



CSAM



Sustainable Mechanization for Smallholder Farmers in India



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INDIA

Introduction



India, is a country lying in the Northern Hemisphere extending between latitudes $8^{\circ} 4'$ and $37^{\circ} 6'$ north, longitudes $68^{\circ} 7'$ and $97^{\circ} 25'$ east



Border countries : Afghanistan and Pakistan to the north-west;
China, Bhutan and Nepal to the north;
Myanmar and Bangladesh to the east.
Sri Lanka is separated from India by a narrow channel of sea, formed by Palk Strait and the Gulf of Mannar.



Rich cultural heritage



Red Fort-New Delhi



Madurai Meenakshi Temple-Tamil Nadu



Indian Agriculture dates back to Indus Valley civilization.

- India ranks second worldwide in Farm output
- Total geographic area -328 million hectares
- Gross cropped area -220.9 million hectare
- Net sown area – 141.4 million hectare
- Net irrigated area – 62.8 million hectares
- India is the world's largest producer of many fruits,
- Second largest producer of rice and
- One of the world's five largest producers of animal husbandry products.

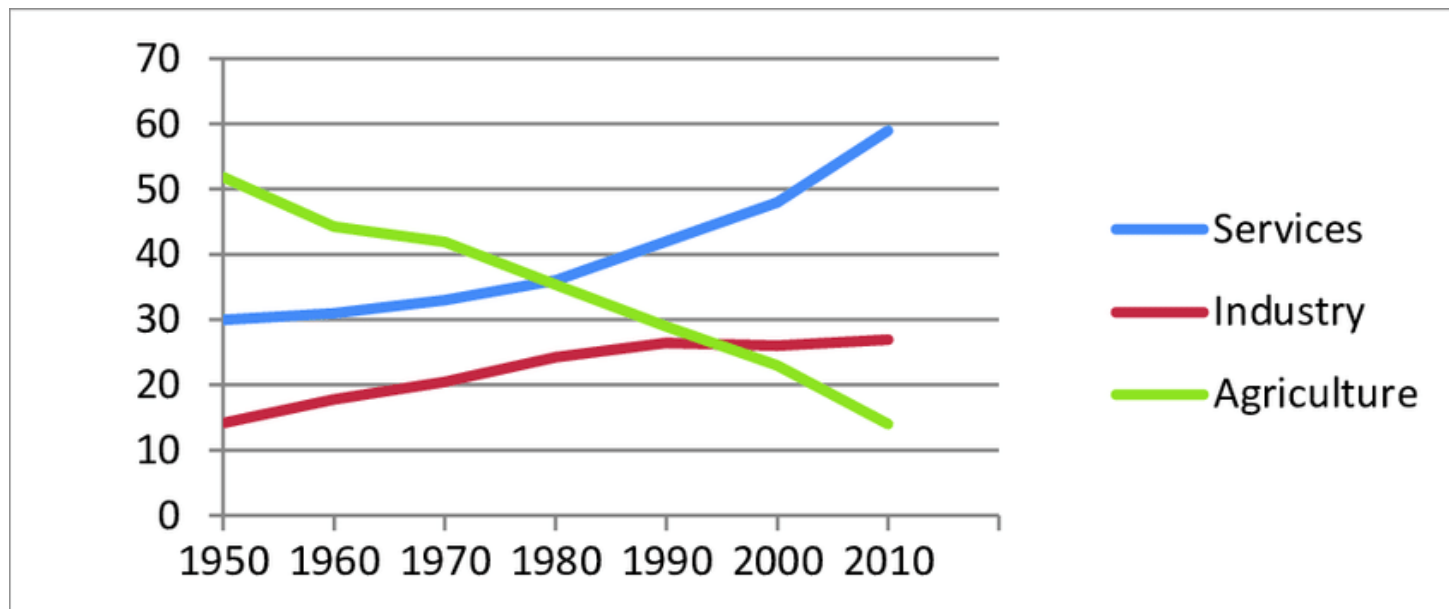


Source: Department of
Agriculture, Cooperation &
Farmers Welfare





Sector wise contribution to GDP



The Agricultural sector is the largest employer in Indian economy, but contributing to declining share of GDP



Indian agriculture;

- Contributes to 17-18% of GDP
- Provides food to 1 billion people
- Sustains 65 % of the population
- Produces 51 major crops
- Supplies raw materials to the industries
- Contributes to 1/6th of export earnings.





