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DEPARTMENT OF AGRICULTURAL ENGINEERING

COURSE CODE & NAME: 19AGO301 & FARM MECHANISATION

III YEAR / VI SEMESTER

UNIT : I SCOPE OF MECHANISATION IN INDIA

TOPIC : 3





PRIORITY AREAS FOR INDIAN AGRICULTURAL MECHANIZATION

Intensification of R & D to introduce energy efficient machines for relatively un-mechanized crops such as cotton, sugarcane, oil seeds, pulses, vegetables & fruits. Use reverse engineering and enforce close collaboration with farm machinery manufacturers. Assist Indian manufacturers in seeking collaboration with well known foreign firms wherever desired engineering technologies are not available.

Intensify research in the area of tractor design engineering due to their extensive use in Indian farming. India is now the largest tractor manufacturer in the world. TMA needs to be involved in this task.

Farm machinery management research to find out use patterns, annual usage, breakdown frequencies, repair & maintenance cost and above all reliability.

Research on safety, comfort, exhaust emissions and health hazards in the use of mechanical power sources and machines needs to be expedited.

Emphasis be laid on conservation farming and energy saving/energy efficient tools and machines.

An area of utmost importance from environmental point of view is proper utilization of about 540 million tonnes of crop residues available in India. Punjab alone has 10 million tonnes paddy straw which is mostly burnt. Burning needs to be banned. Appropriate machines for incorporation of residues into the soil, for mulching, for collection, handling & transport for briquetting, gasification, power generation, and/or allied usage is a priority area in the field of mechanization.

Research on alternate engine /tractor fuels including bio-diesel, ethanol, producer gas need to be intensified.



Greater emphasis be laid on design and manufacture of high capacity and precision machines for multi farm use, for corporate/contract farming as well as for custom hiring through Agri. Business Centres being promoted by Govt. of India for the benefit of rural youths.

Equipment for post harvest transport, bulk handling, cleaning grading drying milling packaging and storage are urgently required. These could be imported wherever non-existent. Next revolution in agriculture must be ushered in the area of efficient food processing & agro industries to transform the rural areas & utilize the surpluses.

Mechanization packages will be crucial to ensure success of contract/corporate farming.

Mandi mechanization with a view to introduce bulk handling of grains is an urgent need.

Mechanization of hill-agriculture (20% total cultivated area), horticulture and floriculture, forage production and handling equipment, forestry mechanization, and efficient transport equipment are some important areas.

Women-friendly tools and gadgets need to be evolved by modifying the existing ones and designing the new tools to reduce drudgery to women workers.

Mechanization of experimental plots is an important area requiring urgent attention. A mission mode project under the NATP has recently been sanctioned in this area.

Nearly two-third of the cultivated area is rainfed. Farm power available in these areas is barely 0.3 kW/ha. Hence, mechanization of these areas should be under taken on priority basis. Large horse power tractors and suitable equipment for conservation of soil moisture, seed bed preparation, seeding/planting, harvesting etc., are required.

The benefits of farm mechanization have so far remained confined to mainly wheat-based cropping systems. These need to be expanded to all cropping systems including horticulture.



The present credit policy based on land mortgage is not favourable to small farmers to own mechanical prime movers. It excludes them from the benefits of farm mechanization and supplementing their incomes through hiring out their spare operational capacity. Instead of land mortgage, viability and hypothecation of the machinery may be better criteria.

There being a positive relationship between power availability and agricultural productivity, power constraint should be removed. An annual growth rate of 4% over 1996 base in power supply to raise it from 1kW/ha to 2kW/ha by 2020 will be adequate to maintain a growth rate of 3% or more in agricultural production. This is based on “power-production relation” studies in India and abroad. The additional power will be supplied by tractors, power tillers, self-propelled machines, engines and electric motors.

For precision farming, precision equipment for planting and plant protection are required.

Increasing emphasis on Integrated Pest management and Organic farming would require use of efficient cultivation machinery for weeding and hoeing. Research in this area would be necessary to evolve optimum planting geometry and practices.

Under the WTO regime with liberalization of markets foreign countries might take advantage of dumping their machinery in India, especially such equipment as sugar-cane harvesters, paddy transplanters, potato combines, cotton pickers, horticultural machinery, sprayers unless required equipment are expeditiously developed indigenously and have cost and quality competitiveness. Joint projects by R&D organizations and Indian firms would be desirable.



SUGGESTIONS FOR FURTHER IMPROVEMENT

- 1.No Farm Machinery research/development project should be initiated without conducting a market survey to assess the client needs and perceptions.
- 2.Greater industry-institution collaboration by undertaking joint research projects and use of reverse engineering would be helpful for speedy development and commercialization of new equipment.
- 3.Computer Aided Design (CAD) must be used for optimum design, cost reduction and reliability. All R&D organizations must have a CAD facility with latest design packages. Train R&D engineers to develop proficiency in computer aided design.
- 4.R&D engineers must ensure compatibility of their designs with BIS/ISO standards, norms and practices.
- 5.Standardization of critical components to ensure quality, durability and inter changeability is essential.
- 6.Up gradation of manufacturing technology to upgrade quality and reduce the cost.



1. It is understood that a proposal is afoot to establish a Farm Mechanization Institute under the auspices of the Ministry of Agriculture and Co-operation. This institute will intensify research on different aspects of Farm Mechanization including techno-socio-economic aspects with a view to develop a long range Farm Mechanization Policy. A Draft Agricultural Mechanization Policy has already been evolved and it awaits approval of the government. Since bulk of tractor and farm machinery manufacturers are located in the northern states of India, it might be desirable to locate such an apex institution in the Punjab, as this state in spite of being one of the most mechanised states in the country, has just one ICAR institute, whereas her neighbouring states have 2 to 3 ICAR/central institutes.

To sum up, it may be concluded that farm mechanization is a dynamic technology. It evolves with changes in agriculture in a region/state/country. With diversification of agriculture and adoption of frontier technologies with a view to have eco-friendly sustainable agriculture with globally competitive outputs, cutting edge farm mechanization technologies will need to be developed and introduced expeditiously. Reduction in cost and up-gradation of quality are the twin goals to be achieved. Farm mechanization technology being capital intensive, all farm mechanization R&D projects must be demand-driven and reverse engineering approach must be followed. Up-gradation of manufacturing capabilities, use of computer-aided design and close co-operation with industry through joint projects will help improve the quality and reliability of farm equipment. Conformance to global standards and norms will be necessary. In coming years, higher horse power tractors and high capacity machinery will be required to meet the needs of export oriented agriculture, corporate farming, custom hiring and multi-farm use. Human engineering applications to ensure safety, comfort and compatibility in respect of noise levels and exhaust emissions will be necessary. The future of farm mechanization in India is bright. However, we will have to intensify research funding and efforts in frontier areas as outlined in this chapter.



Thank You