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SOCIO-ECONOMIC ATTRIBUTES OF AGRICULTURE: A CASE STUDY OF HIMACHAL PRADESH

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Abstract: *In the present study, socio-economic attributes which affect agricultural patterns are analyzed, because these factors impact the land-use and crop land use patterns effectively in each physical environment. For achieving this objective, various attributes are considered which effected maize cultivation in Himachal Pradesh. The main selected attributes are density of rural population, agricultural workers, sources of irrigation, extent of irrigation, size of land holdings, consumption of chemical fertilizers, share of High Yielding Varieties of seeds, road density, market accessibility, etc. It is observed that share of agricultural workers is moderate to high in maize predominant areas, because maize requires more human hands as compared to other crops. While size of land holdings also affected agricultural operations and in respect of extent of irrigation it determines area under different crops. Whereas road accessibility has influenced area under different crops, which enhances the movements of inputs from market to field and agricultural produce from farm to market. Same observations are found in marketing facilities, because the magnitude of marketing facilities enthused the cultivation of a crop, which farmers can carry to the market and earn respectable economic returns. Thus, study has concluded that socio-economic attributes played very decisive role in agriculture. The present study is for the 2014-15 year, which is based on secondary sources of data and personal observations. Three years averages of 2013-14, 2014-15 and 2015-16 are taken for determining the 2014-15 period. Simple statistical techniques are used and choropleth method is applied for preparing the maps.*

Key words: Rural Population Density, Road Density, Extent of Irrigation, Chemical Fertilizers.

Introduction

In addition to the physical factors, agricultural land-use, cropping pattern and agricultural processes are also largely influenced by the socio-economic factors such as fragmentation of operational land holdings, labour, land tenure system, irrigation, farm mechanization, high yielding varieties of seeds, chemical fertilizers, transportation facilities, marketing facilities, etc. .(Shodhganga.inflibnet.ac.).Farmers make decision about what to grow, what animals to keep, the level and type of inputs and the methods they will use.Their decisions are based upon a range of social, economic and environmental factors.The farmers attitudes and level of knowledge about agriculture are of vital importance (https//:revisionworld.com). Growth and development of agriculture is always directed and determined by physical, social, economic, and political factors. Social factors affect farming in several ways. The type of farming practiced, be it shifting cultivation, subsistence farming, extensive cereal cultivation or mixed farming, etc. is always related to regional and social structure. Social factors can also affect the type of crops that are grown. Social factors can affect agriculture through ownership and laws about inheritance of land. The most important economic factors affecting agriculture are market, transport facilities, labour, capital, government policies, size of land holdings, irrigation, chemical fertilizers, etc. The level of scientific and technological development has a great bearing on agriculture.Farmers, using primitive methods obtain poor yields.Where farmers are using modern farm technology in the shape of fertilizers, pesticides, machinery and high yielding varieties of seeds, etc. the farm yields are high.An Indian farmer is poorer in comparison to an American farmer, because the later uses more modern farm technology.The per hectare yield of rice in India is only 2000 kg.as compared to about 5600 kg.in Japan.This difference in yield is due to scientific and technological differences.The system of land tenure also plays a significant role in the patterns and productivity of crops (www.Preservearticles.com). Hussain (2007), has also observed that there are numerous socio-cultural, economic, technological, and infrastructural factors, which also determine the agricultural land-use, cropping pattern and agricultural processeso f these factors, land tenancy, size of land holdings, population, labour, farm machinery, market, and mode of accessibility, etc. are vital.

Study Area

Himachal Pradesh has 1.69 percent of India's total reporting area and is situated in north-west of the country. Its longitudinal and latitudinal extent lies between 75^0 40' 55 "E longitudes to $79^0$04'20 "E longitudes and $30^0$22'44 "N latitude to 33^0 12' 40 "N latitude. Its mean minimum annual temperature and mean maximum annual temperature are of -4^0 C to 30^0 C. While its average annual precipitation varies from 70cm. to 300 cm.

Objectives

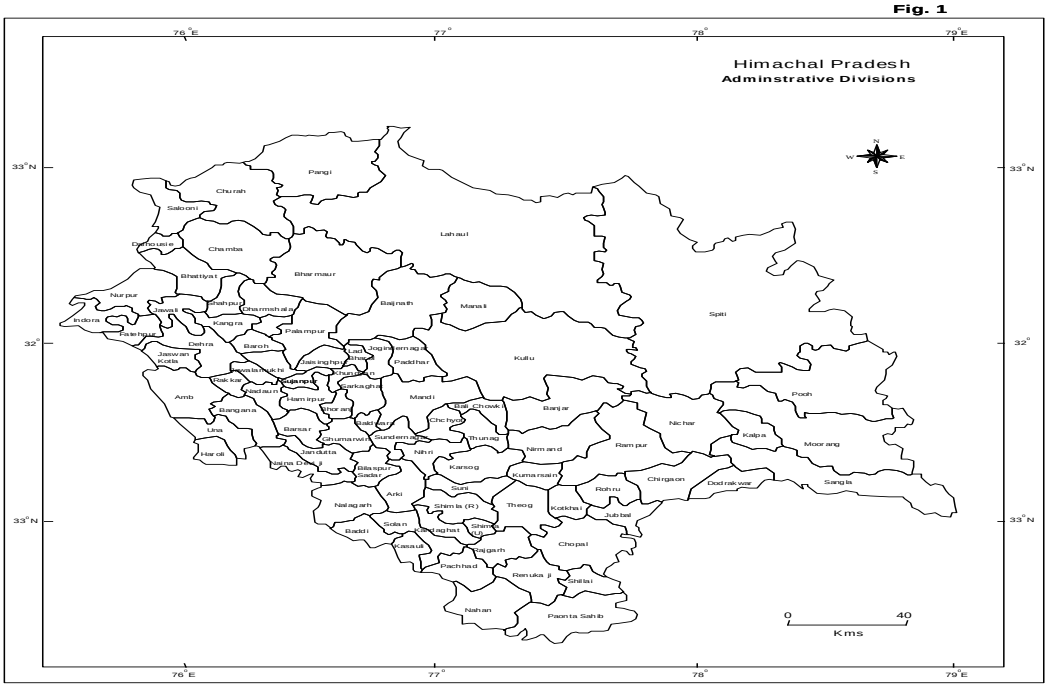
The major objective of the study is to identify socio-economic factors influencing agriculture.

