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

Summary Report

Papua New Guinea, Vanuatu, Tonga and Kiribati

Waste Glass Recycling “Okinawa Model” for South Pacific Countries

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Trim Co., Ltd. / Okinawa TLO Ltd. Joint Venture

Introduction

In the PALM6 meeting held in May 2012, Okinawa, the Government of Japan reaffirmed their commitment by providing a maximum US$500 million of ODA over the next three years in order for the Pacific Island Countries (PIC hereafter) to address environment issues, especially the preservation of marine and forest resources, waste management and water resource management.

The people of Okinawa have been working in partnership with local government, citizens and enterprises on tackling environment issues such as recycling and reduction of wastes. Okinawa being Japan's island prefecture isolated from mainland Japan, its experience and know-how, therefore, can be applied to the PIC which have similar geographical conditions.

Trims Co., Ltd. of Okinawa has developed waste glass recycling technology that turns waste glass into inorganic porous formed material called "Super Sol" with various applications in agriculture, civil engineering, water quality preserving, and waste water filtering to name a few. This technology, therefore, may well be able to contribute to the reduction of waste disposal and recycling that the PIC cannot get away from. At the same time, this technology may well utilize Okinawan technology in overseas markets, to expand the business opportunities of Okinawan enterprises. This study, therefore, was conducted.

The Objective of this survey is to look at: 1) what is the possibility of waste glass collection for the ingredient of the "Super Sol", 2) are there any development issues that "Super Sol" can be applicable for, and 3) who can be a possible counterpart to handle "Super Sol" production in a country.

The survey was conducted in Papua New Guinea (PNG hereinafter), the Republic of Vanuatu (Vanuatu hereinafter), the Kingdom of Tonga (Tonga hereinafter), and the Republic of Kiribati (Kiribati hereinafter).

I. Description of the Current Situation and Development Needs of the Development Issues concerned in the Surveyed Country(ies).

i) The Waste Management in PIC

The amount of waste generated in the PIC is rapidly increasing because of the growing population with more consumer-oriented lifestyle. This poses serious environmental issues to many small island states. Thus adequate waste management with more reduction and recycling of waste is required. However, authorities responsible with limited resources and capacities are still in the stage of waste flow analysis, establishing better waste collection services and adequate landfill operation, etc., which is assisted by J-PRISM.

ii) Waste Glass Recycling

The recycling of waste is carried out largely in the private sector as a business such as exporting aluminium cans, or lead batteries. Some do e-Waste but glass is not reused or recycled at all because the waste glass has little value for export and there is no demand domestically. The demand for waste glass has to be created in order for glass recycling to work.

For example, private recycling company in Tonga takes community oriented approach after due trials. Now the company has set up collection bins in various locations and the proceeds are paid to the local communities in the area. In Kiribati, aluminium cans, lead batteries and PET bottles are widely collected on the user-pay basis in accordance with “Container Deposit Legislation”. In these countries recycling is commonly practiced as a business either carried out independently or on a government commission basis.

The proper reduction and recycling system of waste is yet in place on a government basis, since structuring and systemising waste management in these countries have just begun and its legal framework is still underway. Thus, it will be important for the glass recycling to collaborate with existing private sector operators.

iii) Access to Safe Water

The access to safe water is a common issue in the PIC. As a matter of fact, SOPAC/EU is running a regional program for Integrated Water Resources Management. Currently, proper access to running water is limited to urban areas only, whereas in the rural areas, water is sourced from springs, wells, or rainwater. Underground and spring water is used for domestic use only, and in most cases drinking water is collected from rainwater using rainwater catchment and stored in tank

While the regional water programs focus on underground water sources preservation and the supply of running water, it can be said that the benefit is not much shared by those who rely on rainwater for drinking water. Therefore, improving the capacity of rainwater storage will strongly advance better access to safe water and buffering shortage of water. The underground rainwater storage using Super Sol can help communities access to safe water.

iv) Other Issue

Since Tonga and Kiribati are low lying islands of small landmass without rivers, there is a disadvantage in the collection of aggregates such as gravel and sand. Beach mining has a direct effect on the environment and biodiversity. Furthermore, Kiribati is in a very difficult physical situation in agriculture development as it is a low lying coral atoll with extremely limited landmass. Using glass recycle materials such as glass cullet as aggregate can help alleviate effect of beach mining to the environment.

II. Possible Applicability of the SME's Products and Technologies, and Prospects for Future Business Development

Trim Co., Ltd.'s "Super Sol" can be utilized as aggregates for civil engineering, soil conditioner, water quality preserve, and waste water filtering agent to name a few. Glass cullet and fine glass powder can be produced from the same "Super Sol" manufacturing plant can be applicable to civil engineering.

i) Implementation prospects

In order to introduce the "Super Sol" plant and its product, the following approach may be considered:

- To introduce a full plant to manufacture the "Super Sol" to be a manufacturing point;
- To introduce a waste glass crusher and/or cullet mill to manufacture glass cullet and/or glass powder;
- To import the "Super Sol" from a manufacturing point.

