



PRODUCTION OF RAGI AND ITS PREVALENCE ASPECTS IN ALMORA DISTRICT (UTTARAKHAND)

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ABSTRACT

Ragi is the staple food grown in most parts of Almora district; it is a traditional crop of Uttarakhand region. The nutritional value and quite resilient to diverse agro-climatic adaptability have increased its demand not only in mountainous regions but also in other regions. The agricultural system of Uttarakhand hill region is mainly dependent on rainfall. Monsoon rain is the advantage of the Kharif season for Ragi cultivation, but it can tolerate drought too. Department of Agriculture, V.P.K.A.S. Almora and other concerned corporations provide certified varieties of Ragi to the farmers, which can help in increasing production in the district. Ragi has much marketing potential all over the country and can help farmers as a source of income. The present paper describes the production and production area, varieties and marketing prospects of Ragi in the Almora district. It is the most nutritious food in the region and its health benefits are also discussed in this paper.

KEYWORDS: Traditional crop, Diverse, Kharif, Varieties, Marketing.

1.0 INTRODUCTION

A major part of the population of Uttarakhand is involved in agricultural practices. Ragi is one of the wide varieties of crops grown like cereals, millets, pulses, oilseeds and vegetables. Ragi is a type of millet cereal grown in the state during Kharif season (Singh et al.,2018). Ragi is a type of coarse millet commonly known as Madua in Uttarakhand. Ragi is one of the most important primary food, especially for the rural people of Uttarakhand. The common name for Ragi is Finger Millet, but in different places known by vernacular names such as Ragi, Mandua, Nagli, Kapa, Madua etc. Ragi is broadly grown in hilly and rain-fed areas. It is also known as African millet as it is largely grown in African and Asian regions. It is originally a native plant of Ethiopian highland and at present produced in many states in India among which Maharashtra, Tamil Nadu, Karnataka, and Uttarakhand are the major producing states (Raizwan Shariff,2020). It is a highly nutritious food that is rich in calcium, fiber, protein, iron and other minerals. Millet is easy to digest and can be preserved for a long time as insects cannot easily destroy it (Rani et al.,2016). Finger millet is a crop of tropical and subtropical climatic zones but it is cultivated up to an altitude of 2100 meters. It is a heat-loving crop and requires an average temperature of 26-29^o C for proper growth. This crop can be grown in poor to fertile soil and can tolerate certain amount of salinity. The best soil for this crop is mainly loamy, alluvial, and sandy soil with the availability of water (ICAR- CCARI,2021).

A mixed cropping pattern followed by terrace farming in the Central Himalayan region includes the production of Ragi. The Department of Agriculture has divided the agricultural land into two types, one is Upraon and other is Talau based on irrigation availability. In the study area, Ragi is grown largely in Upraon land but in certain other areas it is also grown in Talau land. It is one of the major crops of the Kharif season, which is grown all over the district. Due to the hilly terrain, irrigation is not possible in the entire area of the district. Only river valley areas have irrigation facilities due to the connecting rivers canals.

2.0 OBJECTIVES

The main objectives of the present study are as follows:

- Study and analysis of Ragi production in the study area.
- Study of Ragi varieties in the study area.
- Study of marketing prospects of Ragi.

3.0 METHODOLOGY

The present study based on the primary and secondary data includes intensive field survey which is used in this study to find out the Ragi production areas. Secondary data which are related to production,

productivity, production area and varieties of Ragi have been collected from the Agriculture Department of Almora. Quantum Geographical Information System (QGIS) and Arc GIS software has been used for study area mapping. Microsoft Excel 2010 has been used to analyse and manipulate the data.

4.0 STUDY AREA

Almora district is located in the Lesser Himalayan region formed with a series of ridges and valleys. It is located between the latitude $29^{\circ} 25'30''$ N to $29^{\circ} 58'47''$ N latitude and $79^{\circ} 02'14''$ E to $80^{\circ} 04'51''$ E longitude (Fig.1). It is a hilly district of the Kumaon division in Uttarakhand. Almora district has total area of 3139 sq.km. which is 5.78% of the total geographical area of the state. The total population of the district is 6,22,506 according to the 2011 census. 39.35% of the population of the district is engaged in agriculture. Ragi has the highest area after wheat cultivation in the district, which is 31%.

