



The Impact Of Infrastructural Factors On Changes In Land Use And Cropping Pattern At Village Level Of The District Lahaul And Spiti Of Himachal Pradesh

Dr. Shashi Sharma

Assistant Professor

Department of Economics

Govt College Kullu, Himachal Pradesh, India

Abstract: The pace and pattern of agricultural development are largely conditioned by the growth of infrastructural facilities of road, transport, power, extension services, research institutions, market, irrigation, communication system and financial institutions etc. in particular and educational, health and animal institutions etc. in general. The infrastructure plays a critical role on both input and output sides. While on the input front, it helps to ensure timely and adequate deliveries to farmers and on the output front it helps integrate local market with national and international markets. Besides these economic activities, there are large number of educational and health institutions which plays a vital role in the socio-economic development of the people and literacy percentage is an important index of human capital investment. These infrastructure facilities have created significant impact on changes in land utilization and cropping pattern for bringing about crop diversification in the district.

Index Terms - Land Use, Cropping Pattern, Roads, Rural Electrification, irrigation, Communication System

Introduction

Lahaul and Spiti is the largest district of Himachal Pradesh in terms of geographical area. Total geographical area of the district is 13,835 square kilometres which accounts nearly for one-fourth of the total geographical area of the state. It has two distinct parts viz., Lahaul and Spiti. Lahaul-Spiti is situated in the North-Western part of Himachal Pradesh and lies between north latitude $31^{\circ}44'57''$ and $33^{\circ}42'54''$ and east longitude $76^{\circ}46'29''$ and $78^{\circ}41'34''$. One of the basic pre-requisites of economic growth of an area is the creation of a minimum level of basic infrastructure facilities. The roads constitute the very life line of economy particularly so far, the tribal areas of the district Lahaul-Spiti of this Pradesh located in the lap of the greater Himalayas where no other means of communication are available, rather possible. The roads open up the area to the exchange of ideas, facilitate the movement of human and material resources and thus, constitute the very core of industrial and commercial growth. It is a basic capital asset which is essential for any developmental work. There were about 557 kms roads including jeepable roads in 1979-80 as compared to 1232 km in 2012-13 and the density of population is 2 per square km. The infrastructure plays a critical role on both input and output sides. While on the input front, it helps to ensure timely and adequate deliveries to farmers and on the output front it helps integrate local market with national and international markets. The infrastructural factors have significant impact on changes in land use and cropping pattern at village level in the study area of the district Lahaul and Spiti of Himachal Pradesh.

Literature Review

Maghimbi (2007) conducted a study on recent changes in crop patterns in the Kilimanjaro region of Tanzania relating to the decline of coffee and the rise of maize and rice, based on secondary data. He concluded that peasant households in Tanzania have a variety of income sources. However, establishing a crop in the peasant farming culture requires much investment and the decline of a crop that is a source of livelihood can cause much misery. Widespread social and economic changes in the peasant society and in the regional society as a whole, have led to a decline in coffee crops in Kilimanjaro since the 1970s, despite the fact that coffee is its principal cash crop. This paper explores the decline of coffee and the ascendancy of rice and maize as major crops in the Kilimanjaro region. The argument is made that wider institutional changes, in addition to internal changes in peasant households, have contributed to the decline of coffee and the rise of maize and rice as the principal crops.

Bera (2008) conducted a study on change in cropping pattern and present status of horticultural crops in West Bengal for the period 1970-1971 to 2004-05 with a view to highlight the extent of commercialization of the state agriculture through introduction of horticulture crops to meet the growing needs of green vegetables, fruits and nuts in the domestic as well as international markets arising out of increase in per capita income and rapid urbanisation and also due to the opening up of the Indians economy. He concluded that the area under paddy showed a declining trend when measured as a percentage of total cropped area, but the remarkable increase in area failed to compensate the gross decline in area under total cereals and landslide decline in pulses forced area under food grains to drop down in the same measure, on the other hand, the area under horticultural crops increased in the successive decades. The study of index number of area under different crops showed faster rate of increase in area under horticultural crops compared to cereals for the same period and the percentage change in area of decline of net sown area by 1.90 per cent, the total cropped area has grown by 32.42 per cent which has helped the state to improve the cropping intensity by 46.37 per cent and the percentage increase in area under vegetables and fruits witnessed a galloping acceleration by 136.30 and 117.30 per cent respectively leaving far behind the increment in area under total cereals. In the case of production also, the increase in production of vegetable and fruits has been found to be greater than that of total cereals during the period 1991-92 to 2003-04.

