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Status of the farmers due to industrialization of Udham Singh Nagar district in Uttarakhand

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Abstract

Agriculture is the backbone of Indian economy. Nearly 56 % of the Indian population is dependent on agriculture for their livelihood. The agriculture growth rate in the financial year 2012-13 was around 3.4% against the target of 4%. The slow growth of the agriculture sector and the high exposure to the risk is attracting the rural youth towards the industrial sector. The growth rate of the industrial sector in the country is on high since the adoption of the liberalization, globalization and privatization in the early 90's. The competition between these two sectors for the resources like land, water, energy etc. is seen in the recent times. There is also a competition for attracting the skilled and the unskilled labour in these sectors. The number of the farmers in the country decreased from 110 million to 95.3 million in the period 1991- 2001 (Census data). The government is trying hard to maintain the equilibrium between these two sectors of the economy. Increasing the agriculture credit, input subsidy, electricity subsidy, development of irrigation infrastructure etc. are few major steps that are taken by the government to boost the agriculture sector. Industrial sector provides good amount of timely payments to the people. Apart from that the risk involved in it is significantly lower than the farm sector. The study has been undertaken to study the relationship between the industrial development and agriculture in an area.. The identification of the factors that attract the work force in the agriculture and the industrial sector has been taken into consideration. Traditionally agriculture is the main source of occupation for the people of Udham Singh Nagar district of Uttarakhand.

SIIDCUL has various effects on Udham Singh Nagar. It has increased the investments in the state tremendously. The problem of the migration of the local youth to other parts of the country is also checked. In total the job opportunities and sources of the livelihood have increased. On the other hand, the agriculture of Udham Singh Nagar is badly affected. The depletion of the water table, increase pest infestation, increased use of fertilizers etc. are the negative ecological effect of SIIDCUL in the nearby areas. The availability of the labour is also another problem which is severely affecting the state. Farmers are more interested to switch their occupations due to the increased cost of cultivation and the problems discussed above.

Keywords: SIIDCUL, farmers, Udham Singh Nagar, employment

Introduction

Since independence (from British-rule) in 1947, India, having the second biggest population in the world, faced two key economic challenges: achieving food security and alleviating poverty. In a country which relies predominantly on agriculture, the focus was to promote growth in the agricultural sector to meet both of these challenges. This led to formulation of measures such as agricultural improvements called the Green Revolution, the public distribution system and price supports system for farmers ^[1].

Over the last 50 years average farm sizes have been increasing in the developed world while significantly declining in developing countries ^[2]. In Asia this trend is illustrated by the case of India where the average farm size declined from 2.6 to 1.4 hectare between 1960 and 2000 World Bank, 2007. The 2008 World Development Report estimates that 85 % of smallholders in developing countries are farming less than 2 hectares World Bank, 2008.

Green revolution technology during late 1960s brought agriculture to the centre stage of debate on economic growth. Rising concern about rural poverty, equity and gains from agricultural productivity from green revolution technology in Asia in the early 1970s motivated agricultural economists to advance agriculture's claims as a departure from industrial-led growth to the notion that agriculture itself could serve as the engine of growth ^[3].

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This transformed the conventional views of the contribution of agriculture to economic development and led to a new view that Agriculture could drive economic growth [4, 5]. The second view is that with diminishing share of agriculture in the economy, industry can grow on its own^[6] and the linkage between agriculture and industry is weak^[7]. Similarly, while a strong association has been found between earning per worker in agriculture and in rural non-farm activities^[8]. Several scholars remain skeptical about the nature of agriculture growth linkage to generate rapid growth in rural non-farm employment (RNFE)^[9]. There is a need to revisit this debate in the light of recent changes experienced in Indian agriculture particularly in the aftermath of economic reforms and new economic policy followed since the early 1990s. Indian economy - a very sharp decline in the share of agriculture in GDP but only modest decline in share in employment. Consequently, disparity in per worker income in agriculture and non- agriculture has widened^[10] which is seen as a major factor for rise in agrarian distress during recent years^[11]. All these changes, and weaknesses of hypothesis of linkage effect of agriculture, require fresh understanding of the linkages between agriculture income and other segments of the economy, and between agriculture sector and rural non-farm (RNF) sector.

The manufacturing sector is a major sector that contributes around 16 % to the GDP (www.ibef.org). The impact of special economic zones on the farmers is 0.033 per cent of the total land and 0.061 per cent of the total agricultural land and it would be acquired by the approved SEZs^[12]. Although area covered under SEZs is not very significant, the development of these zones still pose threat to the water and food security. The diversion of water for use within SEZs would result in lack of access to water for people living in the SEZ areas. Similarly, release of untreated effluents from SEZs may adversely affect health of people residing in the area.

Since the formation of Uttarakhand as a separate state, successive state governments pushed by an assortment of special interests, have promoted an economic growth model that totally disregards the state's mountain character and the associated environmental frailties^[13].

Two industrial estate was established in the Udham Singh Nagar district in Pantnagar and Sitarganj under Small Industries & Infrastructure Development Corporation of Uttarakhand Limited. The rice fields are shrinking due to use of land in industries and the yield of rice is decreasing in Uttarakhand^[14]. Industrialization is one of the major cause of environmental degradation^[15].

The purpose of this study was to assess the effect of the industrial establishments on the farmers of the surrounding regions. This change (i.e. before and after establishment of the SIIDCUL) in the terms of the cropping pattern of the area, farm and non- farm income of the farmers, labour supply and the labour rates is to be studied. The perception of the farmers towards agriculture and their willingness to switch their occupation was also worked out.