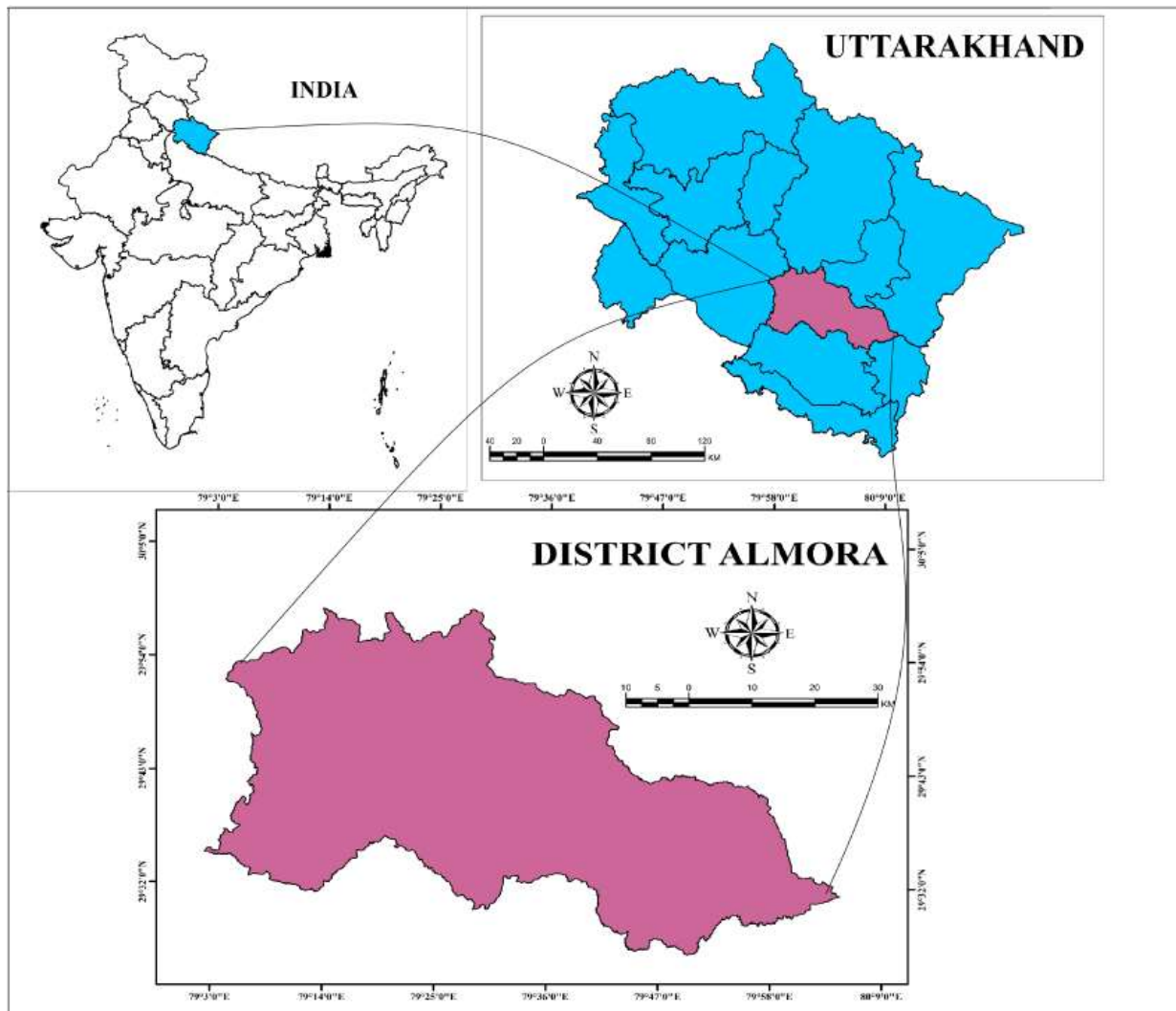


Fig.1: Location map of study area

5.0 RESULT AND DISCUSSION

Agriculture is a crucial occupation of hilly regions of Uttarakhand state. Almora district is one of them where most of the people are dependent on agricultural activities for food requirements. According to Uttarakhand Statistical Diary 2019-20, there are total 1,32,129 farmers and 4,025 agricultural labourers in Almora District. The people of this area practice subsistence farming which maintain the farmer's family. Due to the size, slope and scattered land holdings, the traditional methods of farming are still used throughout the region except in a few areas. In comparison to other rain-fed areas, due to availability of irrigation facilities in the valley areas, the production is higher. Mixed farming is generally practiced in this region, many crops are grown here and Ragi is one of them which is grown in Kharif season. Ragi is grown extensively in the unirrigated lands of the district, but in some places it is also grown in irrigated areas. It is a predominated part of

the subsistence farming of small farmers in rain-fed areas. It is traditionally eaten as a staple food of the local people.

5.1 Ragi As A Traditional Crop: Ragi is a traditional crop of the study area, which is grown by the small farmers of the region (Fig.2). It is commonly known as the ‘food of the poor’ in locality. The local people use this millet mainly in the form of ‘*Madua Ki Roti*’ and ‘*Madua Ki Baadi*’ in the winter seasons which are very tasty and nutritious dishes. Although ‘*Madua Ki Roti*’ is used by all, it is mainly used by pregnant women and children which helps in retaining the nutritional value for them. This crop has gradually lost its existence due to lack of awareness; a new generation of people do not want to engage themselves in agricultural activities. Low productivity, wild animal interference, and migration are also other reasons for the very low yield of this crop.



