

# Assessment of Traditional Crops in Weakening Agriculture System of the Central Himalaya

R. K. Singh<sup>1</sup>, Vishleshwar<sup>2</sup>

<sup>1</sup>Scientist-E, G. B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora-263643, Uttarakhand, India

<sup>2</sup>Junior Project Fellow, G. B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora-263643, Uttarakhand, India

**Abstract:** *As per census 2011, the livelihood of 70% population of the Uttarakhand are depended on the traditional farming system. The traditional farming system includes agriculture, livestock and horticulture supported by forest products. A variety of crops has cultivated in the traditional agriculture system like cereals, pseudo cereals, millets, pulses and vegetables etc. Landholding size and livestock are basic resources for the agriculture sustainability. Due to various socio-economic & geo-environmental reasons the agriculture production is deteriorating. The continuous population growth resulted in decreasing of landholdings size, and the increase in marginal landholdings. Livestock patterns is also deteriorating, it shows a shifting in animal husbandry. Thus, the agriculture sector facing negative changes and could not fulfill even the yearlong food demand. Wheat, Rice and Ragi are the major consumption crops in the Uttarakhand. The recent trend shows that cultivated area of Wheat, Rice and Ragi decreasing in the state. The aim of this study is to present an overview of the Wheat, Ragi and Rice in current scenario and responsible causes for the changes in production.*

**Keywords:** Agriculture, Traditional Crops, Farming System, Weakening Agriculture, Central Himalaya

## 1. Introduction

A larger proportion of population is involved in agriculture practice in the Uttarakhand. They have grown various types of crops like cereals, pseudo cereals, millets, pulses, oil seeds and vegetables etc. The agriculture production is decreasing and population of the state is increasing so that it is not enough for fulfilling the food demand of population. Other alarming situation is that the younger generation is not enough interested in Traditional livelihood practices like agriculture and livestock in hilly areas of the Uttarakhand. The population of five million is spread over 13000 villages in the hill districts of Uttar Pradesh and they have been trying to obtain the maximum Yield from their land for direct consumption, while obtaining as much income as they can, either by growing cash crops or by taking employment away from home (Ashish, 1993). In the present scenario population is reached at 10 million and the villages are 16000 but the production of the traditional crops is decreasing day by day. Most of the agriculture in the state is traditionally rainfed agriculture system, which accounts for about 85% (excluding the Tarai area which falls in the district Haridwar, Dehradun and Nainital and Udham Singh Nagar) of the total agricultural land (Rawat et al., 1996).

The increasing demographic pressure in the rural areas of the state has accelerated the magnitude of dependence on agriculture; the region has been historically supported by agriculture within stratified social structures as main source of people's livelihood (Rawat et al., 1996).

## 2. Material and Methods

### 2.1. Study Area

The Uttarakhand is situated in the western part of the Indian Himalayan Region. Indian Himalayan Region covers approximately 5.91 million km<sup>2</sup> geographical area (18% of total geographical area of the country, which include twelve states of India (ten full and two partial) is spread over 2500 km in length from east (Arunachal Pradesh) to west (J & K) and 250 to 300 km in width from north to south (Rawat et al., 1997). The Uttarakhand constitutes an integral part of the Himalaya and has abundant natural resources – land, water and forests, and panoramic landscape. Stretching between 28°53'24'' –31°27'50'' N and 77°34'27''–81°02'22'' E, its geographical area is 51,125 sq. km, of which about 90% is mountainous (Sati, 2016).

