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## ROLE OF MECHANIZATION IN AGRICULTURE IN THE PRESENT SOCIO-ECONOMIC SITUATIONS: A CASE STUDY OF ANDHRA PRADESH

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### ABSTRACT

*Cultural operations for sugarcane production are arduous especially planting, irrigation and harvesting. In the recent past, labour scarcity coupled with high labour wage rate greatly affected the irrigation and harvesting of the crop in time. The objective of present research is studying the position of the role of mechanization in agricultural in the present socio-economic situation. It has reduced sugarcane area from 3.91 lakh ha 2006–2007 to 3.14 lakh ha in 2009–2010 at Andhra Pradesh. Modern sugarcane machinery and labour saving devices were introduced at large scale to reduce the dependency of labour, and complete the farm operation in time. Mechanical operations proved that it was superior to manual operations. It reduced cost of production and enable efficient utilization of resources with better work output. For e.g. Furrow method of irrigation requires about 320 man-hour as against drip irrigation requires of only 30 man-hours. Manual harvesting required about 1,000 an hour with the cost of Rs 55,000 to harvest 100 t/ha (Rs 550/tonne) against Rs 32,500/ha (Rs 325/t) with the labour engagement of 12 man-hours/ha. Now it is inevitable to use modern sugarcane machinery, which is now available in the-country like sugarcane planters weeding machinery and imported harvesters. Although their initial cost is very high but advantages accrued in their use are much more. There is an enormous need to use drip irrigation and mechanical harvesters to mitigate acute labour scarcity.*

### KEYWORDS

mechanised farming, agricultural, food security, production, scarcity.

### INTRODUCTION

Andhra Pradesh is endowed with fertile soils and favourable climate, two factors ideal for agriculture. But more than two-thirds of Andhra Pradesh's population do not have enough food to eat. A huge contradiction! That is why Government has started numerous interventions to transform the millions of Andhra Pradesh households from subsistence agriculture currently to commercial or large scale farming through agricultural modernisation- to increase farm output- and agricultural transformation to create the value chain and agribusiness.

### STATUS OF FARM MECHANIZATION IN INDIA

Even though farm mechanisation shows an increasing trend, there are wide ranging disparities in the levels of mechanisation across states. Northern States such as Punjab, Haryana, and Uttar Pradesh have achieved a faster growth in mechanization over various Plans. The sale of other implements and machines like combine harvesters, threshers and other power-operated equipment have been increasing almost throughout the country. The pace of mechanization in North-Eastern States has not been satisfactory due to constraints such as hilly topography, socio-economic conditions and high cost of transport, lack of institutional financing and lack of farm machinery manufacturing industries. Mechanization in Western and Southern states of the country viz., Gujarat, Maharashtra, Rajasthan and certain areas of Tamil Nadu, Andhra Pradesh etc., has increased with the increase in area under irrigation and also with the growing awareness among farmer.

### MECHANIZATION IN ANDHRA PRADESH

Machines for conducting agricultural operations, replacing the traditional methods which involve human and animal labour. Agricultural mechanisation is recognized in enhancing production together with irrigation, biological and chemical inputs of high yielding seed varieties, fertilizers and pesticides among others. Mechanization is important for profitable and competitive agriculture. In Andhra Pradesh, the need for mechanisation of agriculture is growing fast and the urgency is growing even faster. A machines deal with Planting, tending and harvesting a crop requires both a significant amount of power and a suitable range of tools and equipment. Mechanised farming increases the acreage for farming which translates into higher farm yields. Most farmers in developing countries such as Uganda experience a greater annual expenditure on farm power inputs than on fertilizer, seeds or agrochemicals. "A tractor can plough seven to ten hectares in one day which no single human being can do. This means increased production. The crops are also planted in rows, which enables farmers to calculate their yields," Without mechanization it is not possible to maintain multiple cropping patterns, which need quick land preparation, planting, weeding, harvesting and processing. In Andhra Pradesh agriculture is characterized by overwhelmingly small holdings due to high population density. As of 2010, Andhra Pradesh's rural population stood at 86.7 per cent, according to a World Bank report published in 2012. Nearly two-thirds of Andhra Pradesh's population lives in rural areas. These are held back by inherent challenges such as land fragmentation, poverty and inadequate knowledge about use of agricultural machinery. These hazards have curtailed the move to mechanized agriculture. For instance, Andhra Pradesh farms range from 1 to 1,000 acres with the majority in the range of 5 to 100 acres. This smallness of acreage is not ideal for mechanised farming, which requires large tracts of land in order to exploit its optimal capacity.

