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Study of the Impact of Agricultural Land Use Pattern and Cropping Pattern Change on Rural Farmers: With Reference to the Hilly Rural Areas of Uttarakhand

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***Abstract*: Indian agriculture is as diverse as the regional and cultural variations in the country. The hilly rural regions of Uttarakhand which represent the most adverse and difficult geographical settings results in not only the absence of industrial sector in these regions but also presents the most difficult environment for the development agriculture. About 80 percent of population in these regions of the state is dependent on agriculture and allied activities and faces the most tough and difficult environment for survival. The agriculture in these hilly regions which is marked with many problems represents the most diverse form of settings. The agriculture is carried out largely in the terraced agriculture farms which are largely fragmented and represents marginal or small agriculture land holdings. Even after adverse environmental settings agriculture sustains the livelihood of the residents of these regions. Due to several issues agriculture in these regions agriculture has depicted a decline in growth rate which has aggravated the problems of the farmers in these regions. Traditionally agriculture in these regions use to effectively sustain the livelihood of the residents of these regions and was the major source of earning and living but in past few decades agriculture has rapidly declined in these regions. The traditional crops and traditional farming practices are getting extinct and posing serious concerns for the agriculture and livelihood generation in these regions of the state. The change in this trend is marked with the change in cropping pattern and land use pattern. The present study explores this change in the cropping and land use pattern and its socio-economic impact on the farmers. The paper further presents the suggestions and policy initiatives for dealing with the adverse impact of this land use and crop pattern change and for reviving agriculture status and making it potent enough to generate livelihood and employment opportunities for the youths of this region.**

***Keywords*: Agricultural land use pattern, cropping pattern, changes in pattern.**

1. Introduction

India is an agricultural country. The agricultural sector is the basis of the Indian economy. The Indian economy enjoys resource specificity and many other facilities for agricultural operations. Indians have long-term experience of agricultural work. Agriculture provides a means of life to about 58.2 percent people in India. The relative contribution of agriculture to national income, employment and production has been relatively low in all the economies due to being an area of business based and compulsory needs fulfillment. But agriculture is the basis of economic development in a developing and semi-developed economy. Accordingly, agriculture is the mainstay of economic activity in the Indian economy. Total agricultural area in India is 141 point 2 3 billion hectares. The area sown in Indian agriculture is 160 billion hectares. Cereals produced area is 123 billion hectares i.e. 5 point 75 percent of total sown area irrigation in India Area is irrigated by a total of 40% of the sown area of 55% of rainwater sown area Indian agriculture. Indian agriculture is also called monsoon gambling. The reason for this is that the Indian economy is dependent on the monsoon rains, most of the rainfall and agriculture in India happens only during the monsoon. That is, due to less means of irrigation, agricultural production is also less in places where there is lack of irrigation.

2. Agricultural Land Use Pattern

The process of using the land area falling under a country, state or region in different ways by the people of that region is called the land use pattern of that area. The land is used for various works. The land being used for various uses is represented in several categories. All the uses of the land are considered to be a reported area, giving a counter intuitive nature. In other words, the total useful land of the economy is called the reported sector, which is classified according to uses. Generally, the total reported area of the economy is forest area, cultivable, barren land, present fallow, other fallow, weed and unfit agricultural land, other useful land other than agriculture, area under pasture, gardens, trees and shrubs and net sown. This refers to so called land use pattern in the present context.

3. Review of Literature

RC Tiwari and BN Singh in their book Agricultural

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Geography in 2012, have used various principles to explain agricultural land use. For the use of agricultural land, he has mentioned the theory of Vanthunen, the theory of Sinclair, the theory of Olaf Jonson, the theory of OE Baker, the principle of Hoover, the theory of Walter Izzard, etc.

SC Kharkwal 9967 has divided the agriculture of the Himalayan region into two parts. Run agriculture man agriculture according to them is the predominance of sustainable agriculture in the Western Himalayas, while run agriculture is the predominance of agriculture in most parts of eastern Himalayan region.