Fig.2: Ragi cultivation in Pathiya Village of Almora District (Source: field survey)

5.2 Production and Production Area: In the central Himalayan region, Almora district is a major producer of Ragi. The slope of hilly district has provided more opportunities for millets, which is the reason of its production throughout the rain-fed area. Many people in the study area still use traditional seeds but few farmers are aware of high-yielding varieties and are adopting them organically. This helps in increasing crop production of Ragi. For the study, we have taken the data of Ragi production and production area of the district for 16 agricultural years (Table-1,2). The production of 16 years of this crop is mentioned in the table (Table-1), in which the maximum production was in the crop year 2011-12. The total production of Ragi in the district in that year has been 45,514 metric tonnes. The total area of this crop in the entire district in that year was 34,053 hectares. The lowest production of this crop has been recorded during the crop year 2018-19 followed by 2019-20 (Fig.3). The crop production area was 29,569 hectares in the year 2018-19 and it has come down to 27,571 hectares in the year 2019-20. If we analyze the production data for 16 years, it can be seen that there has not been much increase in production. There has been a steady decline in the crop production of Ragi in the last 3 crop years, whereas, the area under production of this crop has also declined from the year 2015-16 till now during the year 2019-20 (Fig.4).

Table-1: Ragi Production data in Almora District (Source: Statistical Department Almora)

| S.N. | Year | Production (metric ton) | S.N. | Year | Production (metric ton) |
|------|-----------|-------------------------|------|-----------|-------------------------|
| 1 | 2004-2005 | 38302 | 9 | 2012-2013 | 42717 |
| 2 | 2005-2006 | 35043 | 10 | 2013-2014 | 39550 |
| 3 | 2006-2007 | 45340 | 11 | 2014-2015 | 40898 |
| 4 | 2007-2008 | 42796 | 12 | 2015-2016 | 41322 |
| 5 | 2008-2009 | 44817 | 13 | 2016-2017 | 45270 |
| 6 | 2009-2010 | 34777 | 14 | 2017-2018 | 34512 |
| 7 | 2010-2011 | 43859 | 15 | 2018-2019 | 28666 |
| 8 | 2011-2012 | 45514 | 16 | 2019-2020 | 33391 |

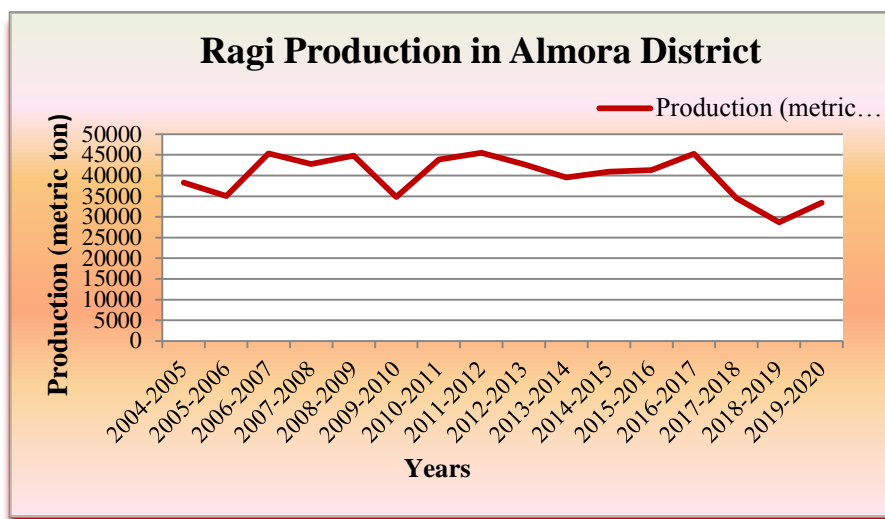


Fig.3: Diagrammatic presentation of Ragi production data in Almora District
 (Source: Statistical Department Almora)

Table-2: : Ragi Production Area data in Almora District (Source: Statistical Department Almora)

| S.N. | Year | Area (Hectare) | S.N. | Year | Area (Hectare) |
|------|-----------|----------------|------|-----------|----------------|
| 1 | 2004-2005 | 35617 | 9 | 2012-2013 | 35960 |
| 2 | 2005-2006 | 33648 | 10 | 2013-2014 | 33882 |
| 3 | 2006-2007 | 37887 | 11 | 2014-2015 | 33569 |
| 4 | 2007-2008 | 36599 | 12 | 2015-2016 | 34518 |
| 5 | 2008-2009 | 34417 | 13 | 2016-2017 | 33588 |
| 6 | 2009-2010 | 32920 | 14 | 2017-2018 | 31517 |
| 7 | 2010-2011 | 35970 | 15 | 2018-2019 | 29569 |
| 8 | 2011-2012 | 34053 | 16 | 2019-2020 | 27571 |