**Bagheri and Moazzen (2009)** investigated agricultural mechanization challenges in Andhra Pradesh. They found that an important part of challenges belonged to human resources. Therefore, development of human resources is the most effective way to solve many challenges. To improve the situation of agricultural mechanization in Andhra Pradesh, government carries out many attempts. Nevertheless, current situation of agricultural mechanization is not acceptable. Previous researches indicated that some challenges hinder the development of mechanization in Andhra Pradesh and it is necessary to be known. So, the main objective of this research is to find out and then prioritize agricultural mechanization challenges in national level.

**Olaoye and Rotimi (2010)** Agricultural mechanization constitutes the centre stage power source for boosting agricultural production. The application of machines in agricultural production minimizes the burdens and drudgery of manual farm labour, and increases farmers' income production in Sub-Saharan Africa. Analyzed effective factors on agricultural mechanization in Andhra Pradesh. Information was collected through a questionnaire survey, covering 120 farm households, and group discussion and key informant interviews. In both instances of farm mechanization, the degree of commercialization is the most influential factor, indicating the significant role of mechanization in agricultural commercialization.



## OBJECTIVES AND METHODOLOGY

Though the paper aims at studying the position of the role of mechanization in agricultural in the present socio-economic situations, it confines itself to the rural scene only. The role of mechanization in agricultural working in and around the urban areas and semi-urban areas are not covered in the present study. Covering all the role of mechanization in agricultural working in the selected villages is also an unwieldy task and hence the present research is restricted for studying the cases of only a limited number of the role of mechanization in agricultural.

## RESULTS & DISCUSSIONS

It is of utmost importance to examine whether the use of machines has been economical or not. On the basis of a study covering 203 farmers having 218 tractors in different districts of Punjab it was brought out that the total use of the tractor, which on an average came out 397 hours per annum is much less than the possible extent of 1000 hours. The cost per cent hour turned out to be very high due to high fixed cost, during 1961-66 whereas, Gurdaspur district attained the maximum growth of 135.54% during 1966-72. Tractor density, which was quite low being 1.31% prior to Green Revolution, moved up to 18.03% in 1976-77. The growth in production, imports and sales of tractors in Indian agriculture over the period 1960-61 and 1987-88. The study revealed that tractorization had proceeded much faster in states such as Punjab and Haryana, which have gone through green revolution while many other states had not made much progress. Andhra Pradesh found that there had been substantial increase in the population of tractors in the state of Madhya Pradesh and the number, which was 1,311 in 1956-57, increased to 3,544 in 1969-70. District-wise analysis showed that tractor population recorded significant increase in almost all the districts, and seven districts accounted for more than 50% of the total tractor population in the state during 1969-70. Krishna district recorded the maximum growth rate and in terms of gross cropped area, the number of tractors per 10,000 acres of gross cultivated land increased steadily from 0.30 in 1956-57 to 0.70 in 1969-70. The district-wise distributions of tractors for the year 1987-88 were also examined by the study. The study revealed that tractor population in different districts was quite skewed and it varied between 37.73 and 84.61 per thousand hectares of cultivated land in Gurdaspur and Ludhiana districts respectively. Singh (1992) revealed that number of tractors in Punjab increased from 10,636 in 1965-66 to 2, 75,000 in 1990-91. Ropar district attained the maximum growth rate. The tractor density in the state increased from 10 per cent thousand hectares in 1971-72 to about 60 per thousand hectares in 1988-89. The inter-district tractor concentration revealed that the intensity of tractor population was largely correlated with the availability of irrigation facilities and the districts with more intensity of irrigation had higher concentration of tractors. Rank correlation analysis indicated that agricultural productivity and irrigation were important determinants of tractorization. The farm mechanization is dependent mainly upon the size of operational holding, land topography, availability of credit facilities and per hectare profitability which in turn is affected by per ha yield, cropping intensity, market prices etc. For the country as a whole, there were 63.47 tractors per thousand of cultivated hectares or 45.91 per thousand of cropped hectares in 1999-2000. The intensity of tractors in the hilly areas such as Sikkim, Tripura, Mizoram, and Arunachal Pradesh, Assam was low because of operational problems of farm machinery and low crop yields.