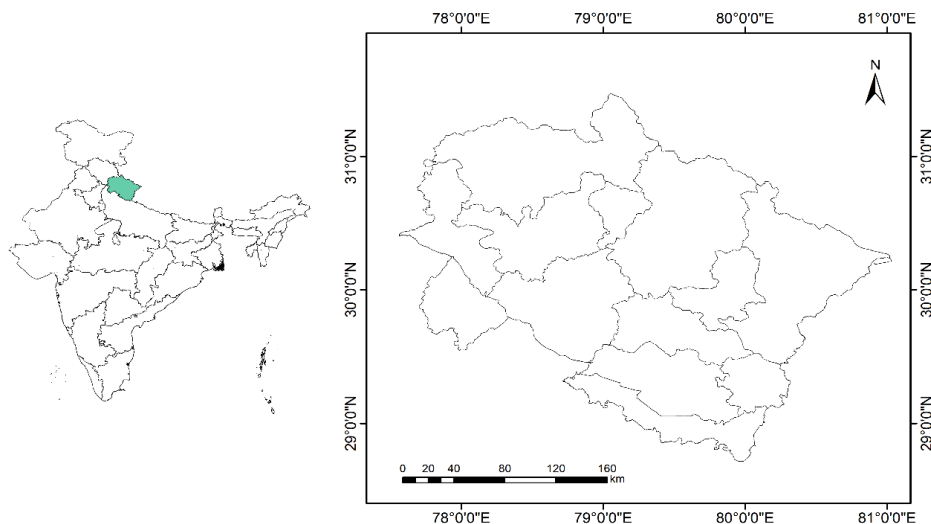


Figure 1: Study area

## 2.2 Methodology

Data has been collected on the demography, livestock, agriculture production and occupational structure etc. from the District census handbooks, Reports, Uttarakhand statistical diaries, etc.

## 3. Results and Discussion

Hill region of the Uttarakhand is based on a traditional rainfed agriculture system. Rainfed agriculture occupies most of the mid and higher slopes ranging from  $5^{\circ}$  to  $40^{\circ}$  and sometimes even on slopes of more than  $40^{\circ}$  (Rawat et al., 1996). The cultivated land is located mostly on terraced spurs, and produces three crops in two years, as against two crops a year in the case of the irrigated agriculture (Rawat et al., 1996).

### 3.1 Production and cultivation of Wheat in Uttarakhand

Wheat is the main crop of the Rabi season. A total of 378 thousand hectare area was cultivated during 2006. Now a total of 23.6 thousand hectare cultivated area of wheat has been decreased and 342 thousand hectare area has reported in 2016 (Fig.2). Whereas the production of the wheat is deteriorating, since the year 2010 to 2015 it was decreasing, but in year 2015-16 it is increased (Fig.3).

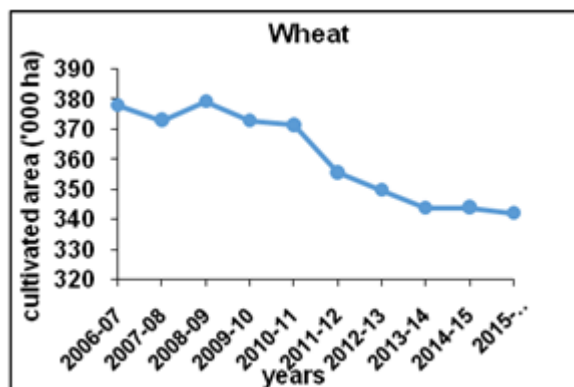


Figure 2: Cultivated area of wheat



Figure 3: Production of the wheat  
(\* - data may change)

### 3.2 Production and cultivation of Rice in Uttarakhand

Rice is main crop of the Kharif season. A total of 274 thousand hectare cultivated area has reported in 2006. A total of 23.4 thousand hectare cultivated area of rice has decreased and 250 thousand hectare cultivated area has reported in 2016 (Fig.4). However, due to technological advancement and high yielding seeds, the production of rice has increased in the state since 2010 to the present year (Fig.5).