Methodology and Sources of Data

Present study is empirical in nature and based on secondary sources of data. The time period of the study is 2014-15. Three years averages of 2013-14, 2014-15 and 2015-16 for 2014-15 are taken. The secondary sources of data are used which is collected from various state offices. Simple statistical methods are used for determining the results and these results are mapped with choropleth technique. Tehsil is selected as unit of study. This paper deals with the assessment of

socio-economic background of the study area, namely density of population, main workers, agricultural workers, cultivators, labourers, land tenure, land holdings, irrigation, farm machinery, high yielding variety of seeds, chemical fertilizers, regulated markets, transportation, government policies, etc.

Fig. 1



Source: Census of India, 2011

Density of Rural Population

Rural population density is an important measure to calculate the extent of population pressure upon agricultural resources. Very high rural population densities indicate the relative scarcity of land resources and presence of intensive subsistence agricultural system and low to moderate rural densities. Apart from this, rural population density determines the availability of labour force for agricultural sector as well as the market for agricultural produce (Mydral,1968). Total population of Himachal Pradesh is 68,56,509 persons and total rural population is 6,167,805 persons according to 2011 census. The highest density of rural population is 378 persons per square kilometers in Hamirpur and lowest of 2 persons per square kilometers in Lahaul & Spiti as per 2011 census.

Spatial Distribution of Density of Rural Population

For showing the spatial variations in the density of rural population in Himachal Pradesh fig.2 is grouped into following three categories-

1. Areas with High Density of Rural Population (>200 persons per sq.km.)

The high density of rural population includes 6 districts namely Bilaspur, Hamirpur, Kangra, Mandi, Solan and Una. The density of rural population in this category varies between 237 persons per sq.km.in Mandi district to 378 persons per sq. km.in Hamirpur district.The main reasons for high rural density of population are favorable climatic conditions as compare to eastern, northern and southern parts of the state, availability of agricultural land, lack of industrial

activities expect in Solan district, suitability of land for crops throughout the years etc. owing to all these reasons, rural density of population is recorded high.

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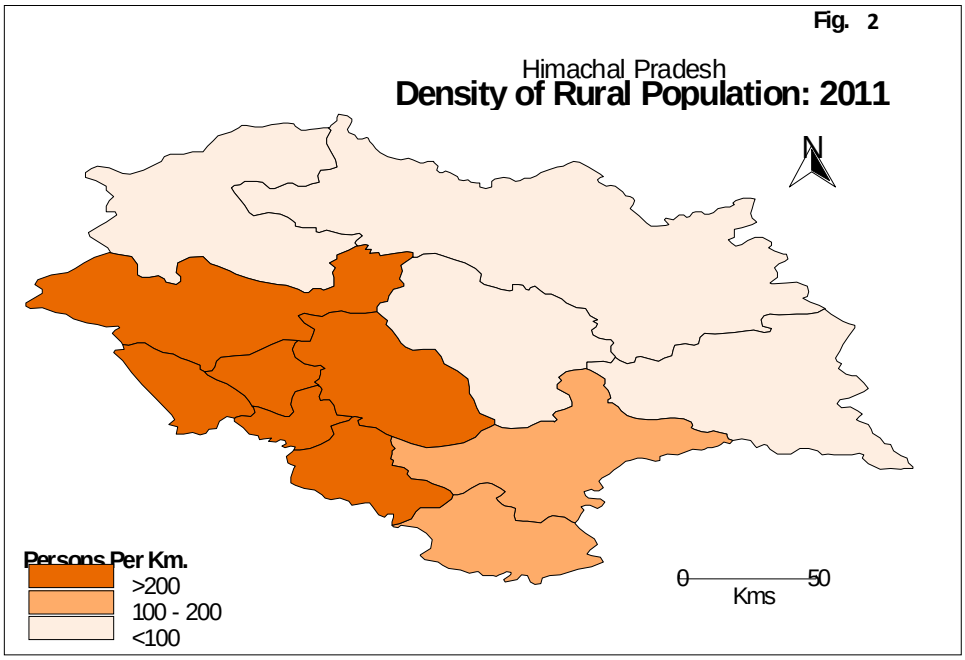


Region's Average = 110.78 Persons/Km
Source: Census of India, 2011, Himachal Pradesh.

2. Areas with Moderate Density of Rural Population (100 to 200 persons per sq.km.):
Only two districts form this category namely Shimla and Sirmaur. The reasons for moderate density of rural population in Shimla district, except Shimla Urban area, are lack of town as well as industries and a result most of the people are living in rural areas and engaged in agricultural activities .While in Sirmaur district, the southern parts are semi-hilly areas and are suitable for agriculture and supporting more people per unit area. Secondly, the existence of Paonta Sahib town, where more people are living in urban areas, but the northern part of the Sirmaur district where population is sparsely distributed and from agricultural point of view, land is less suitable. All these reasons led to moderate rural density of population.

3. Areas with low density of rural population (< 100 persons per sq.km.)
Districts of Chamba, Kullu, Lahaul & Spiti and Kinnaur fall in this category. Here, the density of rural population varies between 2 persons per sq. km.in Lahaul & Spiti to 73.9 persons per sq.km.in Chamba district. All these areas are having difficult terrain and severe climatic conditions particularly during winters except valleys. These are land not suitable for crop farming and as a result cannot support dense population. The primary activity is dominant in valley areas which are supporting people, but about 85 percent of the areas is mountainous. Thus, geo-climatic conditions as well as socio-economic conditions are not favorable for crop farming, except, the apple orchards, thus low density of rural population is recorded.