According to Kesari Nandan Tripathi 2012, as per the facility of irrigation in the mountainous parts, the land is as follows

- In the geography of Talav land and Nautiyal 2010 Uttarakhand, agricultural land of Uttarakhand has been classified into three classes based on land use.
- On the basis of land use in Maithani DD and Nautiyal R, 2010, Geography of Uttarakhand, agricultural land of Uttarakhand has been classified into 3 classes.
- Talau or river valley agricultural land. Rivers of Uttarakhand . Alaknanda, Bhagirathi, Ganga, Nayar, Yamuna, Ramganga, Kosi etc. Fertile plains formed by large rivers and many small rivers.
- Plain Agricultural Land. The entire area of Terai.Bhabar comes under it. The plains of Dehradun, Haridwar and Udham Singh Nagar are the plains which are flat and fertile.
- Agricultural land of hill slopes. Agricultural work is done by constructing a step field on hill slopes. Under it all the hill districts come. Due to the inconvenience of water, agriculture here is dependent on rainwater.

4. Research Methodology and Study Area

1) Study area

For the study the Pauri garhwal area of Uttarakhand has been taken. Pauri Garhwal is one of the most important district of Uttarakhand (27th state of India. The headquarter of the district is Pauri. The area covered is around 5,329 km2. This district comprises of 9 tehsils and 15 developmental blocks. Pauri, Lansdowne, Kotdwar, Thelishen, Dhumakot, Srinagar, Satpuli and Chobbattakhal are the tehsils of Pauri. And Kot, Kaljikhal, Pauri, Pabo, Thelishen, Birokahl, Dvirikhal, Dhugdanda, Jaharikhal, Rikhikhal, Nanidanda, Pokhra and Khirsu are the developmental blocks of Pauri. To the north lies Chamoli, Rudraprayag and Tehri Garhwal. To the south lies Udhamsingh Nagar, to the west lies Almora and Nainital and to the east is Dehradun and Haridwar district. According to the survey conducted in the year 2011 the population of Pauri district is around 687270. The number of males is 326830 and the number of females is 360440. If the distribution of the population is done in terms of rural and urban areas then the number of people in rural areas is 574570 and the urban population is 112700.

If we talk about farming then the situation of farming in Pauri is similar to that of in Uttarakhand. In the district per capita land use is limited. The general category uses around 1.31 hectare of land and the marginal group make use of 0.51 hectare of land. If we talk about the history of Garhwal then the first land settlement was done by British government in the year 1815 and the second land settlement was done in 1816. In the year 1817 and 1820 again the settlement was done for three years. In the year 1925 A.W EBetson introduced the land settlement.

2) Research method

Descriptive survey method is used for research.

3) Sampling method

Stratified random sampling method

4) Sample size

For the research work 6 developmental blocks out of 15 has been selected. From each developmental block 6 villages has been selected, and the farming method of each village was reviewed. For the personal study of the farmers at least 10 farmer's family from each village were selected. In this way around 360 farmers family were studied in this research.

5) Data collection

For the primary data the researcher followed the self. Built system. Besides this observation method, indirect linear investigation methods were also used to collect information. For the secondary data colleges, libraries, government and nongovernment organizations, internet etc. are made use of.

5. Objective of Study

1. To analyze the trend of change in agricultural land use and crop pattern in district Pauri.
2. To study the effect on farmers as a result of changes in agricultural land use and crop pattern.

A. Research findings

The studied the impact of changes in agricultural land use pattern and crop pattern on the livelihood of farmers. For this, detailed observation and assessment of the family, economic, educational status of 360 farming families has been done. Regarding the agricultural land use and crop pattern of the farmers in the research study, in order to know the trend of the impact on the livelihood of the farmers in the last five years (from 2010 to 2015) of the agricultural land use pattern and crop pattern change of the selected area Different.

