

A STUDY OF TEMPORAL VARIATION IN AGRICULTURAL IMPLEMENTS IN IC HYPER ARID PARTIAL IRRIGATED ZONE

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ABSTRACT

Agricultural mechanization is an important input to agriculture for performing timely farm operations, reducing the cost of operations, maximizing the utilization efficiency of costly inputs (seeds, fertilizer, plant protection, chemicals, water and agricultural machinery, improving the quality of produce, reducing drudgery in farm operations, improving the productivity of land and labour and for improving the dignity of labour.

Keywords: Agriculture, Fertilizer, Productivity, Drudgery, Farm Operations.

Introduction

Relief and edapho-climatic conditions largely govern the use of agricultural implements and machinery in a region. In Ic Hyper Arid Partial Irrigated Zone few implements are required to perform agricultural operations mainly due to the predominance of wheat & groundnut cultivation. The most common agricultural implements used by farmers in the study region are the plough for tillage the land and carts for carrying material from place to place and field to field. The land resources being limited, the additional production will have to be achieved by increasing the productivity of land. That is possible by increasing the use of agricultural implement. Each of them is interlinked with the other interdependent of factor (Kadukar, P.M., 2006). These factors are topography, climate, type of soils, along with some socio-economic factors such as economic status. Social structure of community and choice of crop influence the use of agricultural implement. The farm implement are closely adjusted to the environment that there is little possibility of change (Singh, R.L., 1975). The agricultural implements are very simple in size, light and within the capacity of drought oxen (Shitole, P.A., 1990). They are wooden and iron ploughs for ploughing, harrow for crushing the seeds driller for sowing, hoes for inter culture, stoneroller for thrashing motes, oil engine and electric pumps for water lifting, carts for transport and tractors for many agricultural operations. Out of them wooden and iron ploughs, carts and soil engines, electric pumps and tractors are the factors considered in the present study.

Study Area

The Hyper Arid Partial Irrigated Zone (Zone Ic) lies between the irrigated North-Western (Ib), Ia-Arid Western and IIa-Plain of Inland Drainage. In Rajasthan, it spreads from Rajgarh tehsil in Churu district in the North-East to Sam tehsil in Jaisalmer district in the west. It covers the areas of Bikaner, Jaisalmer and Churu districts. The zone lies between 26°24' to 29°00' north latitudes and 69°29' to 75°41' east longitude by covering an area of 82,499 sq km with the altitude ranging from 229 to 292 m above mean sea level. The length of international boarder attached to the zone is 632 km (Fig.1). It is characterized by rocky-gravelly pediment, flat buried pediment, older and younger alluvial plains and riverbeds produced by the fluvial processes within the desert. The pediment is invariably flat, rocky or slightly veneered surface with sharp interface with the adjoining hill slope.

Research Methodology

The research work comprises of primary and secondary data. The primary data have been collected containing landuse, cropping pattern, irrigation facilities, use of machineries and equipments, crop combination, crop rotation, crop diversity, crop ranking etc.; whereas the secondary data have been gathered from various census records, journals and government publications. The literature survey on

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the various aspect of the Ic-Hyper Arid Partial Irrigated Zone has been undertaken in the libraries and internet searching. It also includes the study of respective issues from different governmental and non-governmental organization, and various academic and non-academic people have been consulted.

