

Sri Lanka

Updates on Sustainable Agricultural Mechanization Technology

Eng. M. H. M. A. Bandara

Chief Engineer

Department of Agriculture, Sri Lanka



Eng. Bandara is the Chief Engineer of the Department of Agriculture of Sri Lanka. Eng. Bandara has 31 years experience in the field of farm mechanization, especially in the testing & evaluation of farm machinery. He obtained Bachelor's Degree in Engineering at University of Moratuwa, Sri Lanka, and Post Graduate Diploma in Farm Mechanization at National Agricultural College in Netherlands. Eng. Bandara is the Chartered Engineer and Member of the Institute of Engineers in Sri Lanka. He has obtained professional trainings from various renowned organizations including International Rice Research Institute (IRRI) in the Philippines, BRAIN in Japan, DEULA in Germany, and TBIC in Japan. He is responsible for all engineering-related activities such as development of infrastructure facilities, maintenance of seed storage facilities and for development of farm mechanization activities.

Sri Lanka's population is 20.8 million. Main agricultural crops include paddy, maize, onion, potato, grain legumes, fruits and vegetable, and cash crops cover tea, rubber, coconut and spices.

The performance of main commodities is showed below:

Paddy	excess production, looking for export avenue, need quality improvement
Maize	self sufficient, use imported seeds, development of competitive local hybrid seeds is very urgent
Onion	majority of the requirement imported, focused on self reliance in near future
Grain legumes	becoming self sufficient
Vegetable	export
Fruits	sector needs improvement
Chili	majority imported

The contribution of agricultural sector in Sri Lanka is declining dramatically from accounting for 28% of GDP in the early 1980s to about 12% in 2012, which is the lowest in South Asia of the proportional contribution of agriculture to GDP. Even in rural households, the average income derived from non-farm activities (56%) is much higher than the earnings from farming activities (23%).

The average land holding size in Sri Lanka is about 1 hectare. The majority of paddy farming lands is small fragmented fields. However paddy cultivation system is almost fully mechanized except for bund reconditioning and plant establishment. Mechanization of maize cultivation as the second major crop needs to be strengthened. In addition, the production of grain legume, vegetable and fruit has not been mechanized yet in Sri Lanka.

Most agricultural machinery in Sri Lanka are imported, while very few are locally produced including water pumps, sprayers, seeders and hand tools. However, the supply of machinery is not regulated, which allows inferior quality machinery to inflow into the country. And local production is not supported due to unfavorable trade policy and small local market.

In spite that the Government identified mechanization as a very essential component in food production, the purchasing power of individual farmer is very poor in Sri Lanka. There are private machinery hiring facilities in operation in Sri Lanka, while charges are not reasonable, and the production cost are not reduced. Therefore, regulation on hiring system of agricultural machinery is essential.

Farm Mechanization Research Centre and Institute of Post harvest Technology are responsible for research

and development of agricultural machinery in Sri Lanka. Testing and evaluation activities are also carried out by those institutes. However testing is not mandatory requirement in Sri Lanka.

Farmers in Sri Lanka are facing various problems in terms of getting appropriate machinery and equipment. Firstly, the quality of the machinery is a genuine issue for farmers due to free imports and lower efficiency of machines. Secondly, the high cost of the machinery itself as well the spares due to long supply chain and indirect taxes are a big burden for the farmers. Thirdly, farmers are lack of relevant operational knowledge. Fourthly, farmers' purchasing power of agricultural machinery is low due to the low farm gate price of their agricultural products. In addition, the farmers urgently need machinery for drying and storage of grains during harvesting season.

There are some positive efforts of the government promoting the sound development of agricultural mechanization in Sri Lanka recently. A Cabinet memorandum is presented to the parliament to issue 'import permits' only for the quality assured machinery by any recognized institute. If the performance of the machinery will be affected by local conditions, it has to be tested and certified by Farm Mechanization Research Centre of Sri Lanka. In order to protect the benefits of the farm machinery suppliers, farm machinery producers, farm machinery service providers, farmers and other stakeholders, a farm machinery act is being drafted and will be implemented in the future with necessary regulations.

The following table shows the annual sales of major farm machinery in Sri Lanka:

Year	2 wheel Tractors	4 Wheel Tractors	Combine Harvesters	Sprayers	Trans planters
11/12	14445	7184	2160	26093	n/a
12/13	9664	5141	1099	6240	23
13/14 Aug	2783	1479	N/a	N/A	87

In paddy cultivation, most of the operations are mechanized, while the least mechanized areas covers bund cleaning and plastering, plant establishment and weed management, small scale seed paddy processing, and drying and storage. For bund cleaning and plastering, technology is available and has to be introduced in collaboration with the private sector. In terms of plant establishment, manually operated machines are not productive, and power operated direct seeding and transplanting machines are to be introduced, the preliminary trials of which have been conducted and looked promising. In weed management, design and testing of two models has been completed and can be released after fine tuning. Available machines of weed management in other countries are very expensive. Machines for small scale seed paddy processing are being designed and introduced by FMRC. However, scaling up of the machines is still an issue due to low capacity of the manufacturers.

Laser leveling techniques have been introduced in Sri Lanka. If land leveling is done with the use of laser guided land leveler both in lowland and highland, about 20% - 30% water can be saved and the crops could grow more evenly. The laser guider has to be imported and preliminary trials will be conducted. Specific of commercial scale maize cultivation with high capacity, reliable maize planter is an urgent need. Imported maize planters are not reliable, especially of

high missing hills. Two types of maize planters cum fertilizer applicator are being tested and will be ready for dissemination. For irrigation, very high capacity (more than 20,000 l/min.) four wheel tractor powered axial flow type water pump has been developed, which have very low fuel consumption per liter water and have good demand in the Eastern Province. And a number of manufacturers in that province were already trained.

In terms of promoting sustainable agriculture mechanization in the Asia-Pacific region, various actions could be taken including publishing tested and certified machinery brands products and manufacturers in CSAM web page, giving publicity on precision agriculture mechanization and productive indigenous methods adopted in the region, benchmarking agriculture process costs based on value of produce for the region, and promoting low cost IT systems for farm machinery extension and educating on precision agriculture.