Kumari (2013) conducted a study on changes in agricultural land-use pattern in Andhra Pradesh, based on the secondary data for the period 1998-99 to 2010-11. The study has revealed increase in the areas under forests, non-agricultural uses, miscellaneous tree crop and groves, net sown area, total cropped area and area sown more than once. In contrast, the areas under barren and unculturable land, permanent pastures and other grazing lands, culturable waste land, fallow land other than current fallows and current fallows have declined. Across food crops, the land-use under total foodgrains has witnessed an increase of 4.63 per cent in area. Though there is not much variation in the land area under cereals, the area under pulses has recorded an increase of 4.59 per cent to net sown area during the study period. She concluded that market driven changes in land-use pattern need policy support for growth, diversification and sustainability of agriculture in the state.

Objective:

- to assess the impact of infrastructural factors on changes in land use and cropping pattern at village level.

Sampling Design

The study is based on secondary data as well as primary data. The secondary data for the study have been collected from various sources and government agencies like Department of Agriculture and Horticulture, Directorate of Land Records, Directorate of Economics and statistics etc. the data has been collected by personal field visits and face to face interviews. A sample of 288 households spread over 12 sample villages in two development blocks in the district has been selected randomly. 1979-80 and 2009-10 comprehensive schedule has been used for data collection. In order to assess the impact of infrastructural facilities in the sample villages, it can be divided into three sections. The infrastructure factor relating to economic activities has been discussed in section 1. Whereas section 2 dealt with social aspects and the infrastructure factors pertaining to general (communication) activities has been explained in section 3. The details of which has been presented in Table-1.

ECONOMIC ACTIVITIES

Roads

One of the basic pre-requisites of economic growth of a particular area is the creation of a minimum level of basic infrastructural facilities. The roads constitute the very life-line of the economy particularly in the study area of district Lahaul and Spiti where no other means of communication are available rather possible. The roads open up the area to the exchange of ideas, facilitate the movement of human and material resources and thus, constitute the very core of commercial growth. It is a basic capital asset which is essential for any developmental work. The Table-1 reveals that out of 288 villages, 66.00 per cent villages were connected by roads in 1979-80 as compared to 100 per cent connectivity of these villages in 2009-10 of which 62.00, 69.00, 73.00 and 78.00 per cent on the marginal, small, medium and large size of holdings had connectivity in 1979-80 in comparison to 100 per cent connectivity of these category of households respectively in 2009-10. The tremendous improvement in roads connectivity in villages from 1979-80 to 2009-10 has caused a significant impact on the cropping pattern which has decreased the area under traditional crops viz. barley, wheat, buckwheat, pulses, local peas from 215.64 hectares in 1979-80 to 53.10 hectares in 2009-10. The reduced portion of area under traditional crops has been shifted to the commercial crops viz. potato, green peas, vegetables, apple, manu and kuth from 1979-80 to 2009-10. Besides this, it has also changed the land use pattern from 289.26 hectare in 1979-80 to 281.81 hectare in 2009-10 under total cropped area.

Road Transport

Likewise, road transport in the land locked area of the district Lahaul-Spiti is a vital instrument for its rapid economic growth. It facilitates speedy and cheaper movement of men and material besides increasing the mobility of labour etc. In these areas, goods transport is being operated both by private and public sectors. The passenger service is being attended by Himachal Road Transport Corporation a public sector undertaking. The Table-1 shows that 66.00 per cent villages have road transport facilities in 1979-80 as against 100 per cent transport facilities by 2009-10 which has also put a tremendous impact on changing the cropping pattern under commercial crops and land use pattern in the study area.