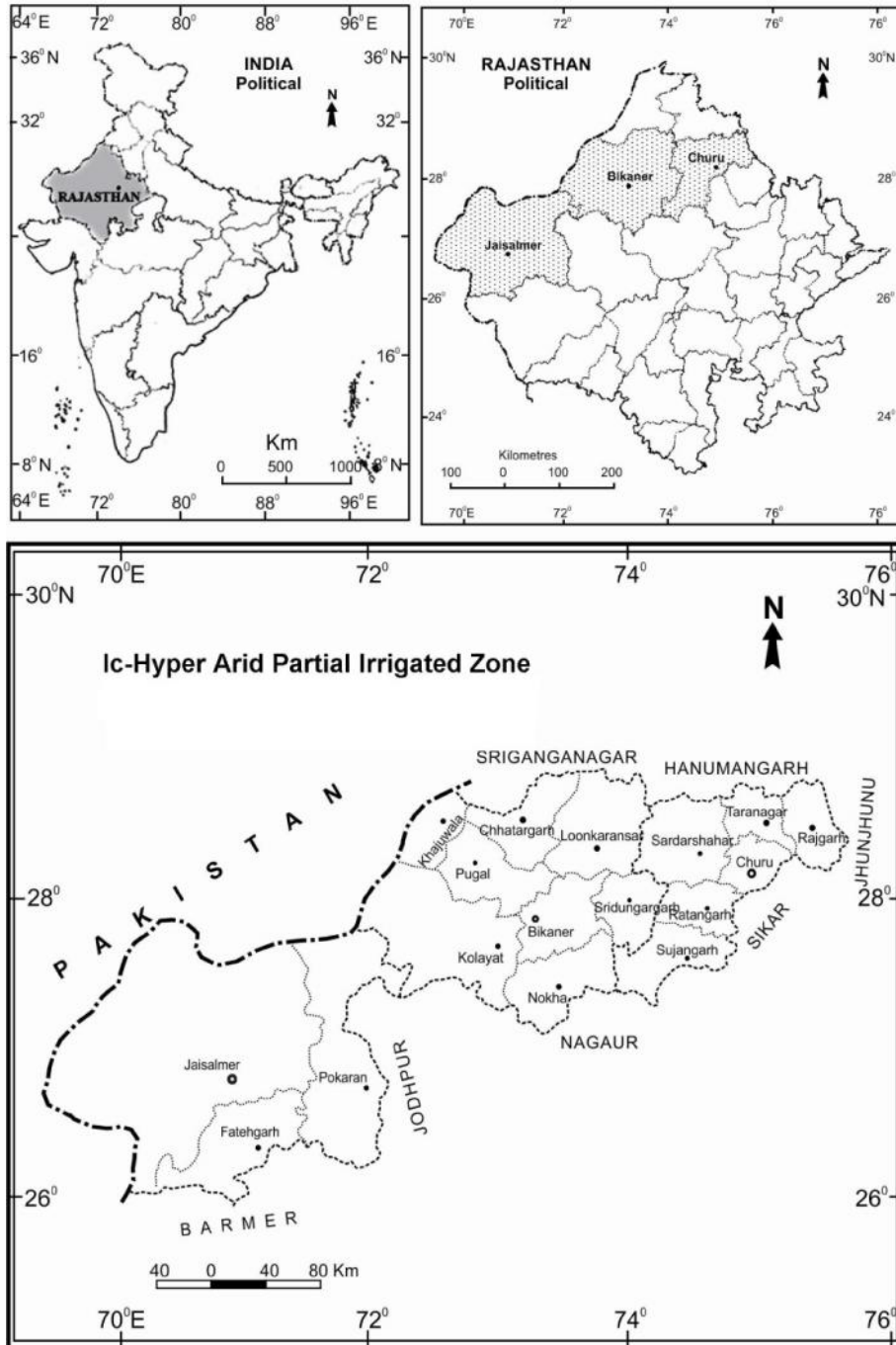


Fig. 1 : IC-Hyper Arid Partial Irrigated Zone - Location Map

After that compilation, calculation and computation of both primary and secondary data; the analysis is done. The final presentation of the same is done using cartographic techniques e.g. bar diagram, wheel diagram, line graph, choropleth and isopleth maps along with correlation and mean.

Objectives of the Study

- To assess the change in agricultural mechanization in the study area.
- To assess the existing mechanization system in the study area.

Review of Literature

Sanjeev Goyle (2013) showed that sustain increase of agricultural mechanization ensure greater return and timely operation. He told that farm productivity in India is far less than USA, Brazil, China and other developed countries. But population growth is very high in India. So to provide sufficient food grains for the nation's people farm mechanization is only remedy of this problem.

