

## What Makes Food Processing Firms Clean Up their Waste? – A Case Study from Sri Lanka

**Many Sri Lankan companies, particularly in the food processing sector, do not have adequate management systems in place to control and dispose solid waste. In order to address this challenge, a new SANDEE study analyzes the factors that make food processing firms adopt good solid waste management practices.**

This study is the work of Udith Jayasinghe-Mudalige and Menuka Udugama from the Department of Agribusiness Management, Faculty of Agriculture & Plantation Management, at Wayamba University of Sri Lanka. The researchers find that cost reductions and improvements in technical efficiency that solid waste management practices (SWMPs) can bring are two key factors that encourage firms to adopt effective SWMP. Liability laws and anticipated future regulations also motivate firms to act. The study concludes that regulations need to be altered at the provincial government level to overcome current shortcomings. Firms, industry and trade organizations should also be engaged in dialogue with the government in order to speed up adoption of good SWMPs.

### The Solid Waste Pollution Problem

In Sri Lanka, the food processing industry contributes to about 4.5 percent to the Gross Domestic Product (GDP). According to the Ministry of Industrial Development of Sri Lanka, there are about 37,000 food processing firms operating in the country. These firms employed almost 198,000 persons in 2004. To try and help shed light on the best means to get these companies to reduce the amount of waste they produce, the study seeks to understand why some firms do better than others at managing environmental quality. (For more on the pollution problems that firms are causing and the current government response, see the side bar).

The study highlights three key factors that can influence firms' behavior and force or encourage them to implement environmental management controls. These factors are: (1) market pressures; (2) political forces and (3) judicial requirements. Market pressures can be brought to bear if, for example, consumers demand that a company has accreditation with the ISO 14000 series of environmental management standards. The political process can assist by offering motivation. Along with these, the judicial process can contribute through, for example, dispute mediation. The study assesses how firms respond to these three different factors and which is more effective at motivating change.

### How are Companies Managing their Waste?

To find out how well companies are managing their solid waste, the study looks at the number of solid waste management technologies and practices that firms adopt. The Sri Lankan Ministry of Environment and Natural Resources (MENR) has recommended eight solid waste management practices to food processing firms. These SWMPs are: (1) sorting waste based on the 3R (reduce, reuse and recycle) systems; (2) composting; (3) the use of biogas technology; (4) the use of biodegradable packaging materials; (5) the development of sanitary land filling; (6) good manufacturing practices; (7) waste auditing and (8) ISO 14000 series of environmental management standards.

The MENR does not suggest any order in which firms should adopt these solid waste management practices, nor does it prioritize one approach above another. Thus, some firms adopt no practices; others adopt a single or a few practices at a time, whereas still others adopt all the measures.

### The Food-processing Sector

Sri Lanka's food and food processing industries are located in nine provinces.

## The Solid Waste Problem in Sri Lanka

The generation and accumulation of solid waste from households and various industries has surfaced as a major concern in Sri Lanka in recent years. According to the Sri Lankan Ministry of Environment and Natural Resources (MENR), four out of the country's nine provinces (Western, Southern, Central and North-Western) are responsible for the generation of more than 80 percent of the solid waste produced by households and industries at the municipal level. About 57 percent of the waste generated in the country is classified as 'short-term bio-degradable waste' and 6 percent is 'long-term bio-degradable' material. The remaining waste is more difficult to classify and also more difficult to dispose of.

The Local Government Act provides the legal framework for solid waste management in Sri Lanka. Under this legislation, local authorities are responsible for the collection and disposal of solid waste at the municipal, urban and pradeshiya sabha (local government) level. Further, under section 12 of the National Environmental Act, the Central Environmental Authority may give directions to any local authority to adopt a course of action that is necessary to safeguard and protect the environment.

Despite all this legislation, the enforcement of the regulations governing the management of solid waste is very poor. This may be because of poor implementation or because regulations vary across local authorities and provincial governments. This problem is exacerbated by an absence of proper management systems at both the firm and household levels and by the existence of a large number of highly-polluting food processing industries.

The MENR is encouraging firms to adopt effective and sustainable solid waste management practices through waste avoidance/reduction, reuse and recycling and final disposal. The MENR has introduced a number of specific procedures under its National Strategy for Solid Waste Management. These include: managing waste based on the 3Rs system (reduce, re-use and recycle), composting, biogas technology, biodegradable packaging materials and sanitary land filling. In another initiative to help companies improve their waste management, the Sri Lanka Standards Institution offers training and certification on the adoption of environmentally sound practices such as Good Manufacturing Practices, Waste Auditing and the ISO 14000 Environmental Management System.



The study focuses on firms in four provinces which have the highest population densities and the largest number of food processing firms. These provinces are Western, Southern, Central and North-Western. To get details of these firms, the researchers used mailing lists of food processors provided by reputed institutions such as the Department of Census & Statistics of Sri Lanka and the head office and regional offices of the Export Development Board of Sri Lanka.

