

Promoting environmentally friendly degradable plastics

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Future impact of environmentally degradable plastics and the present status of plastic industry in Sri Lanka.

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Plastics are polymers derived from petrochemicals, which are used by virtually every end-use segment of the economy. The plastic products have displaced paper, glass and metal products from traditional applications. Although there are wide varieties of plastic products for industrial, commercial and domestic applications three major products sectors dominate the industry. They are packaging, construction products and automotive and other components.

The plastic products industry in Sri Lanka consists of nearly to 200 manufacturing units including local owned small and medium sized and exports oriented ventures located both within and outside the country's Free Trade Zones. Nearly 60% of the plastic industry comprises small & medium industries and in terms of capital 90% of these industries small enterprises with Rs. 50 million utilizing 100% Sri Lankan capital while foreign capital participation accounts for about 10%. It is estimated that total employment generated within the industry exceed 15,000 persons. The modern export oriented sub sector consisting of foreign owned ventures, joint venture collaborators and entirely domestic owned ventures; the third category is considerably larger. The number of enterprises that are in commercial operations and approved under section 17 of Board of Investment of Sri Lanka was 34 at the end of 1998. These 34 companies produce a wide spectrum of products namely polybags, pads, PVC rainwear and bags, plastic items for stuffed toys; packaging items, PVC gloves etc. The other sub sector consists of domestic owned and medium sized manufacturing units that manufacture a wide range of products entirely for domestic markets.

Sri Lanka Standard Institution (SLSI) has stipulated a coding system for different plastic varieties, but this does not appear in any product.

SLSI has also stipulated quality criteria for most of the plastic items, but however faces the problem if implementing these standards in the absence of effective monitoring systems and the lack of technical and manpower resources.

The industrial policy announced in 1994 has placed emphasis on private sector led industrialization. The main objectives of the industrial policy were as follows:

(a). Encourage expansion diversi-

fication and upgrading of the industrial base

(b). To improve the efficiency of management of physical and manpower resources

(c). To create new employment opportunities and in both rural and urban sector

(d). To encourage export orientation

(e). To promote industrialization at regional level.

These objectives are to be achieved by making the macro economic environment conducive to rapid industrial growth, encouraging private sector participation, promote direct foreign investment facilitating the expansion of small and medium sector industries, promoting regional industrialization and promoting linkages between large and small firms. The government continues to provide incentives to both foreign and domestic investors in order to achieve the objectives of the industrial policy declared in 1994. Sri Lanka became a founder member of the World Trade Organization and joined its rule-based trading system in January in 1995 and thereby expected to promote the smooth and orderly development of international trade among the member countries.

In the beginning of the new millennium, Sri Lanka has developed a National Strategy for Solid Waste Management. The main features of the strategy are

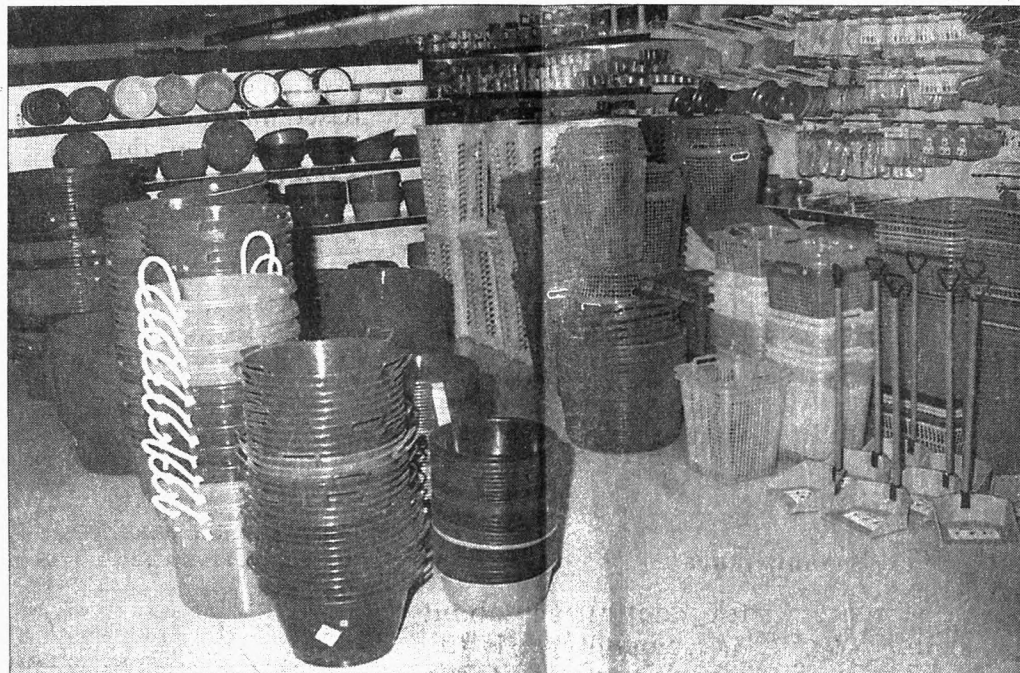
(a). Prioritize waste avoidance over recycling and recycling over other forms of environmentally sound disposal

(b). Reuse non-avoidable waste as far as possible

(c). Maintain the content of hazardous substances in waste at the lowest possible level, and guarantee an environmentally sound residual waste treatment and disposal as basic prerequisites for human existence.