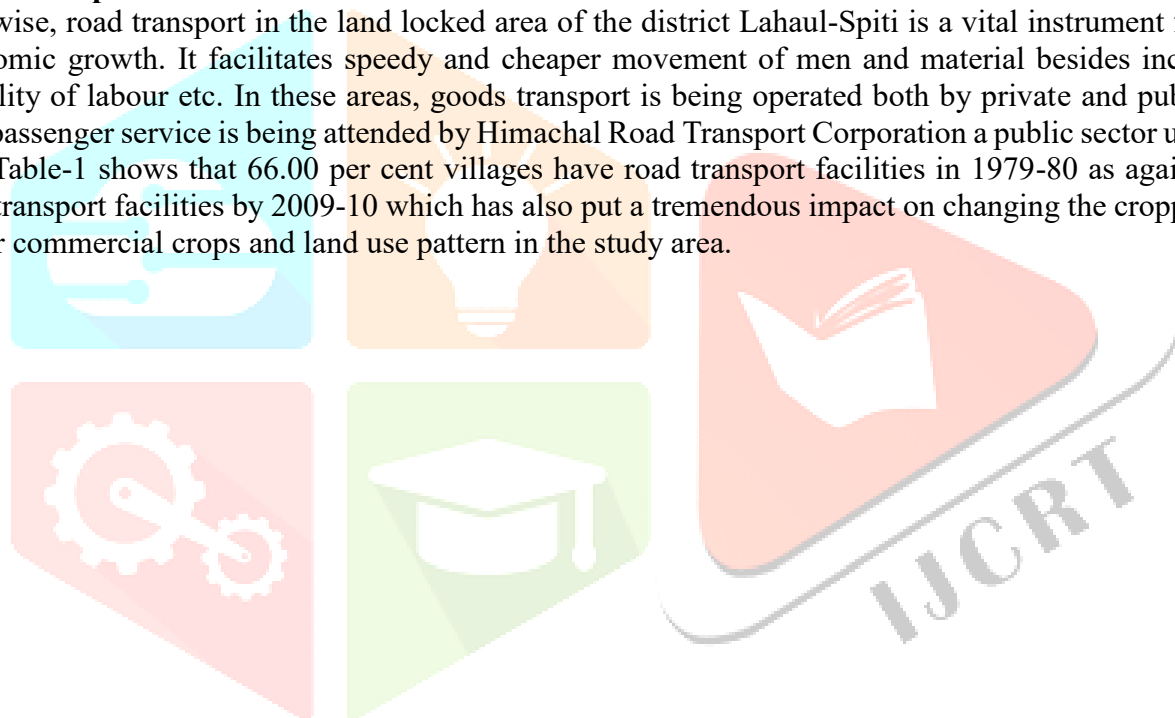


Table-8.1
The Impact of Infrastructural Factors on Changes in Land Use and Cropping Pattern at Village Level

(in numbers)

Sr. No.	Particulars	Size of Holdings									
		Marginal		Small		Medium		Large		All	
		1979-80	2009-10	1979-80	2009-10	1979-80	2009-10	1979-80	2009-10	1979-80	2009-10
1	Road connectivity										
	Motorable	90 (62.00)	145 (100)	59 (69.00)	86 (100)	35 (73.00)	48 (100)	7 (78.00)	9 (100)	191 (66.00)	288 (100)
2	Transport										
	Trucks	90 (62.00)	145 (100)	59 (69.00)	86 (100)	35 (73.00)	48 (100)	7 (78.00)	9 (100)	191 (66.00)	288 (100)
3	Input sale centre										
	Sale centre	56 (39.00)	145 (100)	45 (52.00)	86 (100)	26 (54.00)	48 (100)	6 (67.00)	9 (100)	133 (46.00)	288 (100)
4	Extension Srevice	106 (73.00)	120 (83.00)	55 (46.00)	69 (80.00)	32 (67.00)	42 (87.00)	8 (89.00)	9 (100)	201 (70.00)	240 (83.00)
5	Extension officers/ADO/H.D.O	106 (73.00)	120 (83.00)	55 (64.00)	69 (80.00)	32 (67.00)	42 (87.00)	8 (89.00)	9 (100)	201 (70.00)	240 (83.00)
6	Research Centre	---	145 (100)	---	86 (100)	---	48 (100)	---	9 (100)	---	288 (100)
7	Marketyard	---	86 (59.00)	---	41 (48.00)	---	22 (46.00)	---	5 (56.00)	---	155 (54.00)
8	Lahaul Potato Society	86 (59.00)	86 (59.00)	41 (48.00)	41 (48.00)	22 (46.00)	22 (46.00)	5 (56.00)	5 (56.00)	154 (53.00)	154 (53.00)
9	Irrigation Facility	50 (35.00)	145 (100)	33 (38.00)	86 (100)	15 (31.00)	48 (100)	3 (33.00)	9 (100)	101 (35.00)	288 (100)
10	Power Electricity	76 (52.00)	145 (100)	45 (52.00)	86 (100)	26 (54.00)	48 (100)	6 (67.00)	9 (100)	153 (53.00)	288 (100)
11	Cooperative society	86 (59.00)	86 (59.00)	41 (48.00)	41 (48.00)	22 (46.00)	22 (46.00)	5 (56.00)	5 (56.00)	154 (53.00)	154 (53.00)
12	Banking Facility	20 (14.00)	106 (73.00)	---	55 (64.00)	---	33 (69.00)	---	8 (89.00)	20 (7.00)	202 (70.00)
13	Education Institution										
	Primary	145 (100)	145 (100)	86 (100)	86 (100)	48 (100)	48 (100)	9 (100)	9 (100)	288 (100)	288 (100)