Table 1
Description of economic status of farmers

S.No	Economic Status	Number Of Farmers	Percent
1	APL	732	54.66
2	BPL	456	34.06
3	Antodya	67	5.00
4	Food safety	84	6.28
TOTAL		1339	100

SOURCE: Primary Survey march 2016 to Jan 2017

According to the research, more than 40 percent of the farmers in the selected area are living below the poverty line. That is, the economic condition of most of the farming families in the area is very pathetic and poor. For this somewhere, backwardness of agriculture, low agricultural productivity, lack of resources and odd natural conditions etc. can be responsible elements. Due to negative changes in agricultural land use pattern and crop pattern, the condition of both agriculture and farmers is getting worse. Therefore, it can be said that the

change in agricultural land use pattern and crop pattern has negative effect on the economic condition of farmers.

Research has shown that most of the farmers belonging to the general caste are APL card holders. The only farming family of Scheduled Tribes is Antyodaya card holders and majority of Scheduled Caste farming families are BPL card holders while majority of other backward class farming families are APL card holders. Research results show poor economic status in the study area. Majority of the BPL card holders reveal the pathetic economic situation in rural areas. The position of the Scheduled Tribes in the research field is very worrisome. Comparative study of general caste and scheduled caste shows that the condition of general caste is much better than that of scheduled caste. Because BPL card holders constitute 53 percent of the total scheduled caste agricultural families, while only 30 percent of the general caste farming families are BPL card holders. Maximum 65 percent of the farming families of the general caste are living above the poverty line. Whereas among the very poor class ie Antyodaya card holders, the percentage of scheduled caste agricultural families is the highest. Which clearly means that no specific effect of any programs for poverty alleviation has yet been seen in the rural areas of the district.A high percentage of poverty is not an indicator of good economic condition. Therefore, there is a need to make public expenditure in a planned manner to remove the economic inequality prevailing in the region on the basis of caste in the district. If we look at the distribution of caste income in the study, it is known that most of the population of general caste and other backward classes are in better economic condition than scheduled castes and tribes. Most of the Scheduled Caste farmers and Scheduled Tribe farmers have very poor economic condition. When compared to the average of the family members, this situation becomes more pathetic because the average number of family members in the scheduled castes and tribes is also higher. And as a result of lack of income it is having a bad effect on the livelihood of the family.

First sight research in the study area found that there are many Scheduled Caste and Other Backward Class farming families whose monthly income from all sources is more than 5000 rupees but they are BPL card holders which makes it clear that ration card is somewhere the effect of corruption in construction is still present today.

In fact, the economic situation is almost equal for all castes in the district. Therefore, it is not justifiable to base caste on agricultural development schemes. According to research, almost equality was found in the economic status of all castes. That is, the distribution of income is almost the same. Research results show that most of the farming families are unable to get

Table 2
Details of economic status and caste of farming families

S.No	Economic Status	CAST				
		General	Scheduled Caste	Scheduled Tribe	OBC	Total
1	A.P.L.	156 (62.15)	18 (19.78)	00	09 (52.94)	183
2	B.P.L	77 (30.67)	48 (52.74)	00	00	125
3	Antyodaya	06 (02.39)	11 (12.08)	01 (100)	04 (23.52)	22
4	Food safety	12 (04.78)	14 (15.38)	00	04 (23.52)	30
TOTAL		251	91	01	17	360

SOURCE: Primary Survey march 2016 to Jan 2017

Table 3
Distribution of caste and monthly income of farmers

S.No.	Monthly income of farmers family	CAST				
		General	Scheduled Caste	Scheduled Tribe	OBC	Total
1	Less then 2000	30 (11.96)	15 16.49)	-	-	45
2	2001 ls 5000	51 (20.32)	25(27.47)	01(100)	-	77
3	5001 ls 10000	82 (32.67)	26(28.57)	-	03(17.64)	111
4	10001 ls 20000	78 (31.07)	23(25.28)	-	09(52.95)	110
5	More Then 20001	10 (03.98)	02(02.19)	-	05 (29.41)	17
Total		251	91	01	17	360

SOURCE: Primary Survey march 2016 to Jan 2017

Table 4
Comparative statement of income from agricultural and non-agricultural sources of farming