Materials and Methods

The proposed methodology for conducting the study "Assessment of change due to industrialization in Udham Singh Nagar" involves steps developing indicators and direct interaction/ interview (questionnaires) with farmers, method and tools of data collection, sample design including sample size, methods of data analysis and plan for report preparation. A total of seven *tehsils* are there in the Udham Singh Nagar district. The selection of the *tehsil* was done on the criteria of

their closeness with the SIIDCUL. This criterion is specifically chosen so as to find the actual impact of SIIDCUL. The criterion used eliminated three of the seven *tehsils*. Similarly the selection of the villages was also done on the basis of their closeness to the SIIDCUL so as to get correct results. The list of the *tehsils* visited included Rudrapur, Kiccha, Sitarganj and Gadarpur.

Designing of Questionnaire

A questionnaire was designed which includes the question like the area and the productivity of the farmers field during the survey. The time of the questions is set in such a manner that the farmers will be able to give a clear detail of the change in their crops taken and the yield linked with it. These results will be used for figuring out the total farm income of the farmers. Other major questions include the non- farm income, number of farm animals, labor charges, changes observed due to establishment of SIIDCUL.

The questionnaire includes two types of questions viz. Open-ended questions: Open-ended questions are those that allow respondents to answer in their own words and Close-ended questions: Close-ended questions are those with pre-designed answers with a small or large set of potential choices.

Data Collection

With the help of well-developed questionnaire specially designed for the study to fulfill its objectives data was collected from beneficiaries through interview schedule and focused group discussion with both open & close ended questions with farmers and district officer.

Sorting the data and the measurement of central tendency through mean were calculated for different indicators. With help of various tools and techniques data was converted into useful information and expressed through tables, Pie and Bar charts^[16].

Result and Discussion

A change was measured by seeing the difference of a value or a result in the past. The change in the value tells whether there was any change or not. There were certain criterion which were used to evaluate the change. These criteria were called as the indicators or the parameters. The parameters which were used during this study included change in the area under different crops, labour scarcity perception, labour wages, farm income, non- farm income, participation in non- agriculture sector and land sold in last 10 years.

Change in the area under different crops

The cropping pattern is an ideal way to find out the trend of the various crops grown in an area. Udham Singh Nagar is known in the past for the cultivation of the crops like rice, wheat, sugarcane, maize and soybean (Source- Survey). This trend is still present with the difference that soybean is not grown much. The cropping pattern that was mostly followed in *terai* area. The focus was laid here on the crops like rice, wheat, sugarcane and pea which were the most important crops of both in terms of the area and the economic output.

Rice: Udham Singh Nagar is known as "ChawalkiNagari" (Central Ground Water Board District Report of Udham Singh Nagar). Rice requires standing water in the fields for its growth. The high water table and bright sunshine during the *zaid* (March- June) and *khariif* (June –October) makes the area fit for the rice production. The rice is mainly grown in this area during these two seasons. The productivity of summer rice remains higher than the *khariif* rice. This is because of the low

pest infestation during the summer season. In 2012-13 the average productivity of summer rice in the whole district is 2 quintals more than the kharif rice (*ZilaSankhyiki*, 2014). The net sown area of the kharif rice is increased from 94281 hectares to 103046 hectares from crop year (CY) 2002-03 to 2012-13 (Figure 1). Similarly the area under the summer rice was also increased. The rate of increase in the summer rice

was almost 250% from CY 2002-03 to 2012-13 (Figure 2). The reasons for such a high increase in the area under *kharif* rice is good return on investment on the crop. The attack of the insects like brown plant hopper and stem borer was very low. The presence of the irrigation water in the ample amount also encourage the farmers to take the summer rice in their fields.