Further utilization of waste for energy recovery has been encountered and emphasized in this strategy. The need to promote research and development, multi-sectorial partnerships, education and creation of awareness and low enforcement coupled with incentives to promote compliance have been highlighted as basic prerequisites for the establishment of a proper solid waste management system in Sri Lanka. Island-wide waste collection and waste exchange system and centers will be established to facilitate recycling industry and thereby reduce the amount to be disposed as well as to encourage efficient resource management.

The plastic industry has not been able to conduct research and development work and to make new innovations in Sri Lanka. The industry benefits from the innova-



tions made in machinery, modules processing methods and materials made by suppliers in the global market. Some of the more commonly used techniques in this country are as follows: injection moulding, blow moulding, extrusion, rotational moulding and thermosetting. However, a very limited number of research work has been carried out for the conversion of solid into liquid hydrocarbons. In Sri Lanka but this work should be very fundamental and probably by a thermal cracking process etc., therefore the economic viability of these processes or large scale production is subjected to question.

A need has arisen to establish a waste exchange program i.e., proper transposition system and recycling centers in this regard. In addition, a policy decision has been taken by the government to promote and to establish economical enterprise and markets for products based on the waste. As the "National Strategy for Solid Waste Management Plan" came into effect in the year 2000 all these process have just started and are in the infant stage. Nowadays day reuse of post consumer plastic waste has become a tedious task in order to prevent an environmental threat and health hazardous situation. There is no proper waste plastic collection methodology and/or sorting system exists and therefore, commingled waste is not especially attractive. Further, in addition to initial sorting, there is usually a need for cleaning, which discourage the existing recyclers having a demand for this type of waste and small scale industries are in need of new machinery with washing facilities to produce good quality products. The quality of recycled material needs to be further improved to compete with good quality plastic products available in the market. But production wastes (prompt scrap) are clean and are usually sought after by the existing recyclers. The recycled plastic material is in the range of 75 to 100 tons per

month. Mechanical recycling methods are mainly applicable for HDPE, LDPE and PP scrape. PVC, PET and PMMA is not at all recycled; but PP to a very limited extent. Recyclers in Sri Lanka do not have sophisticated machinery but use simple systems thus limiting the degree of recyclability of waste thus composite production etc., are not carried out. More scientifically and technically improved machinery are needed to perform the tasks in a more professional manner for product quality enhancement of finished products. Further there is an acute need for standards, testing laboratories for further development of plastic industry.

Both the plastic and chemical industries continued to grow substantially during the past two decades and plastic industry has shown a rapid growth during this period. With the increase in the number of production units in Sri Lanka, the domestic consumption of plastics has increased in manifold during the past few years. Plastic industry grew as an auxiliary industry, supplying packing materials to the other growing industries. In the period 1989 to 1998 the plastic sector has increased at an average rate of 15.2% per annum. In 1997 Rs. 4.5 billion worth raw materials had been imported for use in the plastic processing industry (1.2% of total imports into the country). The contribution by the Plastic Industry to the total industrial output was 3% in 1998. The value of exports in Plastic Industry has shown a substantial growth of 15.19% during the past 10 years from approximately US\$ 9 million in 1989 to US\$ 30 million (Rs. 2 Billion) in 1998. In spite of the fact that almost all raw materials for this industry are imported, the Export Development Board (EDB) of Sri Lanka has identified Plastic Industry as a potential area for export development.

The annual per capita consumption of plastics (5 kg) is low in Sri

Lanka comparative to the other countries in the region but still disposal of plastics waste has become a growing threat in Sri Lankan society aggravated in the absence of proper waste management systems. Recycling of plastics from post consumer waste is still at its infancy state. It is reported that in the capital city Colombo along 700 tons of solid waste is collected daily, and about 6% (42 tons) is plastic, thus total wasted plastics is about 1260 per month. It is expected a steady growth in plastic consumption in the Sri Lankan society i.e., the annual per capita consumption be expected to arise to 12.7 kg in 2010. So eventually there is a high impact on environmentally degradable plastics

Today industrial plastic waste is recycled within the factory premises, as it is economically viable. But this is been done in a very small scale. In the absence of proper collection and transport systems to facilitate waste exchange and sorting systems, intensive cleaning is required therefore increase the cost of reusing these waste raw materials. This results in land-filling as the most economically viable option for the local authorities as a means of disposal of this waste, which in turn creates, environmental and health hazard. Recent data pertaining to solid waste accumulation reveals that the present disposal practices more than the rate of generation of waste, has already created an environmental and health problems in the country.

The plastic products manufactured in Sri Lanka are exported to approximately 20 countries located around the globe. USA has the largest export market for Sri Lankan plastic products followed Japan, France, UK and the Netherlands. Eventually the export market oriented companies and agencies should be specially interested in the applications for the promotion of environmentally degradable plastics.