The above discussion shows that western parts of Himachal Pradesh have high rural density of population, while northern as well as eastern parts are with low rural density of

population. But southern parts have experienced moderate rural density of population. Secondly, the pattern of rural density of population largely coincides with the geo-climatic conditions and degree of urbanization.

Agricultural Workers

Agricultural worker is defined under the act as any person who is doing work in agricultural activity (Wikipedia). Any person who is working whether as cultivator or as agricultural labourer on farm is called agricultural worker (Ranjana, 2012). An agricultural worker is someone who works on a farm, maintaining crops such as fruits, grains, vegetables, and nuts.

Spatial Distribution

The distribution of agricultural workers is not uniform in the state. Average of agricultural workers is 62.85 percent in the study area. But it varies from 48.48 percent in Una district to 77.86 percent in Kullu district. For showing the spatial distribution of agricultural workers, fig.3 is mapped which shows three categories and these are as follow:

1. Category of High Concentration of Agricultural Workers (> 65 percent):

High concentration of agricultural workers is found in Chamba, Kullu and Mandi districts of Himachal Pradesh. In these areas, the share of agricultural workers is above 65 percent. These areas are lagging in industrial development and few urban centers. Here, small size of land holdings, severe geo-climatic conditions, etc. compel most of the people to engage themselves in agriculture, because other economic activities are less developed. Except agriculture, people are also engaged in tourism industry. All this has resulted into high number of agricultural workers in these districts.

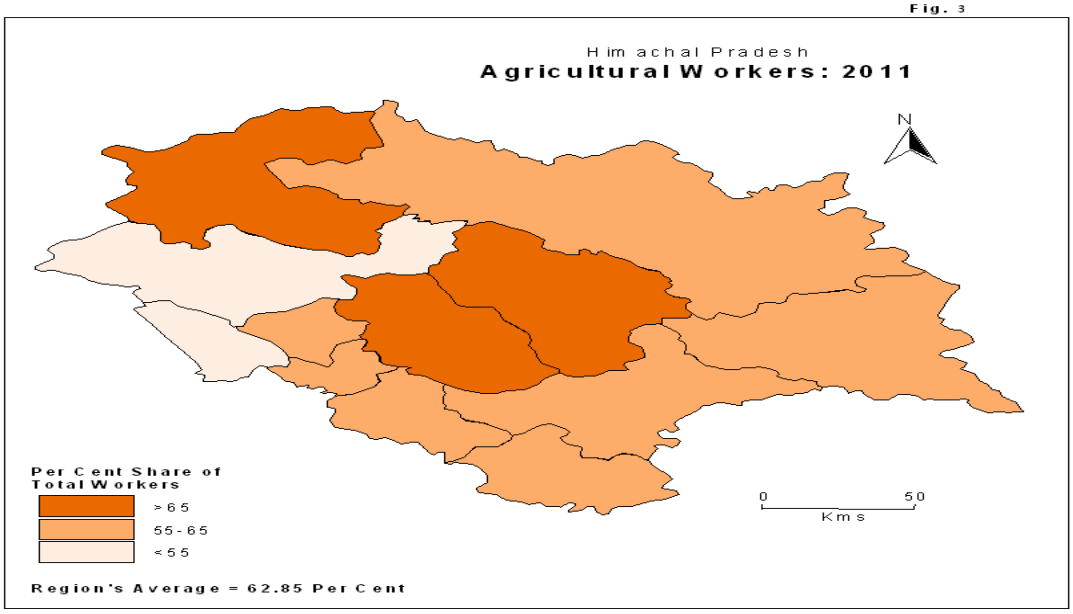
2. Category of Moderate Concentration of Agricultural Workers (55 to 65 percent):

Moderate concentration of agricultural workers is found in Bilaspur, Hamirpur, Kinnaur, Lahaul & Spiti, Shimla, Solan and Sirmaur districts. In these areas, the share of agricultural workers ranges between 55 and 65 percent. Owing to tough terrain and severe geo-climatic conditions in Lahaul & Spiti and Kinnaur districts, few people are involved in agriculture as compare to high category. But in case of Bilaspur and Hamirpur districts, though the major economic activity is agriculture, yet several people are serving in defense services also. Owing to these reasons, share of agricultural workers is moderate.

3. Category of Low Share of Agricultural Workers (< 55 percent):

Low share of agricultural workers is found in Kangra and Una districts of Himachal Pradesh.These districts have less than 55 percent share of agricultural workers. Here, a large number of people are doing jobs in army, industries and other economic activities. The number of urban centers is also more as compare to other parts of the state.Thus, all these reasons are responsible for low share of agricultural workers in this category. In respect of agricultural workers in Himachal Pradesh, their average share is 62.85 percent of the total workers. It is recorded lowest of 48.48 percent in Una district and highest of 77.86 percent in Kullu district. Their concentration is high in the districts of Chamba, Mandi, Kullu, Shimla and Sirmaur. Whereas their share is low in Kangra, Solan and Una districts, which are having large size of land holdings, development of other secondary and tertiary activities, etc.