	Middle	131 (90.00)	145 (100)	72 (84.00)	86 (100)	39 (81.00)	48 (100)	9 (100)	9 (100)	250 (87.0)	288 (100)
	High	86 (59.00)	145 (100)	41 (48.00)	86 (100)	22 (46.00)	48 (100)	9 (100)	9 (100)	154 (53.00)	288 (100)
	Senior Secondary school	---	133 (92.00)	---	72 (84.00)	---	39 (81.00)	---	8 (89.00)	---	252 (87.00)
	Degree College	---	86 (59.00)	---	41 (48.00)	---	22 (46.00)	---	5 (56.00)	---	154 (54.00)
	I.T.I	---	86 (59.00)	---	41 (48.00)	---	22 (46.00)	---	5 (56.00)	---	154 (54.00)
14	Health Institution										
	Dispensary	91 (63.00)	125 (86.00)	35 (73.00)	63 (73.00)	20 (42.00)	40 (83.00)	4 (45.00)	8 (89.00)	150 (52.00)	236 (82.00)
	P.H.C	25 (43.00)	131 (90.00)	17 (20.00)	72 (84.00)	6 (12.00)	39 (81.00)	---	8 (89.00)	48 (17.00)	250 (87.00)
	C.H.C/Distt Hospital	Catering all sample villages from District Hospital Keylong and C.H.C Kaza									
15	Vetenary Institution										
	Vety. Dispensary	55 (38.00)	131 (90.00)	27 (31.00)	72 (84.00)	13 (27.00)	39 (81.00)	2 (22.00)	8 (89.00)	97 (34.00)	250 (87.00)
	Vety. Hospital	Catering all sample villages from District Vety Hospital Keylong and Reginal Vety Hospital Kaza									
16	Communication										
	Telephone	---	145 (100)	---	86 (100)	---	48 (100)	---	9 (100)	---	288 (100)
	Telegraph	20 (14.00)	145 (100)	---	86 (100)	---	48 (100)	---	9 (100)	20 (7.00)	288 (100)
	Post office	111 (47.00)	145 (100)	58 (67.00)	86 (100)	27 (56.00)	48 (100)	5 (56.00)	9 (100)	201 (70.00)	288 (100)
	Fax	---	106 (73.00)	---	55 (64.00)	---	33 (69.00)	---	8 (89.00)	---	201 (70.00)
	Television	---	145 (100)	---	86 (100)	---	48 (100)	---	9 (100)	---	288 (100)
	Mobile phone	---	106 (73.00)	---	55 (64.00)	---	33 (69.00)	---	8 (89.00)	---	201 (70.00)
17	Helicopter Service	---	106 (73.00)	---	55 (64.00)	---	33 (69.00)	---	8 (89.00)	---	201 (70.00)
18	Petrol Pump	---	145 (100)	---	86 (100)	---	48 (100)	---	9 (100)	---	288 (100)

Note: Figure in the parenthesis indicates percentage to total of respective category of households

Establishment of Sale Centres

The infrastructural facilities with the establishment of sale centres also help to ensure timely and adequate supply of inputs at cheaper rates to the farmers. The villages and fields are so located that in absence of road transport, the inputs as well as disposal of marketable surpluses, have to be transported on animal and human backs which increase the cost of production thereby making the entire activity un-economic. With a view to meet the requirements of improved seeds for further distribution to the farmers, supply of chemical fertilizers which plays a vital role in increasing agricultural productivity and production particularly of high yielding varieties which are fertilizer responsive, for minimizing the crop loss from insects, pests and diseases, effective plant protection measures are to be adopted and plant protection materials are to be distributed to needy farmers, the improved agricultural implements and machinery which has direct relation with the development of agriculture and reduces the labour cost and increase the yield of crops are dependent on the infrastructural facilities. The most of all these material components viz. seeds, fertilizers, plant protection material, implements and machinery are supplied to the input sale centres and are distributed to the needy farmers at subsidised rates through the Gram-Sewaks, village extension officers, in charge sale centers of the department of agriculture and horticulture for which these inputs sale centers have been established at village and panchayat levels. The Table-1 explains that out of total sample households constituting 46.00 per cent have input sale centre facilities established by the Himachal Pradesh Government at the nearby village/ panchayat level in the study area for the distribution of various agricultural inputs to the needy tribal farmers at the subsidised rates in 1979-80 as against 100 per cent coverage of sample households under these facilities in 2009-10. Similarly, the study of category wise holdings further reveals that 39.00 per cent marginal size of holdings had these infrastructure facilities in 1979-80 in comparison to 100 per cent in 2009-10. Likewise, 52.00, 54.00 and 67.00 per cent on the small, medium and large size of holdings respectively in 1979-80 as compared to 100 per cent size of holdings are covered under these facilities in 2009-10. The establishment of input sale centre facilities at the nearby village/ panchayat level for the distribution of various agricultural inputs at the subsidised rates to the farmers have helped them to reduce their area under traditional crops tremendously in face of commercial crops which has changed the land use and cropping pattern in the area.

