algeria and Western Sahara (formerly occupied by Spain). Sovereignty over Western Sahara is one of Morocco’s biggest diplomatic issues, and the matter is currently under arbitration at the UN. Additionally, the distance between Morocco and Spain, which lies to the north of the country, is approximately 13 km over the Strait of Gibraltar. In order to use this geographic condition to receive direct foreign investments, Morocco set up a “free zone” at its northernmost point in Tangier with favorable tax systems, including export taxes, as they continue to strengthen their export capacity.

In economic terms, the 2014 per capital GDP in Morocco was 3,316 USD. The economic growth rate improved to 4.4% from the 2.7% rate of the previous year. The inflation rate was 1.9%. Primary industry accounts for 14.6% of Morocco’s total GDP, with 40% of the labor population engaged in such, thus giving it much weight in the country’s economy. However, agriculture in Morocco is easily affected by weather factors such as rainfall. Since there are many small-scale farmers, agricultural productivity is not considered high. Furthermore, although Morocco is classified as a middle-income country, its Human Development Index placed it at 126 among 188 countries in 2014, which was the lowest in comparison with neighboring countries. (Tunisia is ranked 96th; Libya is ranked 94th.) One reason for this is that disparities between urban and rural areas, as well as between men and women, have not been resolved.

3. Environment, Energy, and Waste Management

In the sector of environment, energy, and waste management, (1) medical waste management, and (2) proper management of agricultural waste and the creation of added value were targeted.

3.1 Medical waste management

In this subsector, the reduction of infection risk through the proper disposal of medical waste is the development issue. Medical waste incinerators are proposed as a product/technology expected to contribute

to resolving this issue.

The Moroccan Ministry of Health estimates the amount of infectious medical waste generated annually from the 143 national and other hospitals is 3,285 tons, while 300-400 tons are generated from the 2,759 basic health care centers located throughout the country. However, since a collection and processing system for medical waste from hospitals and basic health care centers has not been established, dangerous waste such as used syringes are regularly stored for long periods or burned on hospital grounds. The outsourcing of medical waste collection and processing to a waste management company has been recommended. However, private companies have not had an interest in jobs with low profitability in rural areas, which has caused the tendering process for such outsourced work to break down in many cases. The inappropriate management of medical waste may lead to secondary infections in medical personnel, and the Ministry of Health has assigned highest priority of this issue.

Meanwhile, based on the current Sectoral Strategy for Health (2012-2016), the Ministry of Health continues to promote the enhancement of basic health care center facilities and improve medical services, especially in rural areas. However, concrete measures for the management of medical waste are not included in this strategy.

Japanese SMEs have developed medical waste incinerators with diverse processing capacities – from small to large scale. These incinerators can process safely waste materials that cannot be processed with the sterilizing crusher machines currently used at some hospitals in Morocco in compliance with WHO standards, and thus contribute to resolving the issue described above.

From a cost perspective, the unit price and maintenance costs for Japanese incinerators are lower than that the sterilizing crushers currently in use. Also, by using waste heat from the incinerators, a reduction in fuel costs for hot water and heaters used at the medical facilities can be expected.

As an ODA project, a feasibility survey with the private sector for utilizing Japanese technologies and a verification survey with the private sector for disseminating Japanese technologies is proposed, which serves the purpose to implement incinerators for medical waste at national hospitals and basic health care facilities in Morocco. This survey also include verifying the safety and effectiveness of Japanese medical waste incinerators, and contributing to the appropriate management of medical waste in Morocco through the recognition of equipment and creation of operation and maintenance manuals for promoting the incinerators in Morocco.

In terms of medium- to long-term business development in the future, it is necessary to build a foundation for sales and maintenance activities by forming contracts between Japanese companies and private enterprises in Morocco, as well as by establishing local subsidiary companies. It is also effective to consider possibilities for localizing the procurement of related parts and the establishment of finished product assembly plants. With this, an appropriate maintenance system can be instituted, and products with price competitiveness can be expected. Furthermore, the expansion of business into Morocco can also be seen as the creation of a foothold into the market of Sub-Saharan Africa.