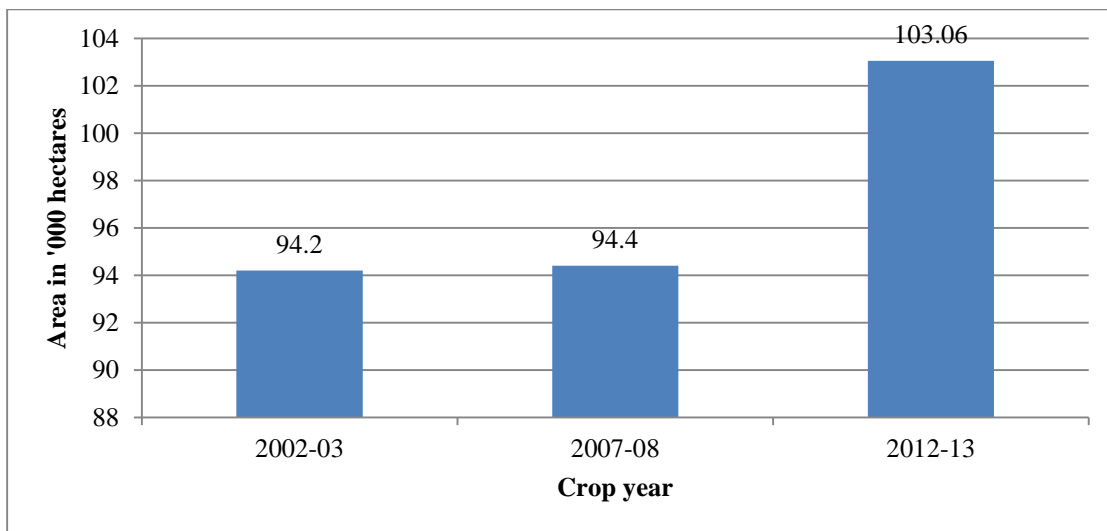


Fig 1: Net sown area of *kharif* rice from CY 2002-03 to 2012-13

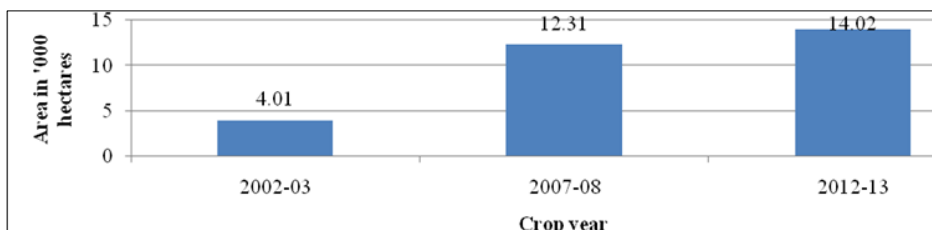


Fig 2: Net sown area of summer rice from CY 2002-03 to 2012-13

Wheat: Wheat is the second most important crop of the *terai* region. The wheat grown in Udham Singh Nagar is also a source of the raw material for Uttarakhand seeds and Terai development Corporation (UKS&TDC). The seed for UKS&TDC is grown under the supervision of its officials. Many farmers of the district are involved in growing seeds for UKS&TDC. The area under the wheat in 2002-03 is 88050 ha

and increased to 97910 ha in 2007-08 (Figure 3). In the next five years i.e. from 2007-08 to 2012-13 it has reduced by 300 ha. The overall growth rate from 2002-03 to 2012-13 is 11%. The major problem in the cultivation of the wheat is the infestation of many worms, rust and *Gehunka mama* (*Phalaris minor*).

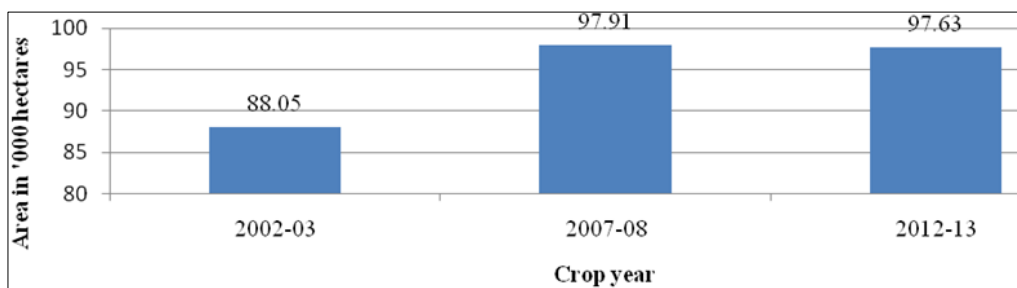


Fig 3: Net sown area of wheat from CY 2002-03 to 2012-13

Sugarcane: The area under the sugarcane crop is reduced by 14010 hectares from CY 2002-03 to CY 2012-13 (Figure-4). Gadarpur has the highest decrease in the area under sugarcane by 36% from CY 2004-05 to 2012-13. The area is under high infestation of the sugarcane borer complex. Sugarcane requires good amount of labour for doing its harvesting and

other crop operations. The reason for the decrease in the area under the sugarcane is the disfunctioning of the Gadarpur sugar mill. Along with that the labour shortage is another factor as sugarcane requires huge labour for its tying, earthing and harvesting.

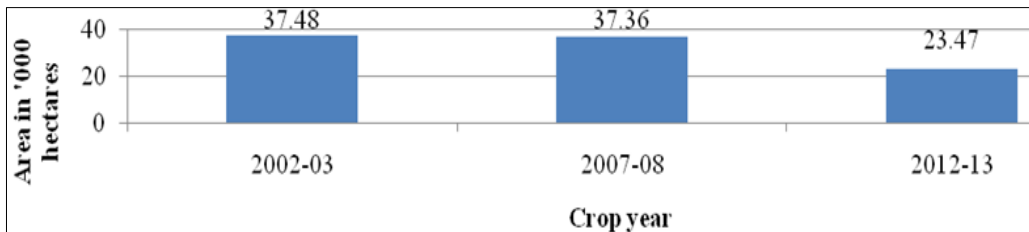


Fig 4: Net sown area of sugarcane from CY 2002-03 to 2012-13

Pea: Pea is another major cash crop which is grown in *terai*. The harvested pea is supplied to the local and other state APMC's. There was an increasing trend of the area under the

pea. The area under pea is increased from 1890 ha to 4840 ha in the period from 2002-03 to 2012-13 showing an increase of 156% in past ten years (See figure 5 below).

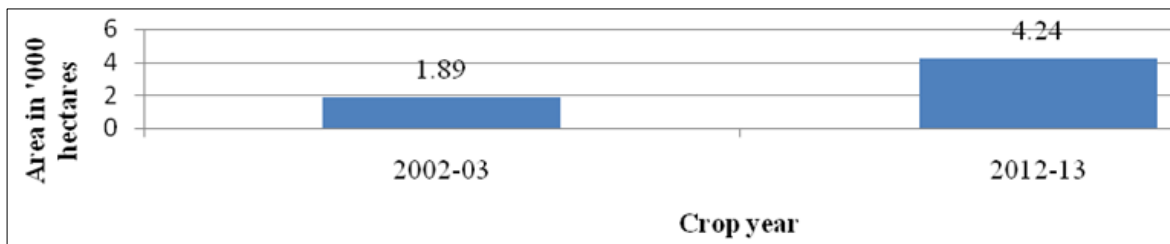


Fig 5: Net sown area of pea from CY 2002-03 to 2012-13

Maize and Gram-

These are the two crops whose net sown area has decreased in the past. The area has decreased from 76 ha to 28 ha from CY 2002-03 to 2012-03 (Figure6). Similarly the area under the

maize crop has decreased by 78% (Figure 7). Maize which was one of the most importantt crops of *terai* in the past is now almost vanished and replaced by other crops.