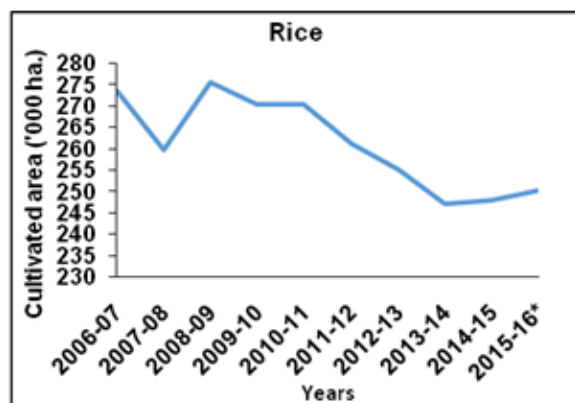


Figure 4: Cultivated area of Rice

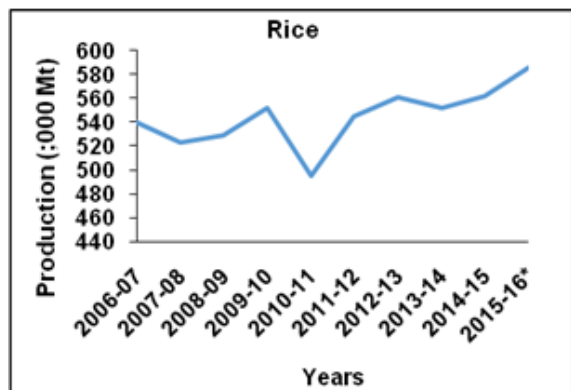


Figure 5: Production of Rice  
(\* - data may change)

### 3.3 Production and cultivation of Ragi in Uttarakhand

Ragi is a main crop of the Kharif season. A total of 126 thousand hectare cultivated area has reported in 2006. A total of 18.2 thousand hectare cultivated area of Ragi has decreased and 107 thousand hectare cultivated area has reported in 2016 (Fig.6). However, the production of Ragi is decreasing, the production of Ragi was 171 thousand Mt reported in the year 2006 (Fig.7). In 2016 it was reported 150 thousand Mt with a loss of 21 thousand Mt.

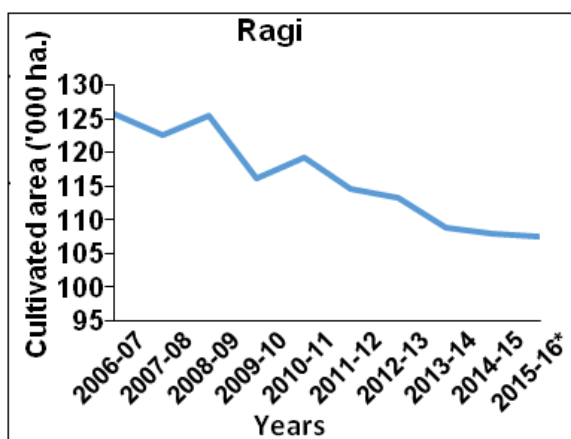


Figure 6: Cultivated area of Ragi

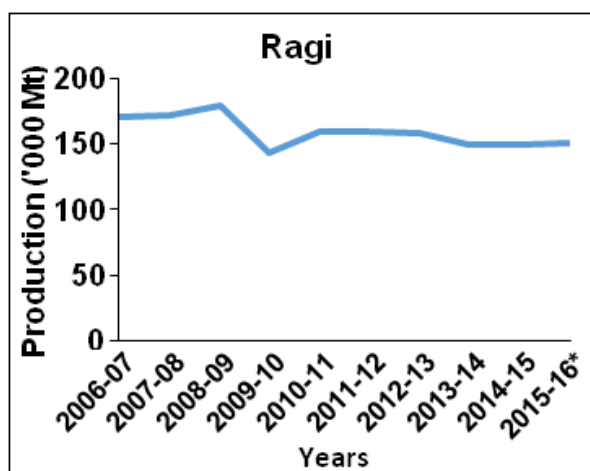


Figure 7: Production of the Ragi  
(\* - data may change)

### 3.4 Productivity of the crops

It is appreciable that due to technological advancement and further agricultural research's new high yielding seeds, fertilizers and organic compost and manure etc. are available for the farmers. This is a major reason for increase in productivity of the crops. Table-1 shows the yield of wheat, Ragi and Rice, it clearly shows an incline in the yield of all three crops.