Extension services/ Extension Officers/ADO/HDO

Extension services in the form of information dissemination, application of the package of practices etc for the cultivation of various traditional and commercial crops are also important to the rapid growth of the agriculture sector. Public research and extension service through Gram Sewaks in late seventies, village extension officers, agricultural/horticultural development officers posted at Sub-Division / circle level have played a major role in bringing about crop diversification. The Table-1 also shows that 201 sample size of holdings constituting 70.00 per cent have been benefitted through organizing various farmer training camps and extension services at Regional Centres/ Block/ Panchayat level by the agricultural/horticultural official ranking from Gram-Sewaks in seventies, Extension officers, Agricultural/Horticultural Development officers as well as Scientists of State Agriculture/Horticulture University posted at their Regional Centres for percolating technical knowhow and farm package of practices to the farmers at the grass root level for adoption in 1979-80 as against 83.00 per cent benefitted in 2009-10. The study of category wise holdings further depicts that 73.00 per cent on the marginal size of holdings have been benefitted by organizing training camps and extension services for adoption of modern agricultural technical know-how and farm package of practices in 1979-80 as compared to 83.00 per cent households benefitted in 2009-10. Similarly, 64.00 per cent households on the small size of holdings have been benefitted by these departmental officials in the training camps in 1979-80 as against 80.00 per cent households benefitted in 2009-10. Likewise, 67.00 per cent households on the medium size of holdings in 1979-80 as compared to 87.00 per cent households who have undertaken the above training camps and extension services in 2009-10. About 89.00 per cent households on the large size of holdings have been benefitted under the training camps in 1979-80 in comparison to 100 per cent benefitted in 2009-10. The extension services and the organization of training camps to the farmers have involved better linkages with the extension functionaries, scientists and the farmers who have exhibited high degree of transformation process towards commercial crops dominating the cropping pattern in the area.

Regional Research Centres

There are 2 Regional Research Stations: one at **Kukumsari Development Block Lahaul** under C.S.K Himachal Pradesh Agricultural University Palampur and another Regional Research **Station Tabo in Development Block Spiti** under Dr. Y.S. Parmar University of Horticulture and Forestry at Nauni in district Solan. These two State controlled universities have an important role to play in the successful implementation of extension programmer as they are the training grounds to the future extension workers as well as centre of

agriculture/horticulture research. The Table-1 depicts that these universities were established in November 1978 and December 1985 respectively as such extension and research activities were still under process in 1979-80 due to which none of the farmers could be benefitted and farmers were largely dependent on the extension workers and officers of Agriculture/ Horticulture for technical know-how and package of practices. However, the establishment of these universities benefited all sample households viz. 145, 86, 48 and 9 on the marginal, small, medium and large size of holdings respectively with the latest technology and package of practices for the improvement of agriculture/horticulture activities and bringing about crop diversification in the area.

Market (Marketyard)

The existence of an efficient market that ensures a remunerative prices and assured purchase is a necessary condition for the survival of a commercial farm. Himachal Pradesh is known for its quality potato seed, off season vegetables and apple. For getting remunerative prices for this produce, the farmers and orchardists need proper facilities for quality control and smooth transport facilities besides adequate training in the post-harvest operations like picking, grading, packing and market advisory services. To create an awareness in the farmers about the market trends in the consuming markets, market information through various media needs to be provided to them so that they can get the benefits of remunerative prices prevailing in different consuming markets of the country. The department of agriculture, Government of Himachal Pradesh has established market yard at Karga in late eighties in development block Lahaul with a view to provide service for ensuring remunerative returns to the growers. The study in the sample villages has revealed that the market yard under reference has been established for providing grading, packing and other post-harvest operations for the farmers numbering 155 sample households in the Development Block Lahaul out of which 56.00, 27.00, 14.00 and 3.00 per cent on the marginal, small, medium and large size of holdings respectively. These kinds of marketing facility are not available to the households numbering 133 falling in Development Block Spiti. It has also been observed that due to inadequate marketing facilities at Kaza, not a single buyer is coming for purchase of agriculture produce. It is only because the farmers have to bring their produce in other district markets for sale which increases transport cost and reduces price of their produce. It is therefore, equally important for proper realization of income by the farmers, the existence of good marketing facilities. Lack of post-harvest management facilities, inadequate storage and processing units, inaccessibility of output market, results in output loss and low-price realization of the agriculture outputs in the study area. The Government needs to take suitable measures to ensure smooth dissemination of information and technology, necessary arrangement for marketing the produce of farmers. The Lahaul Potato Growers Cooperative marketing and processing Society Ltd has been found to be engaged in collection of potato seed for further distribution to the growers in Development Block Lahaul only and also collects the potato produce for marketing which has helped to ensure remunerative returns only to the farmers dwelling in Lahaul area.

Lahaul Potato Growers Cooperative and Marketing Society

Since potato dominates cropping pattern in the district Lahaul and Spiti and to ensure proper marketing of this crop, the Lahaul Potato Growers Cooperative Marketing Society; an organized farmers society is functioning to market the potato seed as potato which was the single most important remunerative crop in Lahaul valley in eighties. The society has constructed a number of storages as collection centres in the valley. The Table-1 shows that 53.00 per cent of households among all the sample households are availing the benefits from the above society in the study area. The category wise household position shows that 59.00, 48.00, 46.00 and 56.00 per cent on the marginal, small, medium and large size of holdings respectively has been benefitted by the society for the both period in the study area. Although all households growing potato crop in the Lahaul valley are members of the society for marketing the potato crop yet majority of them prefer to sell their potato crop to private buyers who pay higher price which spoil/mar the objectives of the society for which it has been formed. This type of farmers private society never existed in the valley earlier.