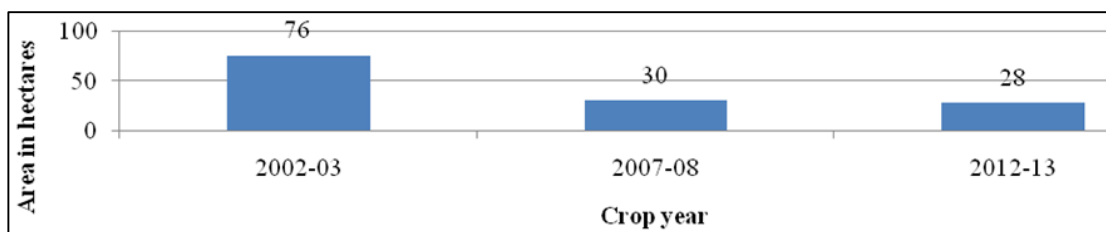


Fig 6: Net sown area of gram from CY 2002-03 to 2012-13

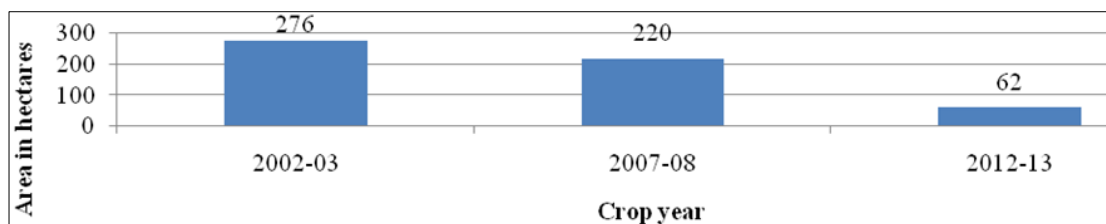


Fig 7: Net sown area of maize from CY 2002-03 to 2012-13

Labour Scarcity Perception

Labour issue is a major problem observed in whole district. In the period prior to establishment of SIIDCUL, the labour demand is met by the local labour present in the area. The farmers having small landholding meet the labour requirement by involving the family labour while large farmers outsource the labour. There is also a huge labour migration from the parts of Uttar Pradesh and Bihar to meet the labour requirement of the area (Source- Survey). The labour issue in the Sitarganj has not been much. This is due to

the supply of the labour from adjoining areas of Uttar Pradesh bordering Udham Singh Nagar. The rates may have gone up significantly from Rs. 80 to Rs. 225 but still the labour supply is good and rates are less than other tehsils of the district. A total of 47% of the farmers surveyed feels that the labour scarcity falls under the category of very high and high. While only 13% of the farmers said that the labour problem is not too much in the region (Figure 8). These are mostly those who were involved and earning good from the non- farm sector.

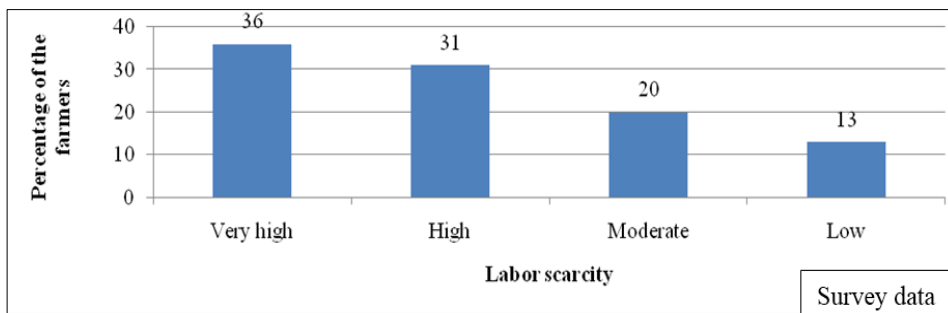


Fig 8: Farmer perception on labour scarcity

Labour Rates

The labour charges in the villages surveyed of three tehsils Gadarpur, Kiccha and Rudrapur were somewhere between Rs. 80-90 in 2005-06. But the labour charge in 2013-14 increased to a minimum level of Rs. 230 per day. This may also exceed to upto Rs. 400 per labour per day in case of peak season like pea harvesting and sugarcane harvesting. The labour requirement is not that much high during the harvesting of the rice and wheat due to high level of

mechanization in the district. The rates in the Sitarganj region were still lower than other tehsils under survey. This is due to inward movement of the labour from the neighbouring districts and border area of Nepal. The hike in the labour charges is found to be 225% in case of Rudrapur and Kiccha tehsils. The rates rose by around 238% and 172% in Gadarpur and Sitarganj tehsils from 2005 to 2013 respectively. The rates of the labour of whole district and each tehsil separately are depicted in figures 9,10,11 and 12.