After Independence,

The total annual grain production was only 50 million tonnes during 1951.

Concerted efforts were made in the late 1960's by introducing

- high yielding varieties,
- fertilizers,
- agro chemicals for plant protection,
- **agricultural machinery** and new technologies resulting from research and development.

This led to green revolution and the grain production raised to three fold times in the mid eighties and has reached a record harvest of 277.49 million tonnes.



The population of India is the second largest in the world. By 2025 it will be the largest with a population of 1451 million. By that time providing food with available resources will be a major problem. The challenges and constraints of Indian agriculture will be

- Small and fragmented land holdings
- Lack of mechanization
- Availability of quality seed
- Water resources
- Climate changes
- Global changes
- Diversification
- Financial constraints



Country level situation

According to the Agriculture Census, the total number of operational holdings in India numbered 138.35 million with an average size of 1.15 hectares. Of the total holdings, 85 per cent are in marginal and small farm categories of less than 2 hectares. The estimates indicate that small and marginal farmers may account for more than 91 per cent of farm holdings by 2030.

India's small-holder farmers comprise 78 percent of the country's farmers, but own only 33 percent of the total cultivated land; they nonetheless produce 41 percent of the country's food-grains.

Their productivity is somewhat higher than that of medium- and large-size farms.



Number of Holdings in India (in '000)						
Year	Marginal	Small	Semi-Medium	Medium	Large	All Sizes
1970-71	36200	13432	10681	7932	2766	71011
1976-77	44523	14728	11666	8212	2440	81569
1980-81	50122	16072	12455	8068	2166	88883
1985-86	56147	17922	13252	7916	1918	97155
1990-91	63389	20092	13923	7580	1654	106637
1995-96	71179	21643	14261	7092	1404	115580
2000-01	75408	22695	14021	6577	1230	119931
2005-06	83694	23930	14127	6375	1096	129222
2010-11	92826	24779	13896	5875	973	138348

Source:india.gov.in

Since 1970, the average size land holding has decreased from 2.3 ha hectares to 1.15 hectares which accounts for the decrease of 30,000 hectares of cultivable land each year.



Agricultural Mechanization

The first tractor was brought to India in 1914.

The crawler tractors were imported during 1940.

The mechanization started during 1942 and there was significant progress in the period 1971 to 2010.

There was increased demand for mechanization services and there was quantum leap in the food production. Agricultural mechanization spread widely and policy decisions were taken to allow mechanization to develop on its own merit and strength.

Mechanization as a whole helped in increasing the productivity with significant impact on small holdings.



Agricultural research and education has been a major consideration in agricultural development in India.

The Department of Agricultural Research and Extension under the Ministry of Agriculture, coordinates and promotes agricultural research & education in the country.

The Indian Council of Agricultural Research (ICAR) institutes and state agricultural universities (SAUs) are located in several states. The ICAR is implementing several schemes in collaboration with state Agricultural Universities.



The All India Coordinated Research Projects (AICRPs) are implemented

under the guidance of ICAR and these currently include research on :

- Farm Implements and Machinery,
- Renewable Energy Sources,
- Utilisation of Animal Energy,
- Ergonomics and Safety in Agriculture,
- Post-Harvest Technology, and
- Application of Plastics in Agriculture.

All these AICRPs have cooperating centres located in different states so as to cater for the mechanization needs of the different agro-climatic zones.