B.A. Mada and Sunday Mahai (2013) has showed the people are not interested in farm activities rather they are very much comfortable with non-farm job so they migrate from farm sector to non-farm sector. As a result farm size and farm rural wage have been increased. These were the driving force of agriculture mechanization industry. It had made off-farm employment opportunity and improves socio-economic status of rural farmers through the farm mechanization. To sustain income status of small scale farmers & welfare of rural farming communities, the manual power is gradually replaced by single axle multipurpose machines from land preparation to post harvest. They should be planned for joint utilization system of agricultural machinery to improve quality and quantity production of agricultural products.

Results and Discussion

The topography, climate, type of soils, along with some socio-economic factors govern the use of agricultural machineries and implements in a region. There are few types of machinery such as tractor, thresher, harvester etc. and implements as plough are required to perform agricultural operations in the study area. The land resources being limited, the additional production is to be achieved by increasing the productivity of land.

Tractor

Unlike farm workers and their bullocks or camels, the tractor is not tired. Moreover, the extra power, speed and persistence of the tractor enable the farmer to execute farming operations rapidly and to work round the year to create favourable soil preparation conditions. The farmers take decisions with regard to the bulk of investment in tractorization depending upon their capacity to invest and credit worthiness. The need of tractors for ensuring timely operations and for reducing the dependency on the uncertainties of hired labour (Singh and Dhillon, 1975). Tractor has also become a major vehicle of transportation particularly agricultural materials e.g. fertilizers, agriculture implements and produce from market to fields and fields to market. There has been more than three times increase in tractors from 9,566 in 1997 to 38,381 in 2015 in the entire study area. The proportion of tractors out of the total machineries and implements was 3.99, 2.24 and 3.03 per cent respectively in Bikaner, Churu and Jaisalmer districts in 1997 which has gone up to 13.47, 16.62 and 18.7 per cent respectively in the year 2015. In the same way, share of light commercial vehicles, and diesel and electric engines increased while the number of ploughs has decreased tremendously and have become about half during the same period which indicates rise of mechanization in the study area (table 1).

Plough

The agricultural implement are very simple in size, weight and within the capacity of farmers. They use wooden and iron ploughs for ploughing, harrow for crushing the seeds, driller for sowing, hoes for inter-culture, stoneroller for thrashing motes, diesel engine and electric pumps for water lifting, carts for transport and tractors for many agricultural operations. Out of them wooden and iron ploughs, carts and oil engines, electric pumps and tractors are considered in the present study.

Table 1 : IC-Hyper Arid Partial Irrigated Zone-Use of Machineries and Equipments

District	Year	Plough	LCV	Diesel Engine	Electric Pumps	Tractor	Total Implements
Bikaner	1997	77009	38197	270	493	4819	120788
	%	63.75	31.62	0.24	0.40	3.99	100
	2015	45532	68274	3886	7217	19452	144361
	%	31.54	47.3	2.7	4.99	13.47	100
Churu	1997	109136	45651	7	2622	3606	161022
	%	67.77	28.37	0.004	1.62	2.24	100
	2015	40361	22213	842	7861	14211	85488
	%	47.21	26.0	0.98	9.19	16.62	100

Jaisalmer	1997	30937	5308	148	86	1141	37620
	%	82.23	14.10	0.39	0.25	3.03	100
Total of Zone	2015	11104	7908	305	1333	4718	25368
	%	43.77	31.17	1.2	5.25	18.7	100
Total of Zone	1997	217082	39156	425	3201	9566	319430
	%	67.96	27.91	0.14	1.00	2.99	100
	2015	96997	98395	5033	16411	38381	255217
	%	38.0	38.55	1.97	6.43	15.03	100

Source: District outlines, Bikaner, Churu and Jaisalmer

The wooden ploughs are easy to handle to the farmers as well as bullocks or camels and it is also easy to repair in village level and widely used in the entire study region. It is made by the local carpenters using locally available wood. This is mainly due to the socio-economic conditions of the farmers, nature of landforms and low cost of manufacturing they have been used for many centuries. Table 1 reveals that total number of ploughs used in Ic-Hyper Arid Partial Irrigated Zone has decreased from 217,082 (1997) to 96,997 (2015).