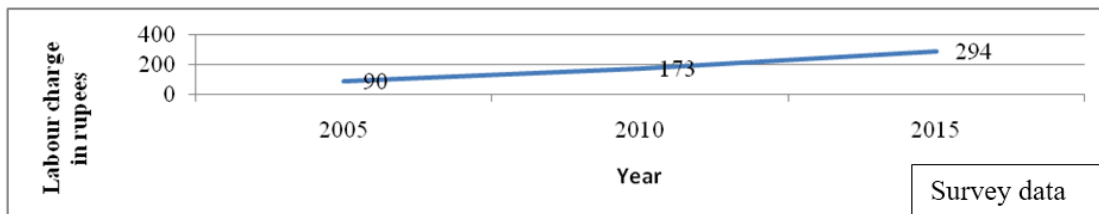


Fig 9: Labour rates of Udham Singh Nagar

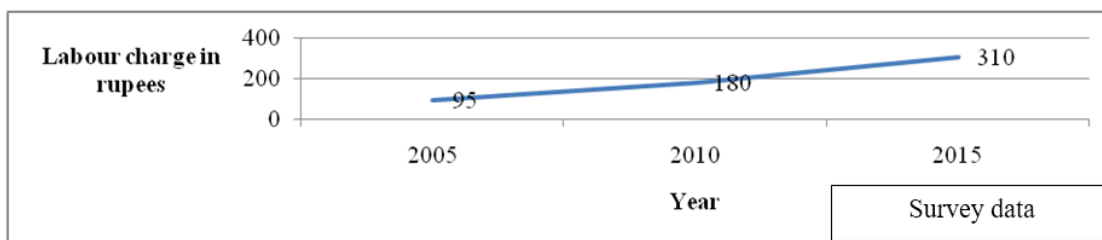


Fig 10: Labour rates of Gadarpur tehsil

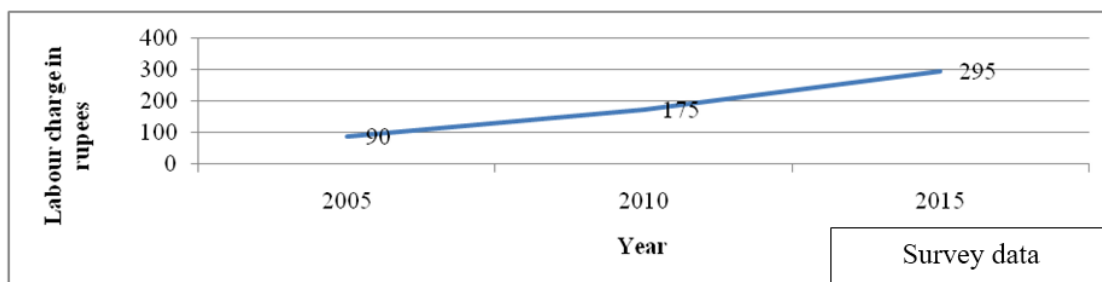


Fig 11: Labour rates of Kiccha tehsil

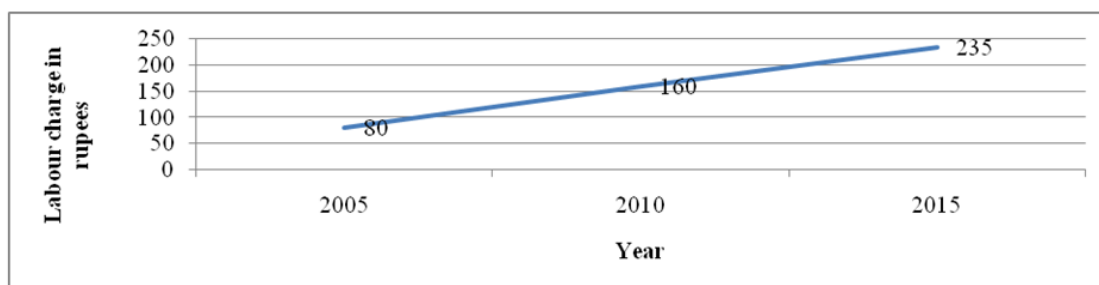


Fig 12: Labour rates of Kiccha tehsil

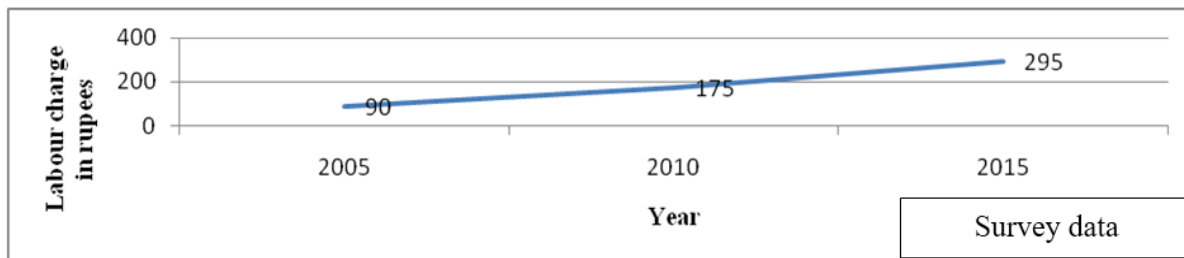


Fig 13: Labour rates of Rudrapur tehsil

Occupational pattern of the farmers-

In the year 2005-06 the number of the farmers purely stick to agriculture are 48% while rest 52% have some engagement in non- farm sector (fig. 14). This percentage of the farmers engaged in non-farm increased to 76% in 2009-10 while the farmers who was engaged only in the farming activity was

24%. There was considerable decrease in the number involved in the agriculture practices from 2005-06 to 2013-14. The current figure shows that only 11% of the total sample population was dependent on agriculture for the sustain of their lives.

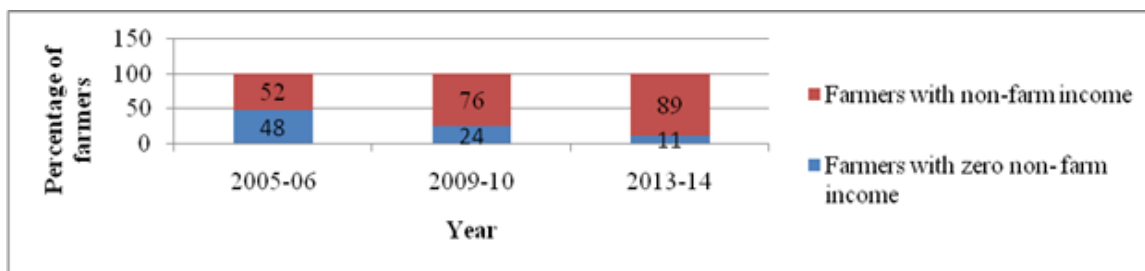


Fig 14: Farmer participation in non- farm sector

Farm and non-farm income

The next indicator is the average income of the individual farmers through agriculture and non- agricultural occupations. The income was calculated on the basis of the yield and area under individual crop in the past 10 years. The data was collected on the three different time slabs which was 2005-06, 2009-10 and 2013-14. The income was calculated by multiplying the net production from the field of each crop by the price given in the *Zila Sankhyiki adhikari*. The non-farm income figures were collected by interviewing the farmers in which the farmers gave an approximate value of their non-farm income over the years. The figures the difference between the farm and the non-farm income for the district and each tehsil over the years.