S.No	Monthly income of farmers family	Numbers of family			
		Income from agricultural source	Income from non-agricultural source	Income from agricultural and non-agricultural source	Total
1	Less than 2000	03 (6.66)	32 (71.11)	10 (22.23)	45
2	2001 ls 5000	04 (5.19)	56 (72.72)	17 (22.08)	77
3	5001 ls 10000	04 (3.60)	72 (64.86)	35 (31.53)	111
4	10001 ls 20000	05 (4.54)	83 (75.45)	22 (20.00)	110
5	More Then 20001	01 (5.88)	11 (64.70)	05 (29.41)	17

SOURCE: Primary Survey march 2016 to Jan 2017

even Rs.5000 per month under the income from agriculture. The main reason for this may be the decrease in agricultural productivity and change in agricultural land use pattern. About 70 percent of the total agricultural families are receiving their monthly income from non-agricultural sources. In which the percentage of farming families having income less than 5000 is 35 percent and the percentage of farming families having income above 5000 is about 65 percent, which is much more than this category of income from agriculture. There are also some farming families who are earning income from both sources from agriculture and non-agricultural. But their percentage is also very low, which is said to indicate agricultural failure. Due to low productivity of agriculture, and adverse agricultural conditions, the interest of villagers in agriculture is ending and migrating in search of other sources of rural income. Probably a major reason here is that the decadal growth rate of Pauri district is negative.

It is clear from the research that due to the failure of agriculture and low productivity, the percentage of agricultural income from agriculture has also decreased and farmers are becoming more attracted towards other sources of income. In the district, the percentage of income of farmers from both agricultural and non-agricultural sources is very low. That is, from the point of view of economic situation, only the percentage of income from non-agricultural sources is the highest. The percentage of agricultural income in the total monthly income of the people in the district is low and is continuously decreasing. Income derived from agricultural sources can be included in the sale of agricultural produce, sale of livestock, sale of grass and bark, sale of wild and seasonal fruits and flowers, sale of handloom manufactured goods and textiles etc. In contrast, income from non-agricultural sources includes work done under MNREGA, wages, self-employment, etc.

Table 5
Change in crop pattern effect on the agricultural production

S.No	**Change in crop pattern effect on the agricultural production**	**No. Of Families And Percentage**	
		No. Of Families	**Percentage**
1	Positive effect	00	00
2	Negative effect	360	100
3	No change	00	00

SOURCE: Primary Survey march 2016 to Jan 2017

Table 6
Description of dependence on public distribution system (from 2010 to 2015)

S.No	**Dependence on public distribution system or targeted distribution system**	**No. Of Families And Percentage**	
		No. Of Families	**No. Of Families**
1	Excessive Growth	22	6.11
2	Normal Growth	183	50.84
3	Minimum Growth	110	30.55
4	No Change	45	12.50
	Total	360	100

SOURCE: Primary Survey march 2016 to Jan 2017

It is clear from the research that the trend of change in crop pattern is negative. Between the year 2010 and 2015, both the agricultural productivity and the production sector have decreased. The production of total crops has reduced to almost zero in total areas. The trend of change in crop pattern has also had a negative effect on the income of agricultural families from farming families. Due to which livelihood of farmers is directly affected.

The table makes it clear that in the past the production from agriculture was sufficient for self-consumption. Farmers were dependent on the market for some items like salt, tobacco matches etc. However, as a result of reduced productivity of agriculture, agriculture has become dependent on the market for almost all commodities of consumption. As the income of the farmers is low, they have become more dependent on the public distribution system. Apart from this, due to the availability of food grains in the public distribution system easily and at a low price, the farmers themselves are automatically involved in agricultural production. Apart from this, due to the availability of food grains in the public distribution system easily and at a low price, farmers are automatically showing less interest in agricultural production, due to which the dependence on the public distribution system is increasing rather than decreasing.