Fig. 3

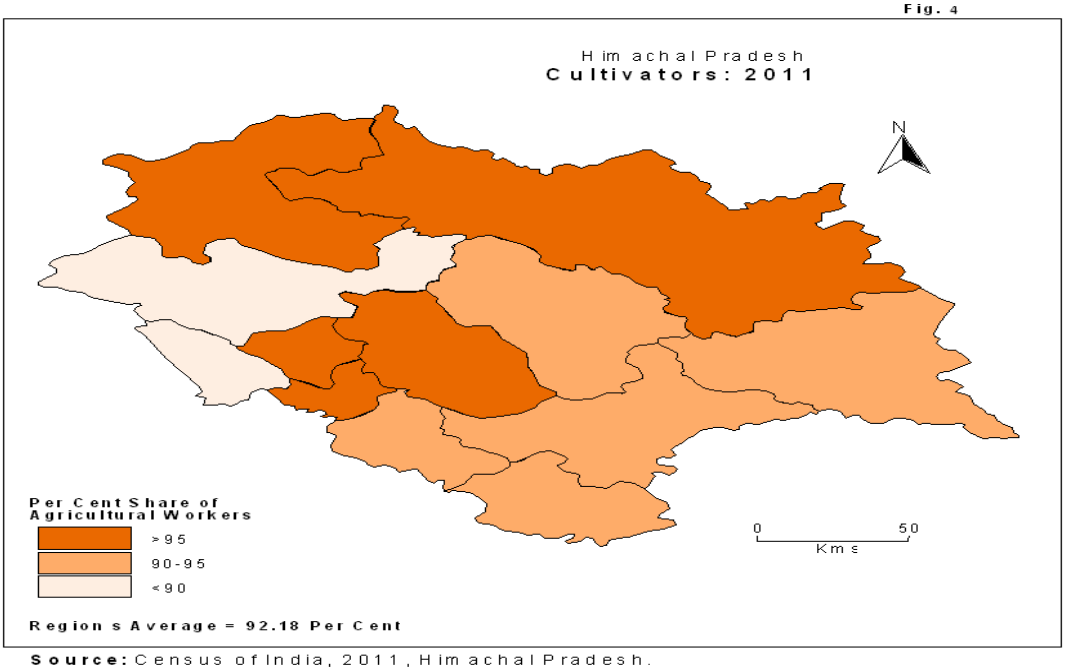


Source: Census of India, 2011, Himachal Pradesh.

Cultivators

Agricultural worker who cultivates the land is called cultivator. Cultivators are those who plough the land which they have either own or taken on rent(Sharma,2014). There are three types of cultivators: Owner cultivators, Lessee cultivators and Tenants-at-will. Cultivators make decision consciously or rationally about the kind of farming to be undertaken, the combination of enterprises in the farming system, the kind and quality of different inputs and the trading or surplus produce. Itis observed that the decision, aims and motivation of the cultivators are largely determined by the size of land holdings, land tenure system, consolidation of land holdings, etc. Cultivator means tilling of land whether own by him / her or on lease or as tenants-at-will.

Fig. 4



Source: Census of India, 2011, Himachal Pradesh.

Spatial Distribution

There are 92.17 percent of the total agricultural workers as cultivators. Their share varies between 81.22 percent in Una district and 96.84 percent in Bilaspur district. For showing spatial distribution of cultivators, fig. 4 is mapped which depicts the following categories:

1. Category of High Concentration of Cultivators (> 95 percent):

High concentration of cultivators is found in Bilaspur, Chamba, Kullu, Hamirpur, Lahaul & Spite and Mandi districts. Owing to small size of land holdings, severe geo-climatic conditions, agriculture as main occupation of the people, poor economic conditions of the farmers, etc. have compelled the farmers to work on their fields, which consequently lead to high share of cultivators in this category.

2.Category of Moderate Share of Cultivators (90 to 95 percent):

Moderate share of cultivators includes the districts of Kullu, Kinnaur, Shimla, Sirmaur and Solan.In this category, the percent share of cultivators is ranging between 90 to 95 percent. In these areas, due to moderate size of land holdings and moderate rural density of population some of the land owners do hire agricultural labourers on their farms, which is responsible for moderate share of cultivators.

3.Category of Low Share of Cultivators (> 90 percent):

The districts of Kangra and Una fall in the category of low share of cultivators. Kangra and Una districts are semi-hilly and most of the parts are lying in piedmont and Shivalik hills. The size of land holdings is comparatively large. Some people engaged in secondary and tertiary activities also.Owing to large size of land holdings, farmers do hire agricultural labourers on their field, which consequently lead to low share of cultivators in this category.It is also observed that the share of cultivators is high in areas with small size of land holdings, less opportunities in other economic activities, severe geo-climatic conditions, etc.Their average share is recorded 92.17 percent of the total agricultural workers, which is lowest of 81.22 percent in Una district and highest of 96.84 percent in Bilaspur district.

Agricultural Labourers in Himachal Pradesh: 2011

Agricultural labourer may be defined as labourer who works in agriculture or allied activities for the whole or part of the year in return for cash or kind or both for full time work. The agricultural labourer has no risk in cultivation and no right of lease or contract on land, but merely works on another person's land for wage. Agriculture Labour Enquiry Committee (ALEC) defined agricultural labourer as the worker whose main source of income is derived as wages for working on farms of others.

Spatial Distribution

Average share of agricultural labourers in the study region is 7.82 percent of the total agricultural workers according to 2011 census. Their percent share is lowest in Bilaspur district with 3.15 percent and highest in Una district with 18.77 percent. Fig. 5 portrays the distributional pattern of agricultural workers and shows three categories.