Table 1: Yield of crops (Q/ha.)

| Years   | Wheat (Q/ha.) | Ragi (Q/ha.) | Rice (Q/ha.) |
|---------|---------------|--------------|--------------|
| 2006-07 | 21.08         | 13.62        | 19.74        |
| 2007-08 | 21.4          | 14.05        | 20.14        |
| 2008-09 | 20.34         | 14.34        | 19.17        |
| 2009-10 | 22.24         | 12.31        | 20.39        |
| 2010-11 | 23.78         | 13.62        | 18.31        |
| 2011-12 | 24.32         | 13.98        | 20.84        |
| 2012-13 | 24.42         | 13.94        | 22.01        |
| 2013-14 | 24.68         | 13.7         | 22.34        |
| 2014-15 | 19.25         | 13.81        | 22.68        |
| 2015-16 | 22.58         | 14.02        | 23.41        |

Source: Agriculture directorate, Dehradun

## 4. Status of the Major Resources of Agriculture Practice

### 4.1 Landholdings of Uttarakhand

Landholding size is the measure of the land resource which is with the farmer by pass on from their forefathers and purchase from others for their uses. Landholdings are one of the basic resources for the livelihood practices of the population of a state. The state Uttarakhand has .81million hectare area distributed in .91million landholdings as per the census 2011. Following figures are showing that the major part of the landholdings (70.5%) are under the marginal landholdings and it covers only the 28.7% area of total landholdings in year 2001. It is increases in 2011 and the total 73.65% is coming under the marginal landholdings covering the 36.23% area of the total land holdings.

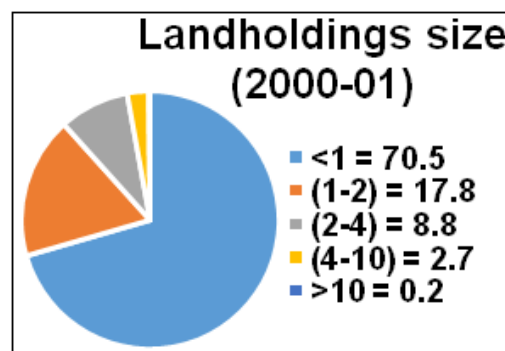
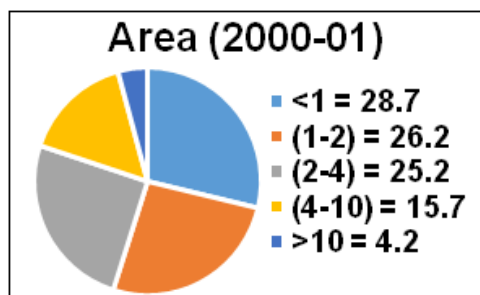
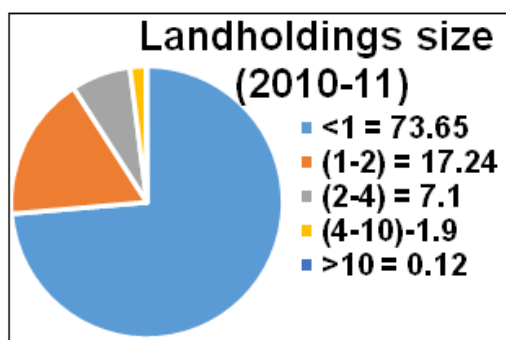