## CONCLUSION AND FINDINGS OF FARM MECHANISATION

The results of this study indicated that the small size of farms and traditional forms of gardens, severe and long process for paying credit loans, financial weakness of agricultural beneficiaries, and weakness of agricultural mechanization programs because of their low feasibility and adaptability and slow trend of beneficiaries in accepting new technologies were determined as the most important challenges facing agricultural mechanization development in Iran. The results of factor analysis indicated that 69.1 % of the variances in the challenges of agricultural mechanization could be classified in seven groups of programming, technical, infrastructural, managerial, economical, research and extension, and content area. It is necessary to mention that the most important challenges include: inefficiency of subsidy payment methods for buying agricultural machinery, large number of time-worn agricultural machinery, incomplete collection of agricultural equipment's for power generator machinery (tractor), slow trend of beneficiaries in accepting new technologies, financial weakness of agricultural beneficiaries, inefficiency of agricultural extension and education methods, and weakness of agricultural machinery producers and operators in protecting their guild benefits.

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## TABLES

**TABLE 1: TREND OF MACHINERY POPULATION IN ANDHRA PRADESH IN AGRICULTURE (Number in millions)**

Machinery	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01	2011-12
Tractor	0.001	0.01	0.08	0.228	1.233	2.641	3.322
Power tiller	0.000	0.000	0.017	0.08	0.095	0.118	1.032
Combine harvesters	0.000	0.000	0.000	0.000	0.003	0.006	0.009
Electric Pump	0.02	0.1	1.029	4.33	8.91	12.514	16.916
Diesel Pump	0.083	0.23	1.546	3.101	4.659	5.94	7.068
Power sprayer/ Duster	0.000	0.000	0.045	0.124	0.2	0.311	1.003

Source: Primary Data

TABLE 2: GROWTH OF MECHANICAL POWER OPERATED AGRICULTURAL MACHINERY IN ANDHRA PRADESH (Number in thousands)

Implement	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01	2011-12
Combine (Tractor)	2.1	4.1	8.0	9.5	12.6	19.3	26.7
Harvester (self-propelled)	3.1	2	4.2	9.6	16.8	19.3	27.9
M.B & disc. Plough	253	426	655	1256	2400	3614	4126
Disc. Harrow	261	556	1203	1930	2630	3678	4563
Cultivator	462	826	1623	2346	2923	3123	3462
Seed Drill/seed fert. drill	156	326	632	1245	2456	2963	3124
Planter	61	126	246	456	841	1679	3623
Leveller	261	465	845	1623	3125	4563	6548
Potato digger	3.1	6.3	126	248	326	426	654
Total threshers	910	1810	2403	3578	4123	5621	6789
Sugarcane crusher	256	623	896	1145	1432	1556	1781

Source: Primary Data

TABLE 3: TOTAL MAJOR FARM EQUIPMENT IN ANDHRA PRADESH DURING PERIOD 1950-2012 (Number of Units)

Farm Equipment	Number of Units
Tractor	1125341
Thresher	96256
Trailer	1235647
Seed Fertiliser Drill	856123
Disc Harrow	725634
Leveler	465789

Source: Primary Data

TABLE 4: MACHINERY SHARE OF NATIONAL INCOME IN ANDHRA PRADESH

Company	Products	Tractor sales as a % of total	Market Share in Tractors
Mahindra & Mahindra Ltd	Utility vehicle, LCV, Three wheelers, Tractors	15%	34%
TAFE Ltd	Tractors & Farm Machines	36%	18%
International Tractors Ltd	Tractors	56%	15%
New Holland	Tractors	65%	16%
John Deere	Tractors	56%	9%
Others	Tractors & Farm Machines	24%	6%

Source: Primary Data

TABLE 5: THE AGRICULTURE EQUIPMENT MARKET SHARE IN ANDHRA PRADESH

Year	Agriculture Equipment Market Share in Andhra Pradesh
1950-51	1.6
1960-61	1.9
1970-71	2.1
1980-81	3.9
1990-91	4.6
2000-01	6.8
2011-12	10.9

Source: Primary Data

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