Irrigation Facilities

Irrigation is one of the most important factors of development under agricultural programmes directed towards increasing production. Irrigation is the life of agriculture in the district as without irrigation, even grass would not survive in grasslands. The entire sown area in the district is irrigated. Therefore, Lahaul-Spiti district is the only district in the country having 100 per cent irrigated agriculture and all crops are grown under irrigated conditions. The Table-1 depicts that 35.00 per cent households had sown area under irrigation in 1979-80 as against 100 per cent sample households who have cent per cent agriculture under assured irrigation in 2009-10. The category wise households position shows that 35.00, 38.00, 31.00 and 33.00 per cent on the marginal, small, medium and large size of holdings respectively had agriculture under irrigation in 1979-80 as against

100 per cent cultivation under irrigation in 2009-10. It is common belief that farmers can increase production to a considerable extent by adopting agricultural innovation if they are supplied with adequate and assured irrigation facilities. Various studies conducted in this connection have proved that farmers having assured irrigation facilities adopted improved agricultural practices much earlier than those who did not have such facilities. Hence irrigation plays a decisive role in the cropping pattern in the area.

Power (Rural Electrification)

Power (rural electrification) has to play a vital role in the socio-economic up lift of the rural population. Apart from providing a convenient mode of lighting the houses, the purpose of rural electrification is to supply power to agriculture pump sets, lift irrigation schemes and small scale and cottage industries for increasing agricultural and industrial production and creating more employment potential in the area. Another important aim to be achieved through rural electrification is to reduce pressure on forest by providing electrical energy as an alternative fuel for domestic consumption. The Table-1 reveals that 53.00 per cent households had electricity in 1979-80 as compared to 100 per cent electricity in 2009-10 among all the sample households. The sample households study shows that 52.00, 52.00, 54.00 and 67.00 per cent on the marginal, small, medium and large size of holdings respectively had electricity facilities in 1979-80 as compared to 100 per cent electricity by all sample households in 2009-10.

The Co-operative Societies

The cooperative societies were mostly concentrated in rural area where they provided credit for agriculture, agricultural inputs and also facilities for marketing, processing and storage of agricultural produce in seventies in the district Lahaul and Spiti. The Table-1 shows that 53.00 per cent size of holdings had co-operative societies for agriculture credit, supply agricultural inputs in both the study period. The sample household wise position shows that 59.00, 48.00, 46.00 and 56.00 per cent on the marginal, small, medium and large size of holdings respectively have been associated with the cooperative societies. These cooperative societies provided short term loans for the purchase of seeds, fertilizers, insecticides and meeting other farm expenses. These facilities continued to be provided in 2009-10.

Institutional Finance

Besides above, the institutional finance has also played a very important role in financing the agricultural sector in the district of Lahaul and Spiti. The institutional finance included advances made by commercial banks and other cooperative banks. The Table-1 reveals that 7.00 per cent sample households had benefits from the institutional finance in 1979-80 as against 70.00 per cent in 2009-10 among all the sample households. The category wise household position reveals that 14.00 per cent were marginal size of holdings in 1979-80 as compared to 73.00 per cent in 2009-10, 64.00 per cent small size of holdings in 2009-10 as against nil in 1979-80, 69.00 per cent medium size of holdings in 2009-10 and 89.00 per cent large size of holdings in 2009-10 who have been benefitted by the financial institutions in the study area which helped these sample households to bring the area under commercial crops and have brought crop diversification in the area.

Livestock (Animal Husbandry)

Livestock rearing is an integral part of farming in the district Lahaul-Spiti mainly because of the people depend upon nutritious food, milk and wool for protecting against the extreme cold in winter. The Table-1 depicts that 34.00 per cent households among all the sample households had veterinary dispensary facility in 1979-80 as against 87.00 per cent in 2009-10. The category wise household study reveals that 38.00 per cent were marginal size of holdings in 1979-80 as against 90.00 per cent in 2009-10, 31.00 per cent small size of holdings in 1979-80 as compared to 84.00 per cent in 2009-10, 27.00 per cent medium size of holdings in 1979-80 in comparison to 81.00 per cent in 2009-10 and 22.00 per cent large size of holdings in 1979-80 as against 89.00 per cent in 2009-10 who have this facility. There is one district veterinary hospital at Keylong which is providing veterinary health service to 155 sample households in Lahaul valley and the Regional veterinary hospital at Kaza is creating the veterinary health needs of the cattle in Spiti area to 133 sample households. Besides this, manure provided by livestock population is the main input for increasing fertility of land which helps increasing production to a great extent in the area.