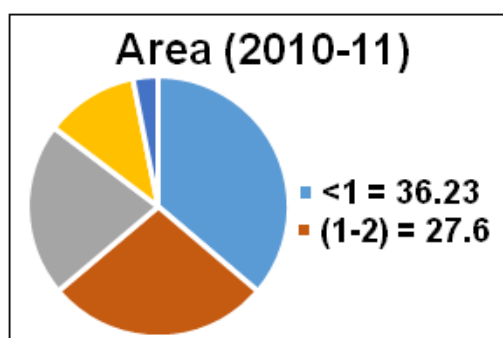
Figure 8: Landholding categories



**Figure 9:** Area under Landholdings categories  
Source: Statistical diary, Uttarakhand (2008-09)



**Figure 10:** Landholding categories



**Figure 11:** Area under Landholdings categories  
Source: Statistical diary, Uttarakhand (2013-14)

#### 4.2 Livestock of Uttarakhand

The agriculture practice in the study area is supported by the livestock. The livestock is used as the resource in many ways here. Due to the undulating landscape the agriculture fields are in the terraces form and not suitable for ploughing by the farm tractors, and by the ancient time people used the bullocks for this purpose and the other livestock like cow and buffalo was used for the manure and production of bullocks for the agricultural fields and milk for the family, and hens and goats for the meat. The Table-2 shows the major livestock population in the state in various census years since 1998 to latest census year. The table is clearly shows a shifting in livestock rearing.

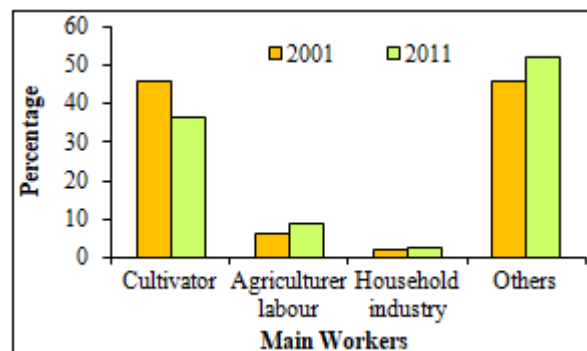
**Table 2:** Livestock population in Uttarakhand

| Livestock | 1998 | 2003 | 2007 | 2014 |
|-----------|------|------|------|------|
| Cattle    | 2031 | 2188 | 2235 | 2006 |
| Buffaloes | 1094 | 1228 | 1220 | 987  |
| Sheep     | 312  | 295  | 290  | 368  |
| Goats     | 1085 | 1158 | 1335 | 1367 |
| Pigs      | 31.5 | 32.7 | 20   | 19.9 |

Source: Statistical diary, Uttarakhand (2013-14)

#### 4.3 Occupational structure of Uttarakhand

The occupational structure of the Uttarakhand is in a rapid dynamic process. All people want a great future in their own life and their coming generation. People are leaving their agriculture practices and they are moving towards the others categories, where they are doing the other works than their traditional practices (Fig.12).



**Figure 12:** Classification of main workers of the Uttarakhand in 2001 & 2011

Source: Statistical diary, Uttarakhand (2013-14)

**Table 3:** Total Workers in Uttarakhand 2001 & 2011.

| Year | Total Worker (Lakh) | Main Worker (%) | Marginal Worker (%) |
|------|---------------------|-----------------|---------------------|
| 2001 | 31.3                | 74.1            | 25.9                |
| 2011 | 38.3                | 74.13           | 25.87               |

Source: Statistical diary, Uttarakhand (2013-14)

#### 5. Major Problems Faced by the Farmers in Agriculture

- Wild animals like monkeys, wild boar etc. are attacking in the agriculture fields and ruins the crops so that the production is decreasing.
- Mostly agriculture area of the Uttarakhand is rainfed, the agriculture production is depends on the rainfall but in previous few decades the erratic rainfall is directly affecting the crops production.
- Due to weakening of production of various crops the people are out migrating in search of livelihood. It is creating a big problem behind in villages. A big part of landholdings of the out migrants are not active, either they are turned into barren land or the wild bushes and trees are grow there, so they remain uncultivated. Wild animals are creating their shelters in that particular areas nearby the villages. They ruins the crops production in the farms that creates problem for the nearby active landholding and farmers in the villages.

#### 6. Suggestions and Future Directions

##### 6.1 To overcome the loss due to wild animals attacks on the crops in the villages

It is an alarming situation where the farmers are not interested in farming because their hard work is not fruitful for them, the wild animals are destroying their crops in the agriculture fields. And the farmers are helpless to protect their fields from wild animals. Thus there is a need of such a

policy by the government either there is some compensation for the loss of production or the techniques should be provided to prevent their farms from the wild animals.