Extension Services

Facilitation of the extension services concerning agricultural technologies in general and agricultural mechanization in particular have been focused on the following areas:

- Provision of institutional arrangements to make the extension system farmer driven and farmer accountable.
- Encouragement of Public Private Partnerships (PPPs).
- Strengthening of Mass Media Support by providing location-specific broadcasts through FM and AM stations of All India Radio and the Doordarshan (DD) National TV Channel.
- Provision of fee-based advisory services by graduates in agri-business development and through the establishment of agri-clinics.
- Operation of Kisan (Farmer) Call Centres through toll-free lines.



During the XII Plan the Ministry of Agriculture launched a Sub-Mission on Agricultural Mechanization with following components:

- Promotion and strengthening of agricultural mechanization through training, testing and demonstration
- Post-harvest technology and management
- Financial assistance or procurement subsidy for selected agriculture machinery and equipment
- Establishment of farm machinery banks for custom hiring by small and marginal farmers
- Establishing hi-tech and high productive equipment hub for custom hiring
- Enhancing farm productivity at village level by introducing appropriate farm mechanization in selected villages
- Creating ownership of appropriate farm equipment among small and marginal farmers in the eastern/north eastern regions

Constraints and challenges



The challenges faced by small and marginal farmers in India are

- 1 • Land issues
- 2 • Water problems
- 3 • Credit and Indebtedness
- 4 • Climatic changes
- 5 • Globalization changes
- 6 • Social Groups
- 7 • Low level Education
- 8 • Diversification
- 9 • Role of women
- 10 • Associated risks

Good practices



Mechanization was adopted due to the advantages of saving in time and timeliness of operation. However, the cost of machinery was the prime concern of the farmers, which restrained the small farmers to accept. The efforts taken by the government and institutions created confidence among the farming community.

Custom hiring centres and Agri-clinics were started in many parts of the country which provided the needy machinery to the farmers on hire basis. Small farmers became entrepreneurs. Apart from that small tools and implements proved successful among small farmers.



The drum seeder, paddy power weeder, and Coconut tree climber are few examples which proved to be successful .





Recommendations

Small holder farmers mechanization is critical issue which requires contribution from farmers, Government, Manufacturers, Academia and policy makers. The main focus is not only to create awareness about recent developments but also about the health issues, which necessitates the use of drudgery reducing machinery.

- Water is the most important input in agriculture.

Conservation and efficient use of water is very important.

Irrigation and water management needs to be developed



- When waste and cultivable lands are brought into cultivation, Inputs required for initial land development and credit should be provided to every farmer.
- Natural resource management among resource dependent communities and small land holders should be properly addressed.
- Enhancing infrastructure support to women farmers, protecting women's rights in land and giving legal support on existing laws, will facilitate recognition for women as farmers and enable them to access credit, inputs, and marketing outlets
- Research for mechanizing small farms need to be strengthened so that drudgery reducing , women friendly equipments are developed.



- Technical expertise through information technology may be provided to the farmers to learn new and improved agricultural practices.
- In India's peri-urban areas and in the off-seasons, small-holder farmers engage in off farm paid work. Such work may be in the tourism and eco-tourism industry, in offshore assembly, or in various agriculture-related or non-agriculture-related enterprises.



Conclusions

Government of India had launched many schemes for the benefit of the farmers.

- National Food Security Mission
- Rashtriya Krishi Vigyan Yojana
- Pradhan Mantri Krishi Sinchai Yojana
- Krishi Karman Award
- Price support scheme
- Market intervention scheme



If well planned and executed, every scheme can be expected to reach the small and marginal farmers of the nation. We need to provide much more inputs for the small and marginal farmers in rural areas and help them get over the line of poverty and hardships.

Small and marginal holdings agriculture is important for raising agriculture growth, food security and to improve the economy in India. These holdings contribute to 80% of Indian agriculture. The future of sustainable agriculture growth and food security of the nation depends on the performance of these small and marginal farmers.



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Thank You

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