The collection and analysis of data was carried out in two phases: first through a pilot study, which was then followed up by a main survey. Over 300 in-depth interviews were conducted for the main survey. These interviews were carried out with managers responsible for environmental quality in five types of food processing firms.

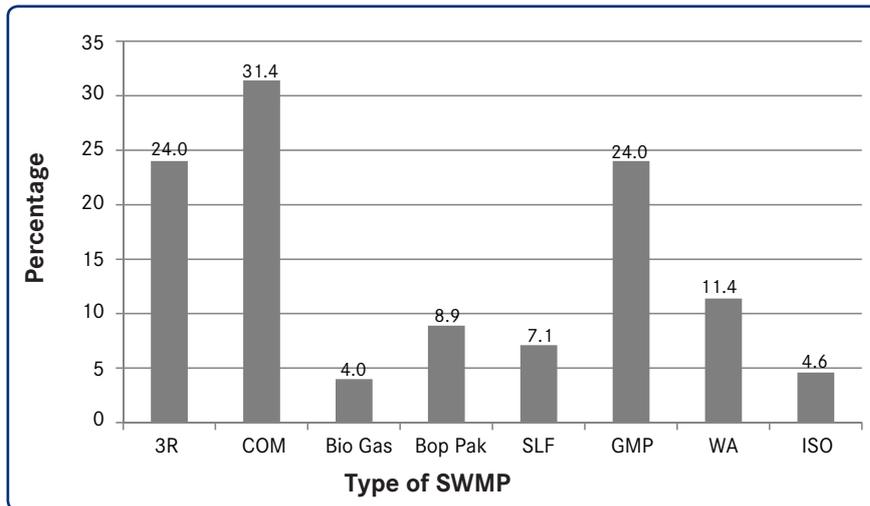
These firms ranged in size from small (turnover < Rs. 100,000) to very large (turnover > Rs. 5,000,000). They dealt with coconut-based products, essential oils, non-alcoholic beverages, processed fruits and vegetables and other processed products. Interestingly, the majority of firms producing essential oils (64.4 percent) and other processed products (67.1 percent) were either small or very small. On the other hand, the firms engaged in producing coconut products (48.3 percent) and non-alcoholic beverages (65.2 percent) were either large or very large.

Nearly 40 percent of firms were involved in international markets (i.e., exporting) and about 51 and 47 percent of firms traded with wholesalers and direct customers. The majority of larger firms exported their products while the smaller firms were mostly limited to the local market.

Firm representatives were asked to express how much they agreed (through a scoring mechanism) with a series of statements that quizzed their approach to solid waste management. In particular, the study assessed how several specific issues and incentives affected the adoption of SWMPs. These issues and incentives were: the cost and financial implications of SWMPs, sales, reputation, commercial pressure, human resources and technical efficiency. The impacts of two regulatory incentives (existing and anticipated government regulations) were also assessed, along with the impact of a firm's legal liability with respect to its waste.

The mean scores that each of these issues and incentives received indicated how strongly and in what way they influenced firms' behavior. For example, the firm representatives were provided with statements reflecting different factor affecting adoption: i.e. "I do not mind about the

**Figure 1: Different Types of SWMPs Adopted by Firms**



3R: reduce, re-use and recycle, COM: composting, BioGas: biogas technology, Bio Pak: biodegradable packing, SLF: sanitary land filling, GMP: good manufacturing practices, WA: waste auditing, ISO:ISO 14000.

costs associated with implementing these SWMPs in this firm”. This had a mean score of -0.9, which implied that the firms saw cost to be a negative incentive that hindered the adoption of SWMPs.

### The Impact of Incentives

A majority of the firms surveyed had adopted very few solid waste management practices. On average, firms had only adopted 1.2 of the eight potential SWMPs recommended by the government of Sri Lanka. Out of the 325 firms contacted, 47 percent had not adopted a single one of these SWMPs. Another 26 percent adopted only one, two or three out of the eight practices. Only five percent of firms had more than five SWMPs in place.

Within the context of these findings composting, the reduce, reuse and recycle (3R) system and ‘good manufacturing practices’ (GMPs) were found to be the most popular measures to control solid waste. The adoption of bio gas units and ISO 14000 were not found to be popular – only five percent of the firms adopted ISO 14000 suggestions, while 31 percent adopted composting.