SOCIAL ASPECTS

Education

Education plays a vital role in the socio-economics development of the people and literacy percentage is an important index of human capital development. The Table-1 reveals that 100 per cent population had primary school facilities for both the period of study 1979-80 and 2009-10. However, 87.00 per cent out of total 288 sample households had middle school facility in 1979-80 as against 100 per cent households in 2009-10. The category wise study reveals that 90.00, 84.00, 81.00 and 89.00 per cent on the marginal, small, medium and large size of holdings respectively in 1979-80 had middle school facility as compared to 100 per cent in 2009-10. The Senior Secondary Schools were not in existence in 1979-80 as such it has 87.00 per cent households out of total 288 sample size of holdings who have senior secondary school facility in 2009-10. The sample households study reveals that 92.00, 84.00, 81.00 and 89.00 per cent on the marginal, small, medium and large size of holdings respectively have Senior Secondary facility in 2009-10. Prior to the opening of Senior Secondary Schools, this facility used to be covered under High Schools. There is only one Government Degree College at Kukumsari located in Lahaul valley for catering the needs of graduate level education for the residents residing in Lahaul. There is no such Government Degree College in Spiti development block. The boys and girls interested for high education have to go to either at Kullu, Dharamsala, Recongpeo and Rampur for higher education. The Table-1 shows that 54.00 per cent households have degree college facility in 2009-10. The category wise study shows that 59.00, 48.00, 46.00 and 56.00 per cent on the marginal, small, medium and large size of holdings respectively have this facility in 2009-10 as against nil facility in 1979-80. There is one Industrial Training Institute (I.T.I) at Udaipur in Lahaul valley which has catered the need of vocational courses for 54.00 per cent of households in 2009-10 as against nil in 1979-80. The category wise study reveals that this facility is available to 59.00, 48.00, 46.00 and 56.00 per cent on the marginal, small, medium and large size of holdings respectively in 2009-10. The education status among members in the family helps in determining the cropping pattern in the area.

Health

In a Welfare State, provision of adequate medical and public health facilities is perhaps the primary charge on the Government Budget. In order to fulfil this obligation towards the people as shown in Table-1 that 52.00 per cent households among all the sample size of holdings had dispensary facility in 1979-80 as against 82.00 per cent in 2009-10. The category wise household study explains that 63.00 per cent marginal size of holdings in 1979-80 against 86.00 per cent in 2009-10, 73.00 per cent small size of holdings in 1979-80 for both period, 42.00 per cent medium size of holdings in 1979-80 as compared to 83.00 per cent in 2009-10 and 45.00 per cent large size of holdings in 1979-80 in comparison to 89.00 per cent in 2009-10 have the facility. Similarly, 17.00 per cent households had the facility of the Primary Health Centre in 1979-80 among all the sample size of holdings as against 87.00 per cent in 2009-10. The category wise position shows that the marginal size of holdings had 43.00 per cent facility in 1979-80 as against 90.00 per cent in 2009-10, 20.00 per cent small size of holdings in 1979-80 as compared to 84.00 per cent in 2009-10, 12.00 per cent medium size of holdings in 1979-80 in comparison to 81.00 per cent in 2009-10 and 89.00 per cent large size of holdings in 2009-10 as against nil facility in 1979-80. There is district hospital at Keylong which is providing health services to 155 sample households in Lahaul valley and one community health centre located at kaza is catering the health need of 133 sample households in Spiti valley. On the whole, the people are healthy due to dry and cold climate of the area.

GENERAL (COMMUNICATION) ACTIVITIES

Public Relation Activities

The importance of information in creating an atmosphere conducive to the proper appreciation of marketing in formal and latest agriculture technology needs hardly to be stressed particularly in the tribal district Lahaul and Spiti. Due to its difficult terrain, the area is facing peculiar problems in the field of public relation work. Besides newspaper and other printed material, radio, television, exhibition, dramas and cultural programmes are a powerful media for spreading information. This is more true about the district Lahaul and Spiti. The telegraph, postal services and tele-communication linking the remote and far-flung areas by wireless system had significant role in disseminating the information to the villages in seventies and eighties. In the late nineteenth, television sets, fax, mobile phone have added more facilities in disseminating the information to the masses. The Table-1 reveals that the telegraph and postal services were only means for disseminating information to the people in study area in 1979-80. There were 7.00 per cent out of total sample households covered by telegraph in 1979-80 as against 100 percent coverage in 2009-10. The category wise household study reveals that 14.00 per cent marginal size of holdings were only benefitted in 1979-80. The postal services had much improved position as 70.00 per cent size of holdings had postal services in 1979-80 as against 100