The farm income has increased from Rs. 265515 to Rs. 537735 and 665306 in 2009-10 and 2013-14 respectively. Thus it showed an increase of 102% in 2009-10 and 23%

(base year 2009-10) for the whole sample population. The primary reason for this change is the increased in the price of farm output and in few cases like the summer rice where the yield has increased considerably. Apart the use of the inputs like fertilizer and the pesticides has also played in the increased the yield of the crop. Similarly the farm income has also showed the increase in the past. There is an increase of 169% from 2004-05 to 2009-10 while the increase from 2009-10 to 2014-15 has been reported to be 32%. The many reasons were noted of increasing the non- farm income. The other employment options which were widely adopted by the people of the district were property dealing and the work of the contractor or the jobs in SIIDCUL. The rates of the commercial crops have also increased. For example there is an increase from Rs. 95 to Rs. 350 over last 10 years in the price of sugarcane. This was a change of 265% over the last ten years in the price of the sugarcane.

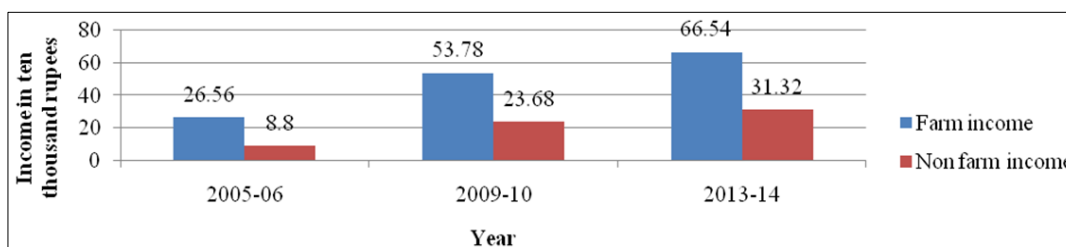


Fig 15: Comparison between the farm and non- farm in cone in Udham Singh Nagar (Survey area)

The comparisons of each tehsil was done separately as per details given below.

Rudrapur Tehsil: Rudrapur being the nearest urban area to SIIDCUL has changed a lot in the recent past. The area well known as major hub for basmati rice production has also changes. The average non- farm per farmer in the sample was found to be Rs. 266347 in 2004-05 and it has increased to a

level of Rs 666974 in 2013-14 (Figure 16). This showed an increase of 150% in the past ten years. On the other hand the increase in the non- farm sector income of the farmers is noted to be 260 %. This significant improvement was due to the increasing the land rates and easy availability of other occupations. The most preferred were property dealing, labour supply in SIIDCUL, government jobs etc. The initial period from 2004 to 2009 has seen a major growth in the non-

farm income i.e. 170% but it declined to only 32% in 20010 to 2014. The reason for this stagnation in the growth rate was the decreasing opportunities growth rate in the other service sector developed due to SIIDCUL. Since the operations of

almost every company in SIIDCUL has reached its maximum level that is why the new opportunities in the service sector were having decreasing growth rate.

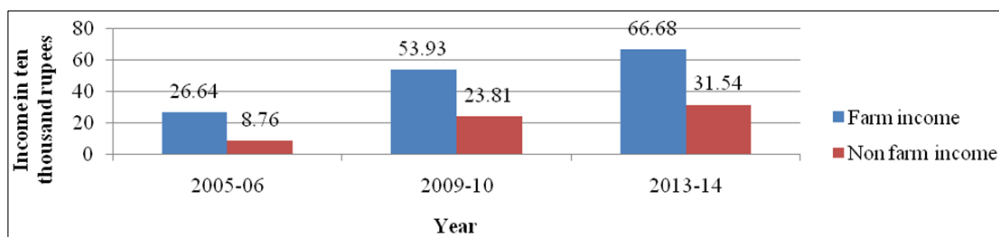


Fig 16: Comparison between the farm and non- farm income in Rudrapur tehsil (Survey data)

Gadarpur Tehsil

The value of the farm and the non- farm income in the Gadarpur and Rudrapur tehsils was moreover the same. This was because of the area influenced by the SIIDCUL (Pantnagar) falls under all these three tehsils. Similarly the

cropping pattern and the kind of the job opportunities present in the survey were also alike. The farm income in Gadarpur tehsil has increased by 105% from 2005-06 to 2009-10. But the growth rate has reduced significantly (19%) in the period from 2009-10 to 2013-14. (Figure 17)

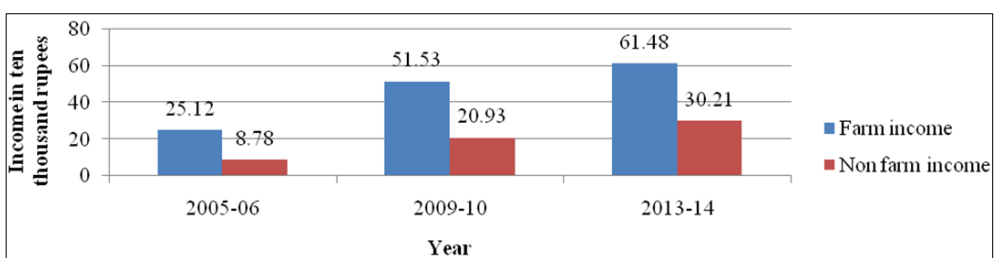


Fig 17: Comparison between the farm and non- farm income in Gadarpur tehsil (Survey data)

Kiccha Tehsil

The area of this Tehsil has been moreover same after the establishment of SIIDCUL. The farmers here mostly complained about the decrease in the yield and increase in the cost of cultivation. Sugarcane borer was the most important problem found in this area. The average farm and the non-farm income of the villages under the Kiccha tehsils has

increased by 102% and 170% respectively from 2004-05 to 2009-10. The farmers were found to be more interested to stick to agriculture rather than taking up the new assignments. But still the youths of the area were involved in the occupations giving them a handsome income from the sectors other than agriculture (fig. 18).