3.2 Proper disposal of agricultural waste and the creation of added value

In this subsector, the proper disposal of olive agricultural waste and the creation of added value is the development issue. A liquid waste treatment system using Oil-degrading bacteria and Purification tanks (*Jokaso*), as well as “Oil under heating and decompression drying machines” are proposed as products and technology expected to contribute to resolving this issue.

Under the Green Morocco Plan pushed by the Government of Morocco, olive production increased

exponentially from 478,000 tons in 2004-2005 to 1.143 million tons in 2014-2015. This plan intends to expand production in the future as well, with the goal set at 2.5 million tons in 2020. The Government of Morocco has also indicated a policy for creating jobs by increasing their export volume, which will be achieved by developing the domestic olive oil industry and improving processing technology.

There are three methods for extracting oil from olives: two-phase method, three-phase method, and the traditional method. For each method, vegetal waste liquid (called “*margines*” in French) is generated. Since this *margines*, or waste liquid, includes oil and polyphenol, it has a very high impact on the environment. During oil extraction season, illegal dumping of this liquid has caused a serious environmental problem in rivers and soil. Therefore, in order to shift from the three-phase method, which has a high output of *margines*, to the two-phase method, which has a low output, the Government of Morocco has implemented a financial subsidization program to assist in the purchase of equipment. However, since disposal methods for wet solid waste (olive solid waste called “*grignons*” in French) generated during the two-phase extraction method have not been established, these subsidies have not been utilized very much. The dry *grignons* generated during the three-phase and traditional extraction processes has long been re-used as fuel or livestock feed. Thus, a technology for creating added value for the wet *grignons* is necessary.

Under these conditions, a large increase in the amount of generated *margines* and wet *grignons* is expected. Environmental measures are being taken, but it is a pressing issue for the Ministry of Agriculture, the Ministry of Environment, and the Ministry of Economy and Finance.

Japanese companies possess a technology for using oil-degrading bacteria, which can reduce the pollution impact of *margines*. They also have the technology for treating highly concentrated organic sewage and wastewater containing polyphenol through purification tank technology before it is discharged into the sewer system. These technologies will likely contribute to resolving the issues described above.

Additionally, for the wet *grignons*, the experiment of Japanese Oil under heating and decompression drying machines has proven that the dried product can be used as feed for livestock, fuel, and fertilizer. The solid fuel blocks produced by this machinery emits a high level of heat, and are currently being used as solid biomass fuel at power plants in Japan.

As an ODA project, a feasibility survey with the private sector for utilizing Japanese technologies and a verification survey with the private sector for disseminating Japanese technologies are proposed, which introduces waste liquid processing systems with oil-degrading bacteria and purification tanks in regions where there is serious damage from *margines* discharged from olive oil extraction plants. This project is expected to contribute to Moroccan environmental problems by reducing the pollutive impact of *margines*. Also, a feasibility survey with the private sector for utilizing Japanese technologies and a verification survey with the private sector for another disseminating Japanese technologies are proposed, which create added value to the wet *grignons* from the process of olive oil production. This project is expected to contribute to promoting a shift to the two-phase method, which has less impact on the environment, by demonstrating methods for creating added value for wet *grignons*.

In terms of medium- to long-term business development in the future, when selling waste treatment systems in Morocco for reducing the pollutive impact of *margines*, the cooperation with Moroccan companies for subcontracting civil engineering works, localization of the procurement of a portion of machinery parts and establishment of product assembly plants is necessary in order to reduce transport costs from Japan. Locally procuring a portion of the parts including consumables will also lead to reduced cost of “Oil under heating and decompression drying machines” to give added value to wet *grignons*, making it possible to broaden the targeted range. Therefore, as a business development scenario, business shall be

conducted through sales agents for a short period of time, with a subsequent transition to business that incorporates the production process at local plants for the medium- to long-term.