### 6.2 To improve the productivity of the traditional subsistence crops

It is required that crop production should be market oriented so that the farmers can sold out their production and make money, it will attractive for the remaining people who are out migrated for the searching of their livelihood. This has tremendous potential for not only improving farm productivity but also for creating more employment opportunities in the agriculture sector (Badhani, 1998; Mamgain, 2004). The area under market oriented crops is very low about 15% during the year 2001 (Mamgain and Mehta, 2006). However, it has been slowly increasing over 2% points per annum (Mamgain, et al., 2005).

### 6.3 To improve the skills of the farmers

The farmers are still using their traditional ways to cultivate in the remote areas. The present agriculture extension services are very weak, particularly in the hill districts in terms of their approach and outreach to farmers living in remote areas (Mamgain and Mehta, 2006). It is required that there must be some programs and workshop should organized in remote areas to enhance the technical knowledge and capacity of the farmers to improve their production and maximize the profit.

## 7. Conclusion

Analysis suggested that Uttarakhand has a high population growth. The state is in a dynamic process where the population is shifting their livelihood practices, because the production of the crops is deteriorating and the cultivated area is decreasing. It was found that due to a number of causes (i.e. migration, wildlife- human conflict uncertain climate change, no interest of young generation for agriculture activity etc.) the traditional cropping system is severely affected. Some crops are having low production and some are in positive growth, but the major crops wheat, Ragi and rice having low production in current scenario. As the traditional livelihood is concern the major population were involve in agriculture and livestock rearing practices but in present day the occupational structure is very much differ from the early time. The cultivators are decreasing and they are pursuing for the other works for their livelihood. Main reasons for these changes are that the resources of the traditional practices are compressed day by day, size of landholdings are decreasing and population is continuously increasing, people are feel unable to fulfill the requirements of their families by doing the agriculture so that they are losing interest to continuing the practice, so they are going for the other option for earnings.

## References

[1] Ashish, M. (1993). Decentralised Management of natural Resources in the UP Hills. *Economic and Political Weekly*, 28(1), 1793-96.

[2] Badhani, K.N., 1998. Enterprises-based Transformation of Hill Agriculture; A case study of Vegetable Growing farmers in Garampani Area, Nainital district, India, Discussion Paper, Series No. MEI 9815, Kathmandu, Nepal: ICIMOD.

[3] Mamgain, Rajendra P., 2004. Employment, Migration & Livelihoods in the Hill Economy of Uttarakhand, Ph.D. Thesis, Jawaharlal Nehru University, New Delhi.

[4] Mamgain, Rajendra P., Awasthi, I.C. & Mehta, B.S., 2005, Employment Generation in Uttaranchal: Constraints & opportunities, Institute for human development, New Delhi (mimeo).

[5] Mamgain, Rajendra P. Mehta, B.S., 2006. Employment & Income in Uttaranchal: Trends and policy Issues, *The India Journal of Labour Economics*, Vol. 49. No.3.

[6] Rawat, D.S., Farooque, N.A. and Joshi R. 1996. Towards sustainable landuse in the hills of Central Himalaya, India. *International Journal for sustainable development and World Ecology* (3): 57-65.

[7] Rawat, D.S., Joshi, M., Sharma, S., Rikhari, H.S., and Palni, L.M.S(1997) Sustainable development and management of rural ecosystems in the central Himalaya: a case study From Haigad watershed. *International Journal of Sustainable Development and World Ecology*, pp.214-225

[8] Sati, V.P., 2016. Livestock farming in the Uttarakhand Himalaya, India: use pattern and potentiality. *Current Science*, vol.111, No.12, 25 December 2016.

[9] Uttarakhand, statistical diary 2013-14. Directorate of Economics and Statistics, Uttarakhand.

[10] Uttarakhand, statistical diary 2014-15. Directorate of Economics and Statistics, Uttarakhand.