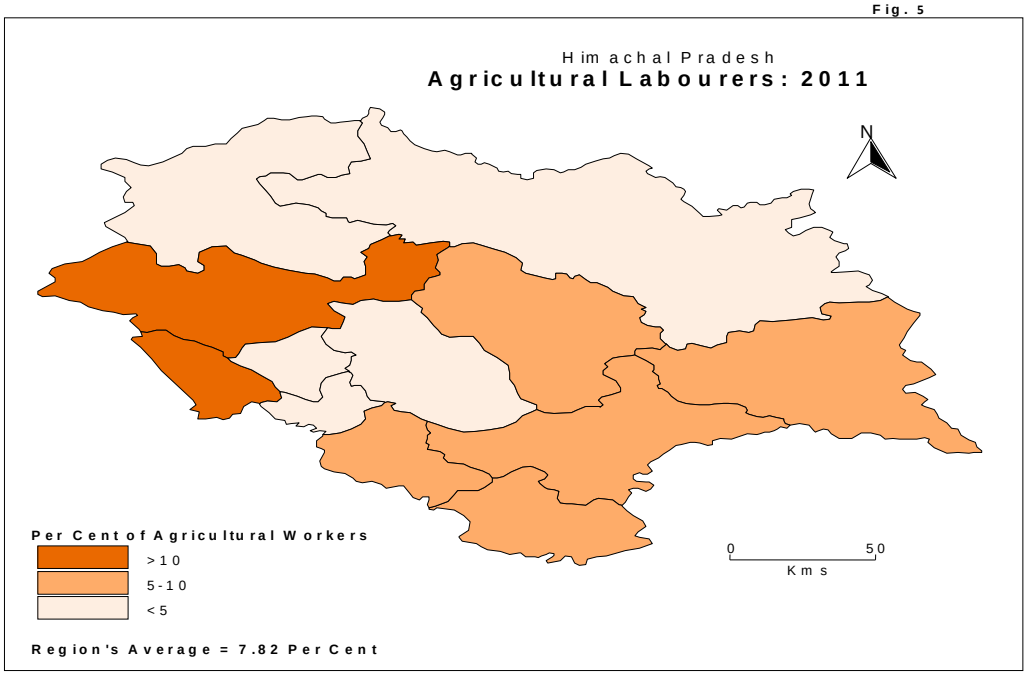
1. High Concentration of Agricultural Labourers (> 10 percent):

Two districts namely Kangra and Una fall in this category. The share of agricultural labourers is comparatively high owing to large size of land holdings, piedmont plains, valley of Palampur, etc.

2. Moderate Share of Agricultural Labourers (5 to 10 percent):

The districts of Kinnaur, Kullu, Shimla, Sirmaur and Solan form this category. Here, the share of agricultural labourers is varying between 5.53 percent in Sirmaur district and 9.46 percent to Shimla district. In all these areas, the share of agricultural labourers is moderate, because of the small size of land holdings, mountainous terrain, existing of Manali, Shimla, Solan and Paonta sahib urban centers, industrial activity particularly in Solan and Sirmaur districts, etc. All these factors are responsible for moderate share of agricultural labourers.

Fig. 5



Source: Census of India, 2011, Himachal Pradesh.

3.Low Share of Agricultural Labourers (> 5 percent):

Four districts namely Chamba, Hamirpur, Lahaul & Spiti, Mandi and Bilaspur fall in this category. Here, the share of agricultural labouers varies from 3.15 percent in Bilaspur to 4.84 percent in Lahaul & Spite districts. In all these areas, the share of agricultural labourers is less than 5 percent. The study has concluded that, average share of agricultural labourers is only 7.82 percent, but it varies from 3.15 percent in Bilaspur district to 18.77 percent in Una district. But, the share of agricultural labourers is more in areas with large size of land holdings, comparatively developed agriculture like areas of Una and Kangra districts.Overall, it is observed that the number of cultivators is high in the state, while the number of agricultural labouers is low, because of the poor socio-economic conditions of the farmers supplemented by their small size of land holdings, because small farmers are not in a position to hire more labourers owing to their poor paying capacity.

Size of Operational Land Holdings in Himachal Pradesh

There are 9,60,765 operational land holdings in Himachal Pradesh in 2014-15 .Out of its 69.78 percent are recorded marginal operational land holdings which have less than 1 hectare of land. While 18.17 percent are small land holdings with 1-2 hectares, but in case of semi-medium (2-4 hectares) land holdings the percent is 8.83 percent of the total land holdings. The size of medium size of land holdings (4-10 hectares)is 2.87 percent, while the share of large land holdings above (10 hectares) is recorded 0.34 percent.

Among the marginal land holdings, Kullu has lowest share of 8.32 percent and highest share of marginal land holdings in Lahaul & Spiti district with 43.00 percent. Whereas the size of small land holdings varies from 10.88 percent to 29.83 percent in Kullu and Lahaul & Spiti districts respectively. Semi-medium size of operational land holdings is recorded lowest of 3.25 percent in Kullu district and highest of 21.73 percent in Lahaul & Spiti districts. But, medium size of operational land holdings is recorded lowest of 0.55 percent in Chamba and highest of 10.68 percent in Sirmaur district. Himachal Pradesh has 87.95 percent land holdings less than 2 hectares. Whereas only 0.34 percent land holdings are of large size. It shows that marginal and small farmers are predominant which are unable to adopt modern technology for agricultural development.

Extent of Irrigation

Irrigation is the artificial supply of water to agricultural land. It is practiced by more than half of the farmers in the world because they need more water for their crops than is available from rainfall. The development of irrigation facilities plays a crucial role in transforming the agriculture of an area.The use of other important inputs like high yielding varieties of seeds and chemical fertilizers become possible, when assured water supply is available.The supply of water to land or crops to help growth, typically by means of channel.Irrigation is the application of controlled amounts of water to plants at needed interval.Irrigation helps to grow agricultural crops, maintain landscapes and revegetate disturbed soils in dry areas and during periods of inadequate rainfall.Irrigation also has other uses in crop production, including frost protection and preventing soil consolidation.In contrast, agriculture that relies on direct rainfall is referred to as rainfed or dry land farming (www.researchgate.net).