per cent in 2009-10 among the sample size of holdings. The category wise household study reveals that marginal size of holdings had 47.00 per cent, small size of holdings had 67.00 per cent, 56.00 per cent each for medium and large households respectively, had this facility in 1979-80 as against 100.00 per cent facility to all the size of holdings in 2009-10. The television, mobile phone and fax etc are the most effective media to convey the message to the people and exchange the views. Prior to mid nineteenth, these facilities were non-existence in the study area. There are 70.00 per cent out of total size of holdings who have gained fax facilities in 2009-10. Similarly, the category wise position shows this facility is available to 73.00, 64.00, 69.00 and 89.00 per cent on the marginal, small, medium and large size of holdings respectively against their respective category in 2009-10. Likewise, 100 per cent households have television facilities in the study area mainly because of distribution of dish Antennas supplied by the Government of India to the tribal villages. In addition to above, 70.00 per cent households among all the sample size of holdings had mobile phone facilities in 2009-10. The mobile facilities are available to 73.00, 64.00, 69.00 and 89.00 per cent on the marginal, small, medium and large size of holdings respectively against their respective numbers in 2009-10. Efforts are on to cover the remaining households in the coming years.

Helicopter Services

Besides these facilities, the winter helicopter service at highly subsidized rates are available to 70.00 per cent households in 2009-10 at panchayat level against nil in 1979-80. The winter helicopter services are available to 73.00, 64.00, 69.00 and 89.00 per cent on the marginal, small, medium and large size of holdings respectively against their respective numbers in 2009-10. This helicopter service is also available to other households who have to cover 20 to 30 kms distance due to non-existence of helipads in their panchayats.

Establishment of Petrol Pump

Apart from above, petrol pump is also available near Tandi bridge in Lahaul Development Block and at Kaza in Spiti Development Block for catering the fuel needs of vehicles both for public and private transport in the study area.

Conclusion

It is concluded that there has been remarkable development in the creation of infrastructure facilities and amenities including improved road connectivity, better means of transportation, establishment of sizeable number of sale centres for distribution of inputs and extension services for dissemination of farm technology, agricultural research and development for evolving new technologies, creation of market for ensuring a remunerative prices, better irrigation facilities, electrification of maximum number of households and also concentration of the cooperative societies and financial institutions for providing credit in term of short loans for the purchase of agricultural inputs besides providing facilities for marketing, processing and storage of agricultural produce. Livestock rearing is an integral part of farming in the district. There are number of district and Regional veterinary hospitals and dispensaries for providing veterinary health services in the villages. The manure provided by livestock population is the main input for increasing fertility of land which helps in increasing production to a great extent. Besides these economic activities, there are large number of educational and health institutions which plays a vital role in the socio-economic development of the people and literacy percentage is an important index of human capital investment. These infrastructure facilities have created significant impact on changes in land utilization and cropping pattern for bringing about crop diversification in the district.

REFERENCES

Sam Maghimbi, Recent Changes in Crop Patterns in the Kilimanjaro Region of Tanzania: The Decline of Coffee and The Rice of Maize and Rice, *African Study Monographs*, Vol. 35, Centre for African Area Studies, Kyoto University, 2007, pp. 73-83.

Ranbir Singh Rana, R.M. Bhagata, Vaibhav Kaliaa and Harbans Lalb, Impact of Climate Change on Shift of Apple Belt in Himachal Pradesh, *ISPRS, Archives XXXVIII-8/W3 Workshop Proceedings: Impact of Climate Change on Agriculture*, 2007.

B.K. Bera, Change in Cropping Pattern and Present Status of Horticulture Crops in West Bengal, *Indian Journal of Agricultural Economics*, Vol. 63, No.3, Mumbai, 2008.

Government of Himachal Pradesh, *A Draft Outline Sub-Plan for Tribal Belt*, Department of Planning, Shimla, 1974-1979.

Government of Himachal Pradesh, *Report on Agricultural Census*, Directorate of Land Records, Shimla, 2005-06, p.24.

Government of Himachal Pradesh, *Agriculture-Plan District Lahaul-Spiti*, Department of Agriculture, consulting Agency CSK, Agricultural University, Palampur, Volume-VII, 2009.

Government of Himachal Pradesh, *Statistical Abstract of Lahaul-Spiti District*, Directorate of Economics and Statistics, Shimla, 1982, p6.

G.S. Singh, S.C.Ram and J.C.Kuniyal, Changing Traditional Land Use Patterns in The Great Himalayas: A Case Study of Lahaul Valley, *Journal of Environmental Systems* Vol. 25, No.2, Baywood Publishing Company, 26 Austin Avenue, Amityville, New York, 1996-97.

Government of Himachal Pradesh, *Statistical Abstract District Lahaul-Spiti*, Directorate of Economics and Statistics, Shimla, 1982, p.5.