Table 7
Percentage of supply of domestic demand by the public distribution system

	Percentage of supply of domestic demand By the public distribution system				
	100 to 75	75 to 50	50 to 25	25 to 05	Less than 05
Wheat	02	20	183	30	125
Rice	10	35	48	75	192

SOURCE: Primary Survey march 2016 to Jan 2017

It is clear from the research that farmers are mainly dependent on public distribution system for major wheat and rice out of the main food crops. Antyodaya and BPL card holders get about 25 to 50 percent of their grain from the public distribution system. Which shows the dependence of the rural population of the district on public distribution system.

Table 8
Description based on the use of agricultural produce and nature of farming

	Nature of farming			
Use of agricultural produce	Organic Farming	Un Organic Farming	Mixed Farming	Total
For self-consumption	251(98.9)	00	03(1.1)	254(70.5)
For commercialization	00	00	00	00
For both self-consumption and commercialization	62(58.5)	00	44(41.5)	106(29.5)
Total And Percentage	313(86.9)	00	47(13.1)	360

SOURCE: Primary Survey march 2016 to Jan 2017

It is clear from the research that there are some farming families in the study area who are doing agricultural work for both self-consumption and commercialization. From a livelihood and economic point of view it becomes important that farmers get income by selling some part of their produce which is left after self-consumption. No crop is produced in such a large quantity in the state that farmers can make them available for sale. Apart from this, due to lack of means of

accessing the produce to the appropriate markets, the farmers produced goods at low prices in the local markets.

Table 9
Development Block wise details of change in income of farming families

Devlopment Block	Income From Agriculture			
	Positive	Negative	No change	Total
Thelishen	00	17	43	60
Birokahl	00	19	41	60
Pabo	00	29	31	60
Kot	00	21	39	60
Khirsu	00	27	33	60
Pokhra	00	19	41	60
Total	00	132	228	360

SOURCE: Primary Survey march 2016 to Jan 2017

It is clear from the research that more than half of the total farming families believe that there is no significant change in the income from agriculture. While about 35 percent of the farming families believe that there has been a decrease in income from agriculture. One of the main reasons for this is that the practice of farming for self-consumption has been going on in the district since before. Farmers do not do agricultural work for commercialization, due to which even before agriculture, farmers were getting very less income. At present, some farmers are selling their produce, but as a result of the decrease in production, agricultural income of those farmers is having a negative effect.

Table 10
Statement of participation in non-agricultural sectors as a result of the change

S.No	Participation in non-agricultural sectors as a result of the change		
		Total	Percentage
1	Increase	356	98.88
2	Decrease	00	00
3	No Change	04	01.22

SOURCE: Primary Survey march 2016 to Jan 2017

It is clear from the research that almost all farmers believe that as a result of changes in agricultural land pattern and crop pattern, participation in other areas other than agriculture has increased. Continuous lowering of agricultural productivity and reduced amount of income and scope in agriculture is reducing the interest of farmers in agricultural work.

6. Research Findings

According to research, it can be said that due to change in agricultural land use pattern and crop pattern, the economic condition of farmers has a negative effect. Majority of the BPL card holders reveal the pathetic economic situation in rural areas. The position of the Scheduled Tribes in the research field is very worrisome. Comparative study of general caste and scheduled caste shows that the condition of general caste is much better than that of scheduled caste. If we look at the distribution of caste income in the study, it is known that most of the population of general caste and other backward classes are in better economic condition than scheduled castes and tribes. In the district, the percentage of income of farmers from both agricultural and non-agricultural sources is very low. That is, from the point of view of economic situation, only the percentage of income from non-agricultural sources is the highest. Due to easy availability of food grains in public distribution system, farmers are automatically showing less interest in agricultural production due to which the dependence on public distribution system is increasing rather than decreasing. Almost all farmers believe that as a result of changes in agricultural land pattern and crop pattern, participation in other areas other than agriculture has increased. Continuous decrease in agricultural productivity and low amount of income and scope in agriculture is reducing the interest of farmers in agricultural work.

7. Conclusion

This paper represented an overview of Study of the impact of agricultural land use pattern and cropping pattern change on rural farmers: with reference to the hilly rural areas of uttarakhand.

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