Spatial Patterns

Out of total net sown area of 5,43,345 hectares, the area under net irrigation is 1,09,940 hectares in 2014-15. In respect of average figure of extent of irrigation in Himachal Pradesh is 20.23 percent, but owing to variations in physiography, soils, climate, nature of crops, etc. It is not uniformly distributed throughout the state. It is recorded lowest of 3.14 percent in Shimla district and 99.79 percent highest in Lahaul & Spiti district. For making a detailed study of distribution of extent of irrigation in Himachal Pradesh, fig.6 is mapped, which exhibits three categories and these are discussed below:

1. Areas of High Extent of Irrigation (> 40 Percent):

Two districts namely Lahaul & Spiti and Kinnaur form this category. It is lying in eastern parts of the state. Here, the extent of irrigation varies between 65.39 percent in Kinnaur district and 99.79 percent in Lahaul & Spiti. The extent of irrigation is high owing to less net sown area

because of perceptual snow in major parts of the year. Very small proportion of area is under cropping. Secondly, the irrigation is available from the kuhls during the summer season when snow melts.

2. **Areas of Moderate Extent of Irrigation (20-40 percent):**

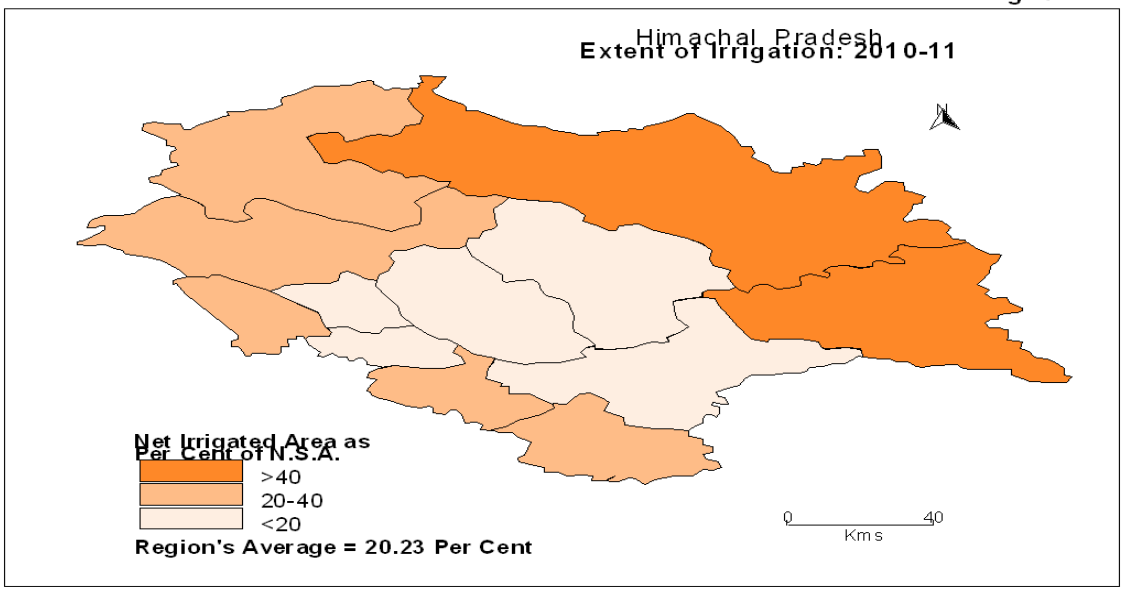
This category mainly lays along the western parts of the study region. It includes the districts of Chamba, Kangra, Una, Solan and Sirmaur.These areas have mixed type of relief, some parts are piedmont areas, some others are of Shiwalik hills and some are of mountainous. There are valleys also like Palampur. Here, sources of irrigation are tube wells and kuhls. Among these kuhls are predominant mainly in Kangra district, but in lower parts of all these districts tube wells irrigation is developed. These are the reasons for moderate share of irrigation in this category. It comprises 33.33 percent of total occurrences.

3. **Areas of Low Extent of Irrigation (> 20 percent):**

This category covers the central parts of the state and lies between the categories of high and moderate proportion. The districts of Kullu, Mandi, Bilaspur, Hamirpur and Shimla form this category, which contains 50 percent of total occurrences. Here, the proportion of extent of irrigation varying between 3.14 percent in Shimla district to 14.25 percent in Mandi districts. In all these areas, sources of irrigation are less developed, because of occurrences of high hills and mountains, high rainfall, etc. which led to low extent of irrigation.

From the ongoing discussion, it is found that lower parts of the state are having moderate share of irrigation, because of low proportion of net sown area, eastern parts have high extent of irrigation and central parts owing to high rainfall have low share of extent of irrigation.

Fig. 6.



Source: Directorate of Land Records, Himachal Pradesh

Consumption of Chemical Fertilizers

The essential nutrients contained in chemical fertilizers are Nitrogen, Phosphorus and Potassium (NPK), as well as other nutritional substances in smaller amounts-all presented in a form than can

easily be absorbed and metabolized by plants (www.thefreedictonay.com).Fertilizers can simply be a word to mean a substance that provides nutrients used by plants.Whereas manure is animal waste that can be used as fertilizers.Any chemical or natural substance which is added into soil to increase fertility is called fertilizer.Low dung manure, farmyard manure, vermicompost, etc. (www.civilsdaily.com).

Himachal Pradesh has consumed 53,055 metric tons of chemical fertilizers in 2014-15. Its total net sown area is 5,43,365 hectares. Thus, state has experienced average consumption of 97.64 kg/hect.This average consumption of chemical fertilizers is not same in all the districts. Some districts have consumed more fertilizers as compare to others. Therefore, it is recorded lowest of 29.48 kg /hect.in Kinnaur district. For making an in-depth study of uneven distribution of chemical fertilizers in the state fig.7 is mapped, which reveals the following three categories:

1. Category of High Consumption of Chemical Fertilizers (> 120 kg. per hect.):
This category comprises three districts namely Shimla and Lahaul & Spiti and 25 percent of the total occurrences. The consumption of chemical fertilizers is high in Lahaul &Spiti district owing to small proportion of net sown area which saw high intensity of cultivation. Farmers grow more than one crop in one agricultural year and crops are mostly vegetables, which required more chemical fertilizers because during summers irrigation is available from kuhls whom receive water from melting glaciers. Where as in the case of Shimla district, there is also predominance of vegetables and fruits crops owing to favorable geo-climatic conditions and existence of Shimla city and its satellites towns, which provide large market for vegetables and fruits. These crops are also grown but the horticultural crops are dominant. But, in case of Una district, most of its parts are piedmont plains which are bordering with Punjab.Here, the consumption of chemical fertilizers is highest that is 199.01 kg per hect. Here, cultivation of wheat, maize, vegetables, fruits, etc. is on large scale which ultimately lead to high consumption of chemical fertilizers.