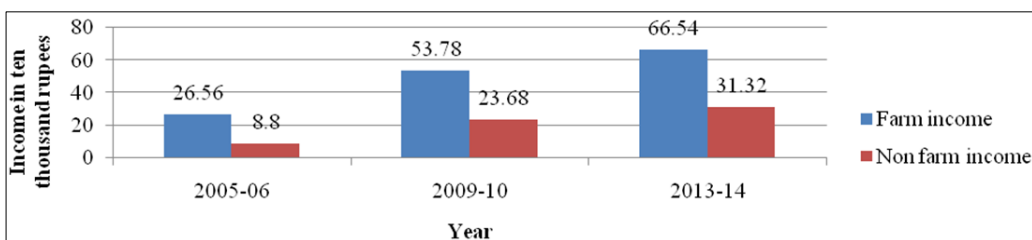


Fig 18: Comparison between the farm and non- farm income in Kiccha tehsil (Survey data)

Sitarganj Tehsil

The farm income of the surveyed population in Sitarganjis increased by almost 90% from 2005-06 to 2009-10. This growth rate decreased to only 31% in the period from 2009-10 to 2013-14. But still it was higher than the whole district for

the period 2009-10 to 2013-14. The growth rate for non- farm income of the surveyed population was 143% and 45% for the period from 2004-05 to 2009-10 and 2009-10 to 2013-14 respectively. (See figure- 19)

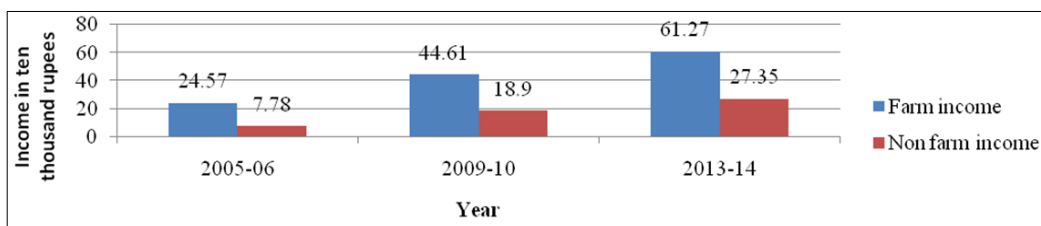


Fig 19: Comparison between the farm and non- farm income in Sitarganj tehsil (Survey data)

Land Holding Sold

In 2004 when the SIIDCUL was planned and its implementation was in initial stages then the land rates in the regions around the SIIDCUL shoot up. The farmers of the villages sold land and bought land or invested in some other sector through this money. Out of the total sample population 33% of the farmers has sold their land during past 8 years (Figure 20).

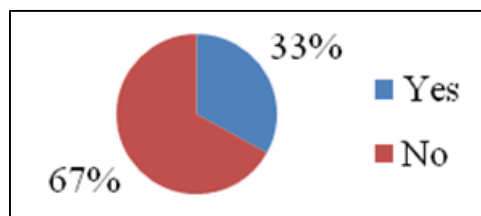


Fig 20: Land sold for non- agricultural purpose by the farmers

Problems faced by the farmers due to establishment of SIIDCUL

The establishment of SIIDCUL in Pantnagar and Sitarganj area has impact on the agriculture of the nearby area. The farmers were asked to share their problems that they faced due to establishment of SIIDCUL. Broadly these issues were grouped into four categories. These included loss in fertility, decreasing water table, increased infestation of pest and disease and increased soil pollution. Around 39% of the farmers interviewed complained about the loss in the fertility of their fields. As per the district agriculture officials the cultivable land lying in the radius of three kilometres of SIIDCUL is severely affected due to establishment of industries. Eleven percent of the farmers complained about the depleting water level in the survey area. The depleting water table was still not seen as a major threat in the area because of the current water table is sufficient enough to irrigate the fields. The presence of the seasonal streams in the region also solves this problem of irrigation of the fields in *terai*. Around 25% of the farmers in the surveyed area complained about the increase in the disease and the insect infestation in the fields. The sugarcane borer is a major threat for the sugarcane cultivation in *terai*. There was an increased infestation of stem borer and blast in the kharif rice of the area. This led to increase in the cost of cultivation as more number of sprays are required to check the increased disease and insect infestation in the area. Soil pollution was a major problem particularly in Sitarganj where the industrial wastage are drained without any proper treatment.

Conclusion

Risk factors observed in this study associated with the agriculture in Udham Singh nagar district were labour availability, availability of the agriculture inputs (Source-Survey data) etc. Similarly the growth rate of the agriculture from the year 2007 to 2012 was decreased while the growth rate of the other sectors like automobile, manufacturing, and real estate has increased. The area under the cultivation has decreased over the past ten years. This is particularly due to establishment of the industries and the use of agricultural land to non- agricultural land. The area under the major crops like kharif and summer rice, wheat and pea has increased. However there is a sharp decrease in the area under sugarcane. This decline is most significant in the Gadarpur area. The major reason for increase in the acreage of rice and pea is the increase in the market price of these crops. The farmers get good return on the investment made in these

crops. While in sugarcane the increased pest infestation and unavailability of the labour for the inter-cultural operation is a main issue for the farmers. Similarly the farmers were also disturbed due to the increased infestation of termite in the poplar plantations. The main reason for pest problem was the decreased water level. Also the skilled labour required for the training and pruning is not readily available.