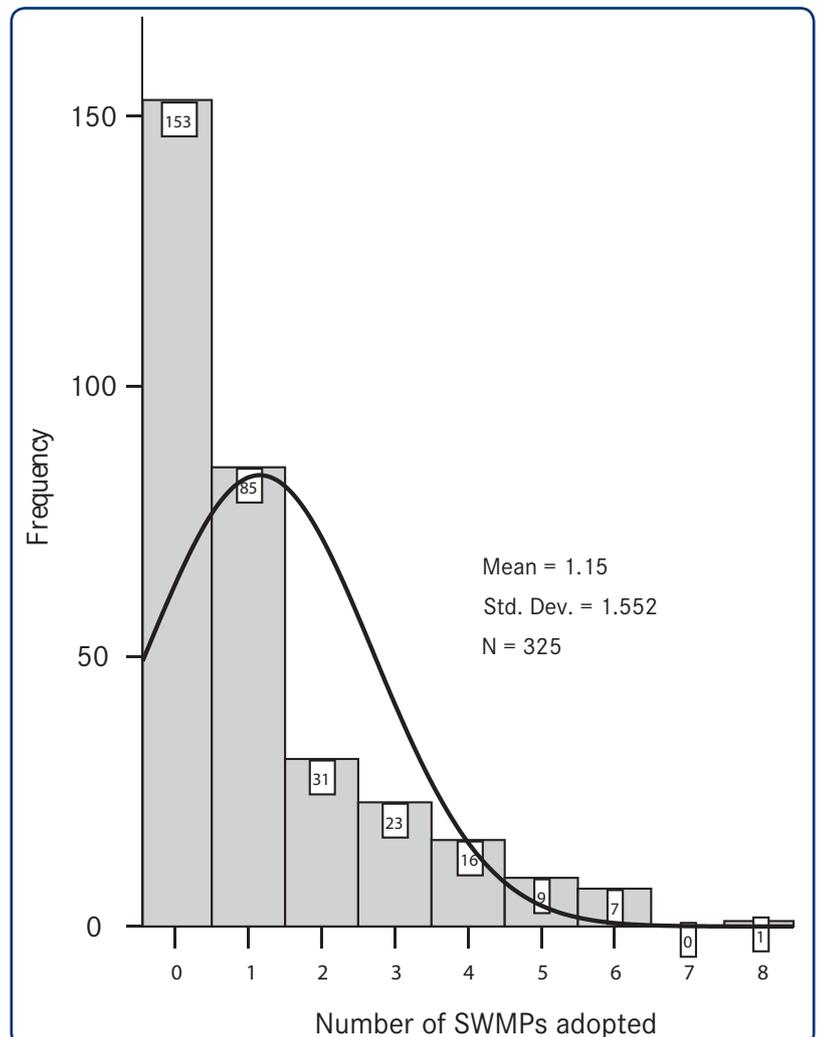
The number of SWMPs adopted by a firm varied to a great extent depending on the firm’s type and its size. Not surprisingly, large firms tended to adopt a higher number of SWMPs. For example, nearly 29 percent of very large firms adopted more than four of

the eight SWMPs, while 71 percent of very small firms did not adopt a single practice.

Firms that produced non-alcoholic beverages and processed fruits and vegetables tended to adopt a higher number of SWMPs in comparison to those that processed essential oils and coconut products. In fact, nearly 75 percent, 63 percent and 61 percent of essential oil, other processed products and coconut product processing firms, respectively, did not adopt a single SWMP.

Interestingly, export oriented firms did no better than non-export firms in terms of SWMP adoption. This is thought to be because environmental standards matter less than food safety standards in the export market.

**Figure 2: Number of Different SWMPs Adopted by Firms**



## SANDEE

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## Why Do Firms Adopt Solid Waste Management Practices?

The cost of adoption and perceived improvements in technical efficiency are the two market-based incentives that seem to most influence firms' decisions to adopt environmentally responsible practices. Thus, subsidies for different environmental management technologies may motivate firms to adopt them. It is also clear that firms will be more amenable to better environmental practices if they think these practices will make them more efficient. Contrary to findings from other empirical studies conducted in developing countries, firms disregard several other market-based incentives: incentives associated with reputation, commercial pressure or increases in sales don't seem to matter yet in Sri Lanka.

The impact of regulatory incentives is also mixed. Current regulations don't seem to motivate adoption - thus, the government's current information provision, monitoring and regulatory roles don't seem to be having much impact at the moment. Firms do tend to adopt practices when they anticipate that there may be stricter regulations in the future. Thus, the idea of stricter regulations seems to matter but current regulations seem to be too weak to make a difference. Legal liability also seems to influence adoption.

## The Need for Consultation

The study concludes that it is imperative to design private and public sector initiatives to achieve a higher level of environmental quality at the firm level. It recommends that Sri Lanka's regulations may need to be altered at the provincial government level to overcome current shortcomings. It also suggests that the situation would improve if firms were more carefully consulted during the process of establishing regulations and setting standards. While the government could play a more facilitative role by augmenting firm-level incentives, industry and trade organizations should also become more engaged to help facilitate the process of adoption.

The researchers caution that new initiatives should take into account differences in both industry structures and the sizes of firms. The study shows that larger and older firms adopt more environmentally responsible practices. Thus, particularly in newer sectors, there may be a lag between policy declaration and actual adoption. It should therefore be recognized that firms may need to reach a degree of maturity before they become more environmentally compliant.

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