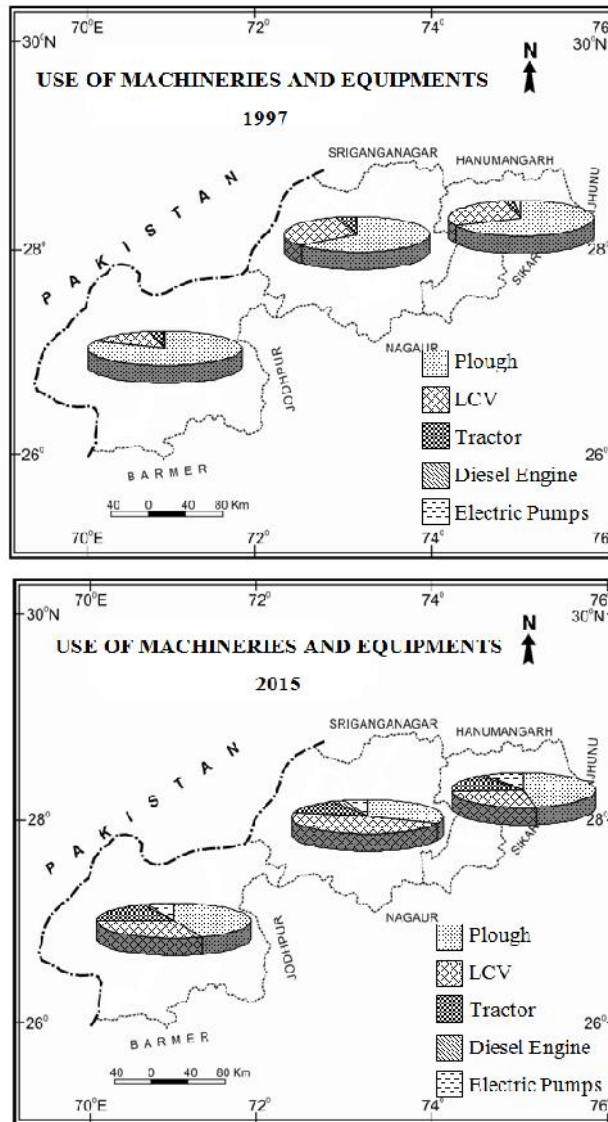


Fig. 2: IC-Hyper Arid Partial Irrigated Zone - Use of Machineries and Equipments

The highest number of ploughs were used in Churu district (109,136) followed by Bikaner (77,009) and Jaisalmer (30,937) in the year 1997 while their number has decreased to 45,532, 40,361 and 11,104 respectively in Bikaner, Churu and Jaisalmer districts in the year 2015. The percentage of ploughs to total number of implements was 67.96, 63.75 and 87.77 per cent respectively in 1997, have decreased to 31.54, 47.21 and 43.77 per cent respectively in the districts of Bikaner, Churu and Jaisalmer. It indicates the use of traditional implements to the mechanized equipments of cultivation in the study area.

Light Commercial Vehicle (LCV)

It is such a vehicle which not only serves as a means of transportation of goods and agricultural implements, raw material from field to field and place to place in the study region. There are great variations in the percentage of LCV to the total implements in the study area. The data reveals that in the year 1997 total number of LCVs used in the Ic-Hyper Arid Partial Irrigated Zone was 89156. The highest number of them was in Churu district (45,651) followed by Bikaner (38197) and Jaisalmer (5308) districts. The proportion of LCV to the total number of agricultural machineries and equipments increased from 31.62, 28.37 and 14.10 per cent in 1997 to 47.3, 26.0, 31.12 per cent respectively in Bikaner, Churu and Jaisalmer districts in 2015.