Considering each option will need to take into account the quantity of waste glass available, the availability of a waste glass collection method, demand volume, and operation capacity. Below is a summary of each point.

ii) Volume of waste glass and possible collection mechanism

The estimated volume of waste glass dumped at landfills each year is shown in Table 1. Tonga and Kiribati already have aluminium and other resource waste collection mechanisms available, thus, it would be possible that waste glass may be added to it.

iii) Demand and Practicability of the "Super Sol"

Demand and application of the "Super Sol" is considered as follows:

Rainwater Storage: While PNG is said to have and abundant water resource, the areas surrounding the Capital and coastal villages face a severe shortage of water. Therefore, a rainwater storage system utilizing Super Sol can be installed in the premises of public facilities such as health centers, schools or churches. As it is considered that the demand for such water storage would be high, so also would be the practicability of "Super Sol".

Glass Cullet for Civil Engineering Use: Glass cullet for concrete aggregate is widely practiced so that it is applicable in all the surveyed countries. PNG, however, has an abundance of high quality gravels so the aid effectiveness would not be high.

See below chart to summarise the above:

Table 1 Volume of waste glass, possibility of collection and recycling

	PNG	Vanuatu	Tonga	Kiribati
Estimated glass disposed at landfill (Ton/year)	2,300	800	105	37
Waste glass collection	Individual trade base	Individual trade base	Recycling firm's collection system	By container deposit legislation
Supersol for rainwater storage	High	High	Medium	Low
Lightweight embankment	Medium	Medium	Medium	Medium
Cullet for concrete aggregate	Medium	Medium	Medium	Medium

III. Expected Development Impact and Effect on Business Development of the Proposing SMEs in the Surveyed country(ies) through Proposed ODA Projects

Waste glass recycling contributes the solid waste management by reducing the volume of waste. To do this, there should be mechanism in place to consume waste glass, and Trim's glass recycling technology would be a solution. On the demand side, Rainwater storage using the "Super Sol" will provide more opportunity to gain access to safe water that fulfils MDGs' target, 7-C. While the use of "Super Sol" for civil engineering has no direct relevance to development issue, it is highly effective to stable use of waste glass, therefore, it indirectly, yet, strongly, stimulates reduction of waste glass.

It was found that "Super Sol" is particularly effective in Kiribati as a soil conditioner, therefore, MDGs' target, 8-C, that aims to cater for special needs in small low lying developing island countries may be fulfilled.

By making use of the ODA scheme, it is highly expected that the proposed company be able to establish;

- Japanese Brand which contributes to the environment issue,
- Personal relation and rapport with government officials of the recipient country,
- Accumulate knowledge and know-how of application of the said technology, and
- Minimize investment risk in developing countries

If realized, it will greatly help the company acquire more effective way of doing business overseas.

IV. Proposals for Formulating ODA projects

Suggested below are possible ODA projects.
Tonga has the potential for glass recycling because waste glass collection can be achieved utilizing private firms collection mechanisms, as does Kiribati, because CDL has been working for years now. PNG and Vanuatu have great potential once a collection mechanism is in place in the future.

	PNG	Vanuatu	Tonga	Kiribati
Project:	-Marketing glass recycling materials -Rainwater storage utilizing *"Super Sol"*	-Marketing glass recycling materials	-Marketing glass recycling materials -Introduction of glass recycling materials manufacturing plant	Marketing glass recycling materials
Scheme:	-Dissemination/Trial scheme -Grant Assistance for Grassroots Projects (GGP) -JICA Volunteer	-Dissemination/Trial scheme -JICA Volunteer	-Dissemination/Trial scheme -SME non-project grant scheme -JICA Volunteer	-Dissemination/Trial scheme -JICA Volunteer

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SMEs and Counterpart Organization

- Name of SME : Trim Co., Ltd./ Okinawa TLO Ltd.
- Location of SME : Naha, Okinawa, Japan

Concerned Development Issues

- Growing volume of waste and the pollution of environment in geographically isolated islands with limited land mass
- Provision of safe drinking water for healthy living.

Products and Technologies of SMEs

- Production technology of porous materials ("Super sol") and fine glass powder made from waste glass.
- Application of glass recycle materials for rain water reservoir, aggregate for civil engineering, agriculture, and waste water treatment.

Proposed ODA Projects and Expected Impact

- Waste glass recycling that contributes reduction of waste.
- Underground rainwater reservoir for alleviating water shortage, drought and improving access to safe water.

Future Business Development of SMEs

- Increased sale of "Super sol" production plants by accelerating waste management capability.