4. Water Purification and Water Treatment

In this subsector, the purification of household wastewater in regions where sewerage systems cannot be connected is the development issue. Combined purification tanks are proposed as a product/technology expected to contribute to resolving this issue.

With the implementation of the National Sanitation Program or Programme National D'Assainissement (PNA) formulated in 2005 by the Government of Morocco, the improvement of the sewerage network has advanced rapidly. However, the regions targeted for this program are concentrated in urban areas, with little actual progress being made on sewerage systems in rural areas. In regions where there is no sewerage infrastructure, household wastewater is directly discharged, without treatment whatsoever. Problems such as foul odors emitted from gutters, degraded scenery, as well as groundwater pollution caused by seepage are a concern. Since toilet paper is not normally used in Morocco, especially in rural areas, the impact on purification tanks is thought to be quite low compared to Japan. Conversely, since only small amounts of water are used, the concentration of pollution in the water is high, which makes the impact more than expected. Therefore, while considering the difference of the number of target users normally estimated in Japan, design specifications for purification tanks conforming to Moroccan conditions are required.

Combined purification tanks (*Jokaso*) in Japan (1) have a high level of treatment performance (less than BOD 20 mg/L); (2) are high-quality products (electric blowers, etc.); and (3) are designed to be compact (80-90% smaller than those from other countries). In addition to these product characteristics, another strength is the operation and maintenance systems available to support the use of combined purification tanks. These factors are all effective in resolving the development issue described above.

As an ODA project, a feasibility survey with the private sector for utilizing Japanese technologies and a verification survey with the private sector for disseminating Japanese technologies are proposed, which introduces Japanese purification tanks in regions where sewerage systems have not been built. This project is expected to contribute to the purification of household wastewater in rural areas through the installation of purification tanks which are based on Moroccan specifications which take into account household wastewater discharge patterns, peak discharge times, and discharge sources. Additionally, increasing awareness among citizens regarding proper use of purification tanks and strengthening the technical skills of local government engineers will also contribute to this goal.

In terms of medium- to long-term business development in the future, it is envisaged that Japanese companies will enter into contracts with private companies and sales agents in Morocco, or create business tie-ups similar to joint ventures. For the former, Japanese companies will export finished products to Morocco and outsource product sales activities. French purification tank manufacturers are already using this business model in Morocco. However, for the latter option, partially finished products will be exported from Japan and the final production assembly process take place locally. In this case, transport costs from Japan to Morocco can be expected to be decrease greatly.

5. Education

In this subsector, the educational disparity between urban and rural area lower secondary schools is the development issue. Digital paper tablets and digital blackboards are proposed as products and technology

expected to contribute to resolving this issue.

There is a large regional disparity between urban and rural areas for lower secondary education in Morocco. The net enrollment rate for lower secondary schools in the 2012-2013 school year was 30.6% on average in rural areas. In comparison with the average of 80.7% in urban areas, a difference of approximately 50% occurs. One cause of this disparity is the shortage of schools and long commuting distances. In particular, there have been many cases in which the parents of girls decide not to allow their children to attend school in consideration of their safety of school route. In addition, since instructors who are able to teach math and science are reluctant to be assigned to rural areas, problems of education quality have arisen.

Meanwhile, Morocco's Regional Academies of Education and Training (AREF) have expressed their intent to implement distance learning (e-learning) for students in remote rural locations using the internet, which continues to be connected at schools in rural areas as well. However, the development of educational materials and the dissemination of ICT equipment has not progressed enough to achieve this.

Products and technologies owned by Japanese SMEs include digital blackboards and digital paper tablets. Since Japanese digital blackboards are portable, they can easily be moved between classrooms. Compared to products with a high global share of the market, they are also less expensive. The strength of digital paper tablets is that the conversion of existing paper educational materials into electronic files (PDF) will allow these materials to be used the same way on the tablets, which facilitates the creation of educational materials by teachers themselves. Additionally, they can be connected to the internet to assist in the teachers' daily work, and have a function to manage grades available.