Diesel Engines

They are mainly used to lift water from wells of low depth and storage tanks to irrigate the crops. There has been more than six times increase in the total number of diesel engines in Ic-Hyper Arid Partial Irrigated Zone from 425 in 1997 to 5033 in the year 2015. The maximum share out of the total number of agricultural machineries and equipments is recorded in Bikaner district (2.7 per cent) followed by Jaisalmer (1.2 per cent) and Churu (0.98 per cent) in the study area in 2015. Due to expansion of electric transmission lines share of diesel pumping sets is reducing day by day.

Electric Pumps

It is an important device to lift the water from the source of water e.g. well, canal, tank etc. to the field. As a result of electrification the oil-engines are mostly replaced by electric pumps. The number of electric pumps used for agricultural purpose is increasing day by day in the study region. There has been more than three times increase in electric pumps from 3201 (1 per cent) in 1997 to 16411 (6.43 per cent) in the year 2015. The data shows that the proportion of electric pumps out of the agricultural implements has increased gradually in the study area.

Conclusion

Modern farming tools and technology like tractors, leveler, seeder, planter, threshers, harvesters, winnower and sprayers are also imperative for the successful cultivation of the high yielding varieties. These varieties require adequate arrangements of controlled irrigation. Raising of two or three crops from the same field is possible only if the modern technology is available to the farmers. The indigenous plough and bullock/buffalo carts are less efficient to complete the agricultural operation on time. Machinery like tractors, threshers, sprayers, tillers, chaff cutters, leveler, pumping sets etc. are required for the timely operations of sowing, weeding, spraying and harvesting. The present study concluded that the number of tractor, electric pump, LCV and diesel engines has increased in the study area during 1997 to 2015, where the number of plough has drastically decreased during the same time period.

References

- ✧ Ali, Mohammad (2013). Studies in Agricultural Geography, I Edition, Vasundhara Prakashan, Gorakhpur, pp. 99-109.
- ✧ Ali, Mohammed (1978). Studies in Agricultural Geography. Research Publication, New Delhi, pp. 1-6.
- ✧ Bhalla, G.S. and Gurmail Singh (2009). 'Economic Liberalization and Indian Agriculture: A State-wise Analysis', Economic and Political Weekly, Vol. 46, No. 52, pp. 34-44, Dec., 26.
- ✧ CAZRI (2009). Surface and Ground Water Resources of Arid Zone of India: Assessment and Management: In Trends in Arid Zone Research in India (eds.) Goyal, R.K., Angchok, D., Stabdan, T., Singh, S.B. and Kumar, H., Central Arid Zone Research Institute, Jodhpur.
- ✧ Chandana, R.C. and Siddhu, M.S. (1980). Introduction to Population Geography, Kalyani Publishers, New Delhi, p. 31, 144.

- ✕ GoR (2016). Rajasthan Agricultural Statistics At A Glance for Year 2000-01 to 2015-16, Commissionerate of Agriculture, Govt. of Rajasthan, Jaipur.
- ✕ Hussain M. (1997). Systematic Agricultural Geography, Rawat Publications, Jaipur and New Delhi, pp. 122-32.
- ✕ Hussain M. (2005). Human Geography, Fourth Addition Published by Rawat Publications, Jaipur, pp. 114.
- ✕ Majid Hussain (1996). Systematic Agriculture Geography, Reprinted 2014, Rawat Publication, Jaipur and New Delhi, pp. 255-257.
- ✕ Singh, J. (1974). 'An Agricultural Atlas of India -A Geographical Analysis', Kuruksheetra, Vishal Publication, p. 263.
- ✕ Singh, J. (1976). Agricultural Geography, Tata McGraw Hill Publishing Co. Ltd., New Delhi, p. 221.
- ✕ Singh, J. and Dhillon, S.S. (1995). Agricultural Geography, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, p. 116
- ✕ Socio-Economic Review and Statistical Abstract of Bikaner and Churu Districts, 2000-01.
- ✕ Socio-Economic Review and Statistical Abstract of Bikaner and Churu Districts, 2010-11.
- ✕ Socio-Economic Review and Statistical Abstract of Jaisalmer District, 2000-01.
- ✕ Socio-Economic Review and Statistical Abstract of Jaisalmer District, 2010-11.