2. **Category of Moderate Consumption of Chemical Fertilizers (60 -120 kg. per hect.):**
This category is largely confined to western and central parts of the state. It contains 58.33 percent of the total occurrences.The districts of Kangra, Kullu, Mandi, Bilaspur, Hamirpur, Solan, Una and Sirmaur form this category.Here, farmers sow wheat, maize and rice crops, though others crops like pulses, oilseeds etc. are also grown.In some parts of this category, irrigation is available from kuhls and tube wells.Thus, farmers make use of chemical fertilizers for increasing the production of crops which consequently lead to moderate proportion of consumption of chemical fertilizers. Moreover, consumption of chemical fertilizers is noted lowest of 67.61 kg.per hect. in Mandi and highest of 114 .69 kg. per hect. in Kullu district.

3. **Category of Low Consumption of Chemical Fertilizers (> 60 kg.per hect.):**
Only two districts Chamba and Kinnaur fall in this category and as a result it comprises 16.66 percent of the total occurrences. The consumption of chemical fertilizers ranges between 29.48 kg.per hect.in Kinnaur and 30.56 percent in Chamba district. Most of its parts are receiving high snowfall except Chamba valley. Here, the geo-climatic conditions are highly favorable for successful crop farming, peoples are poor, some area is under horticultural crops like pulses, millets are also grown .There are poor irrigational facilities and all this is responsible for low

consumption of chemical fertilizers. In respect of chemical fertilizers, it is recorded that areas with irrigation facilities as well as with horticultural crops are using more chemical fertilizers as compare to other areas, but areas with moderate irrigation facilities have experienced moderate use of chemical fertilizers and the rest of the areas have low consumption of chemical fertilizers.

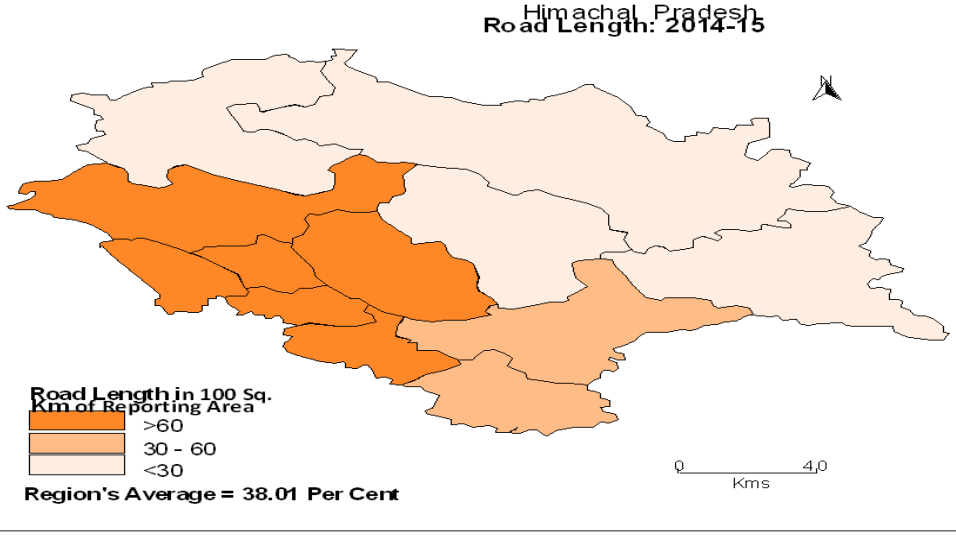
Density of Roads

There is total 21692 km. mettled roads in Himachal Pradesh in 2014-15, which yield density of roads of 38 km. per hundred sq.km. of area, but is not homogenously distributed throughout the state.It is recorded lowest of 7 kms per hundred sq.km. of area in Kinnaur district and highest of 196 km. per hundred sq.km. of area in Hamirpur district. For, knowing its spatial distributional pattern in fig.8 is mapped, which depicts following three categories:

1. Category of High Density of Roads (> 60 km. per hundred sq. km. of area):

This category embraces the districts of Kangra, Una, Mandi, Bilaspur, Hamirpur and Solan and varies between 69 km. per 100 sq. km. in Mandi district and 196 km. per hundred sq. km. in Hamirpur district. The reasons for high density of roads are comparatively favorable relief for construction of roads, socio-economic development, high density of population, etc.

Fig. .7



Source: Public Works Department, Himachal Pradesh.

2. Category of Moderate Density of Roads (30-60 km. per hundred sq .kms):

Only two districts namely Sirmaur and Shimla comprises category of moderate density of roads. Here, road length varies between 48 km. per 100 sq. km. in Sirmaur district and 51 km. per 100 sq. km in Shimla district. Though, these areas are socio-economically developed, but there are certain areas which have rugged topography and high mountains, therefore, density of roads is noted moderate.