In terms of maintenance, since both types of equipment were developed envisioning use by students, they are highly durable; charging the battery one time allows them to be used for about 1-2 weeks.

As an ODA project, a feasibility survey with the private sector for utilizing Japanese technologies is proposed, which uses Japanese digital paper tablets and digital blackboards to push the implementation of distance learning (e-learning) at lower secondary schools in rural areas of Morocco. This project is expected to contribute to the reduction of educational environment disparity by offering distance learning using both types of equipment to students in rural areas.

In terms of medium- to long-term business development in the future, it is envisaged that by forming sales agency contracts with companies in Morocco, Japanese companies can build a foundation for sales. In addition, if the equipment is used at public schools in an ODA project, publicizing the analysis of the resulting learning effects will allow entry into the education ICT market aimed for private schools. Furthermore, the expansion of business into Morocco can also be seen as the creation of a foothold into the market of Sub-Saharan Africa.

Morocco, Needs Survey under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY2015, Environment/Energy/Waste Management, Water Purification and Management, Education

Research Company and Counterpart Organization

- Name of Research Company: Earth and Human Corporation, Sano Planning Co., Ltd.
- Survey Site/Counterpart Organization: Kingdom of Morocco (Rabat, Kénitra, Fès, Meknes, Taounate, Agadir) Ministry of Health; Ministry of Energy, Mining, Water and Environment; Ministry of Agriculture; Ministry of Interior; Ministry of Education; etc.

Concerned Development Issues

- Environment, Energy, and Waste Management
 - (1) Reduction of infection risk through proper treatment of medical waste
 - (2) Proper disposal of olive agricultural waste and creation of added value
- Water Purification and Water Treatment
 - Purification of household water in regions where sewerage cannot be connected
- Education
 - Educational disparity of lower secondary schools among urban and rural

Products, Technologies, etc. of SMEs, etc.

- Environment, Energy, and Waste Management
 - (1) Incinerators for medical waste
 - (2) Waste liquid treatment system using oil-degrading bacteria and purification tanks (*Jokaso*), Oil under heating and decompression drying machine
- Water Purification and Water Treatment
 - Combined purification tanks (*Jokaso*)
- Education
 - Digital papertablets, Digital blackboards, Special scanners

Proposed ODA Projects and Expected Impact

- Environment, Energy, and Waste Management
 - (1) Feasibility Survey with the private sector for utilizing Japanese technologies (Feasibility Survey) and Verification Survey with the private sector for disseminating Japanese technologies (Verification Survey) for medical waste incinerators: A reduction in the risk of secondary infection, etc. from medical waste at rural hospitals and basic health care centers can be expected. (2)-1 Feasibility Survey and Verification Survey for the proper disposal of waste liquid from olive oil extraction (*margines*): A reduction in the pollutive power of *margines*, which causes serious environmental problems in rivers, etc. can be expected (2)-2 Feasibility Survey and Verification Survey to create added value for wet solid waste from olive oil extraction (*grignons*): By suggesting methods for adding value to wet-*grignons*, a shift to using extraction machines with a low environmental impact can be expected.
- Water Purification and Water Treatment
 - Feasibility Survey and Verification Survey related to building combined purification tanks: Purification of household wastewater in rural areas not connected to sewerage systems can be brought up to the same level as at sewage treatment plants.
- Education
 - Feasibility Survey related to the introduction of distance learning (e-learning) at lower secondary schools in rural areas: A reduction in educational environment disparity can be expected by connecting classrooms in urban and rural areas through the internet and allowing rural students to take classes given by specialized instructors from urban areas.

Future Business Development of SMEs, etc.

- Medical waste and agricultural waste management sector: If Japanese companies conclude sales agent and maintenance contracts with Moroccan companies, or if local subsidiary companies are established to conduct maintenance, highly competitive product sales with maintenance systems can be expected.
- Education sector: By publicizing the learning effects at public schools, entry can be made into the educational ICT market targeted for private schools.
- Common to all sectors: The creation of a foothold in the market of Sub-Saharan Africa can be expected.