A trend that was seen in the survey area that the farmers were relying both on the farm and the non- farm income. Especially the younger generations who were more interested in the activities other than the farming. The rising level of the education in the rural areas was also responsible for the migration and change in the occupation of the rural youth. The generation of the employment opportunities across various sectors has resulted in the shortage of the labour in the farm sector. The establishment of the industrial area has changed the environment of the district. There is a considerable decrease in the net sown area. The productivity of the crops like wheat and sugarcane has also decreased. The region around the industrial area has also been reported the depletion of the water level. The pest infestation is also increased in the crops like kharif rice and sugarcane.

There is an increase in farm income in the last ten year. This is due to the increase in the prices of the crops like rice, pea and sugarcane. The farmers are more interested in growing the summer rice, pea and wheat. The non- farm income in the survey area was also increased in the similar way. But the growth rate from 2009-10 to 2013-14 in the non- farm income is 32% while that from the farming is 23%. The change in the non- farm income is found to be the maximum in Kiccha tehsil while the lowest is in the Sitarganj.

The prices of the agricultural land rose steeply during the period when the SIIDCUL was just established. The land rates were especially high in the nearby villages and the blocks near SIIDCUL. The farmers sold their land in their native villages and purchased huge land in the neighbouring districts of Uttar Pradesh. The remaining farmers who did not sold their land at that time are now selling small residential plots from their agricultural land. This imposes a great threat for the food security of the state because of the shrinking agricultural land. Other small industries which act as a supplementary industry to SIIDCUL like stone crushing, small manufacturing plants etc. were now also established on the agricultural land.

The labour prices were increased by 92% from 2005 to 2010. The inflation on the other hand is increased by 32% in the country. The numbers above is clearly showing the acute shortage of agricultural labour and their increased prices. Similarly the increase from 2010 to 2015 in the inflation is 32% while the labour rates are increased in the district by 70%. The total increase in the labour rates from 2005 to 2015 was around 227% while the inflation has increased by 72% (for all commodities in Wholesale price index). The cost of the cultivation has increased sharply and the farmers are not getting the same amount of return from agriculture like before past decade.

The cost of cultivation has gone up in folds due to the high increase in the labour rates, increased use of fertilizers and pesticides and increased prices of the fertilizers in the area. The farmers are getting more opportunities in the non-farming sector. The farmers are also moving to other nearby areas for practicing agriculture. All these factors will have an huge impact on the food security of the state in near future. The current situation is bad but could be stopped before getting worsened in near future.

References

1. Das S. Agricultural Production and food distribution to vulnerable families in India today, 2012.
2. Madiodio N. Access to land and water for the rural poor in a context of growing resource scarcity. Paper presented at the IFAD Conference on New Directions for Smallholder Agriculture, 2011.
3. Haggblade S. Alternative Perception of the Rural Non-farm Economy: Transforming the Rural Non-farm Economy. International Food Policy Research Institute, Washington, D.C., U.S.A, 2007.
4. Mellor JW, Lele UJ. Growth Linkages of the New Food Grain Technologies. Indian Journal of Agricultural Economics. 1971; 8(1).
5. Johnson BF, Killby. Agriculture and Structural Transformation: Economic Strategies in Late-Developing Countries Oxford University Press, London, U.K. 1975.
6. Rangarajan C. Industrial Growth: Another Look, Economic and political weekly, annual number, 1982, 17.
7. Bhattacharya BB, Rao, HCH. Agriculture-Industry Inter-Relations: Issues of Relative Prices and Growth in the Context of Public Investment". Theme 18, Eighth World Economic Congress of the International Economic Association, New Delhi, 1986.
8. Papola TS. Rural Industrialisation and Agricultural Growth: A Case Study on India, in R. T. Shand (Ed.) Off-farm Employment in the Development of Rural Asia, Australian National University, Canberra, Australia, 1987, 1.
9. Eapen M. Re-revisiting the Issue of Linkages of Rural Non-farm Employment, in Gopal K. Kadekodi and Brinda Viswanathan (Eds.) Agricultural Development, Rural Institutions, and Economic Policy, Oxford University Press, New Delhi, 2009.
10. Chand R. The State of Indian Agriculture and Prospects for the Future in Kanchan Chopra and C.H. Hanumantha Rao (Eds.) Growth, Equity, Environment and Population, Sage Publications India Pvt. Ltd., New Delhi, 2008.
11. Rao CH. Hanumantha. Inclusive Growth: Recent Experience and Challenges Ahead, Economic and Political Weekly, 2009, 44.
12. Shah D. Special Economic Zones in India: A Review of Investment, Trade, Employment Generation and Impact Assessment. Indian Journal. of Agriculture Economics, 2009; 64(3).
13. Chopra R. Uttarakhand: Development and Ecological Sustainability. Published by Oxafam India private limited, 2014.
14. Mani SC. Status paper on rice in Uttarakhand. 2011; [www.rkmp.co. in](http://www.rkmp.co.in).
15. Sreekala K. Environmental impact of development". 2010, [http://shodhganga.inflibnet.ac.in /bitstream/10603/169/1/10_chapter3.pdf](http://shodhganga.inflibnet.ac.in/bitstream/10603/169/1/10_chapter3.pdf)
16. Snedecor GW, Cochran WG. Statistical methods 7th Ed oxford and IBM Publication Bombay, 1994.