3. Category of Low Density of Roads (< 30 km. per hundred sq.km):

It comprises the district of Chamba, Kullu, Lahaul & Spiti and Kinnaur. Here, high mountains difficult terrain, snowfall, etc. are the hindrances in the way of construction of Mettled roads. Though, these areas have attractive tourists spots also, yet the density of roads recorded low which ranges between 4 km. per 100 sq. km. in Lahaul & Spiti district to 19 km. per100 sq. km. in

Chamba districts. The above discussion shows that road density is high in areas with piedmont plains, low hills, high density of population, etc. but is low in areas with high mountains, rugged topography, snow covered peaks, low density of population, etc.

Regulated Markets

Agricultural marketing can be defined as the performance of all business activities that direct the flow of goods and services from producer to the consumer, so that these may reach the consumer at particular time and place and in the form, one wishes and at price one is willing to pay.Further, marketing is one of the most potent factor greatly stimulating agricultural production of an area and farmers always need an efficient market wherein to sell his surplus produce (Kohls, 1958).Regulated market is the provision of services that is regulated by a government approved body. Thompen (1951), has argued that an effective and efficient marketing system from the point of view of a farmer is one of which, when sold to consumers, will yield maximum returns after denudation of maximum marketing charges and farm production cost incurred by a farmer. Regulated market is a market, where the government controls the forces of supply and demand, such as who is allowed to enter the market and /or what prices may be changed(www.bussinessdictonary.com).

Spatial Distribution

An average area served by each market in Himachal Pradesh is recorded 960 sq.km. It varies between 148.92 sq.km.in Solan district and highest of 6258 sq.Km.in Chamba district. For showing the spatial distribution of area served by each market is mapped in fig.9 which depicts following three categories:

1. **Category of High Average Area Served Per Regulated Market (>1200 sq.km):**

Four districts fall in this category namely Kinnaur, Kullu, Lahaul & Spiti and Chamba district. Here, area served by each market varies between 1026 sq.km. in Shimla district to 6528 sq.km.in Chamba district. It shows that owing to rugged topography with high mountains perpetual snow field, etc. and hostile climatic conditions are the hindrances in the way of development of markets because in such conditions the development of agriculture, industry, trade, and commerce are limited which consequently lead to inefficient marketing system in these districts.

2. **Category of Moderate Average Area Served per Regulated Market (600 -1200 sq. km.):**

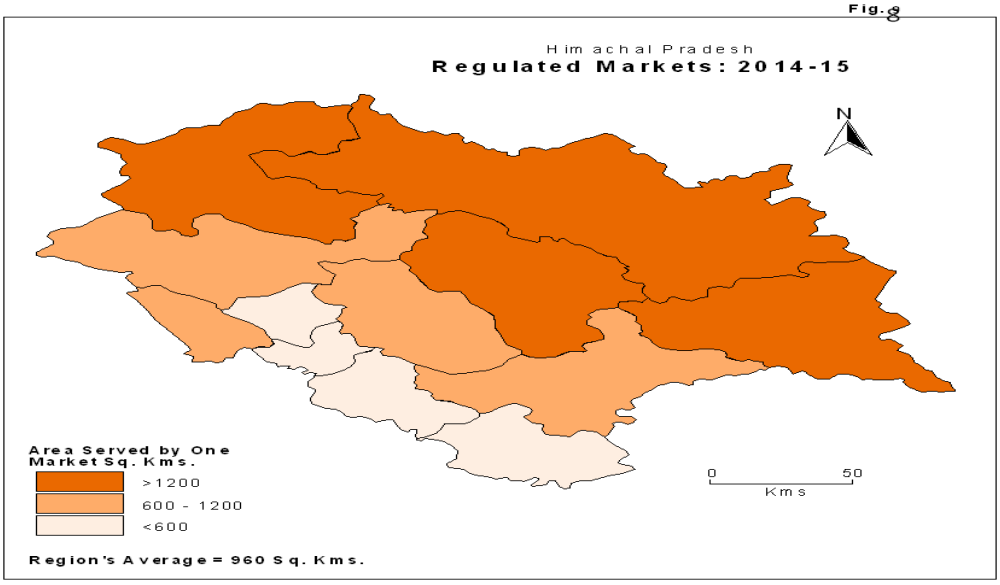
Moderate category comprises four districts of Shimla, Mandi, Kangra and Una and area served by each market ranges between 600-1200 sq.km. Though, these are having difficult terrain for the development of socio-economic factor like urbanization, industrialization and agriculture, etc. yet, there are enough markets to sell the produced. All this is responsible for moderately efficient marketing system in this category.

3. Category of Low Average Area Served Per Regulated Market (< 600 sq .kms):

This category has four districts and are also lying in the south-western parts of Himachal Pradesh. These districts are Sirmaur, Solan, Bilaspur and Hamirpur.There are plains, valleys, Shivalik's and mountains. These are the bordering districts of Punjab and Haryana, where, agriculture and industry are more developed as compare to rest of the state and required more market centers for selling the product and consequently each market serve less than 600 sq.km. which shows that in this category marketing system is more developed as compare to other districts of

Himachal Pradesh. It is concluded that districts with less hostile geo-climatic conditions have efficient marketing system as compare to areas with more hostile geo-climatic conditions. Overall, in the study region, the efficiency of marketing system decreases from south-west to north-east.

Fig.8



Source: Himachal Pradesh State Marketing Board: 2010.

Conclusion

In respect of socio-economic conditions and maize cultivation, it is noted that share of agricultural workers is moderate to high in maize predominant areas, because maize crop requires more man days as compare to wheat, pulses, etc. follow by small size of land holdings. Irrigation affected badly maize cultivation in valley areas of Palampur, Kullu, Mandi and Paonta Sahib, because here farmers preferred rice cultivation owing to its higher economic returns than maize also. The developments in road density, marketing networks, etc. particularly in Shimla, Kinnaur, Sirmaur, Lahaul & Spiti districts have helped the farmers to grow fruits and vegetables crops and consequently the share of maize cultivation is low to very low. Thus, socio-economic factors have affected positively as well as negatively the maize crop in different areas of the study region.

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