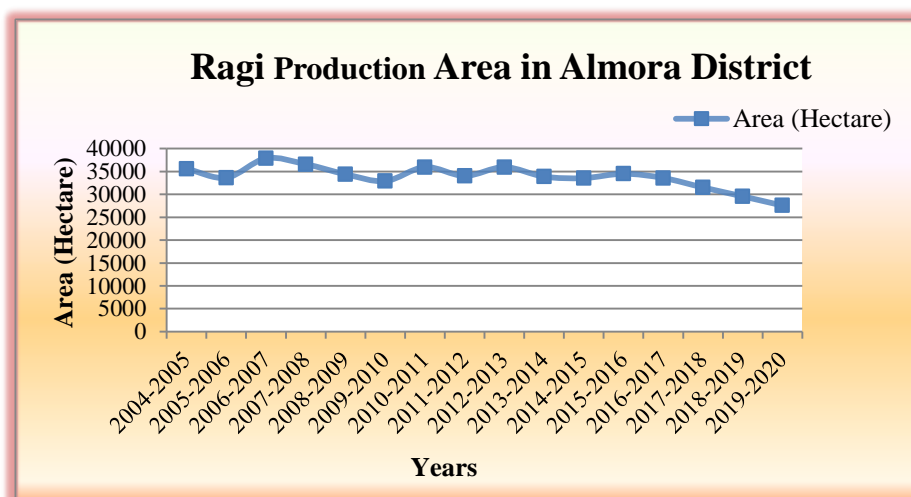


Fig.4: Diagrammatic representation of Ragi production area data in Almora District
 (Source: Statistical Department Almora)

5.3 Varieties of Ragi: Most of the crop varieties in the study area are traditional, but few farmers are aware of high-yielding varieties, so we can call it the transitional phase of crop varieties. The local and traditional varieties introduced during field surveys such as 'Lal Madua', 'Kala Madua', 'Kumaoni Madua'(Fig.6),



'Garhwali Madua'(Fig.5), 'Nangchuni Madua', 'Gol Madua', 'Chaumasi Madua' etc. are the common ones. The names of these varieties are recognized by the local people based on the colour and shape of the ears of Ragi. Some ears of Ragi are like bent fingers, open, curved upwards, etc.

The Agriculture Department of Almora distributes certified Ragi varieties every year throughout the district, with the main objective of increasing production (Table-3). T.D.C.(Terai Development Corporation) (Fig.7), N.S.C. (National Seeds Corporation) and V.P.K.A.S Almora. These seed organizations provide certified seeds to the Agriculture Department. These certified varieties are specially made for the Himalayan region. The details of these varieties are given in the table below.

Table-3: Certified varieties of Ragi in Almora district (Source: Agriculture Department of Almora)

| S.N. | Year | Ragi's Species | S.N. | Year | Ragi's Species |
|------|------|-------------------------|------|------|---------------------------------|
| 1 | 2015 | B.L.-324 | 10 | 2018 | B.L.M.-352 Permanit |
| 2 | 2015 | B.L.-347 | 11 | 2018 | B.L.M.-352 Jaivik |
| 3 | 2016 | B.L.-324 Aadharit | 12 | 2019 | Madua B.L. 352 Jaivik |
| 4 | 2016 | B.L.-324 Permanit | 13 | 2019 | Madua V.L. 352 Permanit |
| 5 | 2016 | Madua T.L. Khuli Mutthi | 14 | 2019 | Madua V.L.352 Permanit Jaivik |
| 6 | 2016 | Madua T.L. Band Mutthi | 15 | 2019 | Madua V.L. 347 Permanit Dwitiya |
| 7 | 2016 | Madua Jaivik V.L. 324 | 16 | 2019 | Madua V.L. 324 Permanit |
| 8 | 2017 | B.L.-324 | 17 | 2019 | Madua V.L. 352 Janak |
| 9 | 2017 | V.L. 324(Jaivik) | | | |



Fig.5: Garhwali Madua (Source:field survey)



Fig.6: Kumaoni Madua (Source:field survey)



Fig.7: Use of certified Ragi seeds by a farmer in Raun village (Almora) (Source: field survey)

5.4 Changing Trends and Its Nutritional Value: Ragi is used as food in hilly regions. Elder people say that ‘*Madua ki Roti*’ and ‘*Madua ki Baadi*’ are nutrition food items. Earlier in the study area, most of the people used their own produced cereals throughout the year, but due to low production people are dependent on the market in recent years. Young people have migrated to another state due to lack of employment. Women, children, and old people live in the countryside areas. Another reason is the interference of wild animals in the cultivated field because of these reasons many people have left the agricultural land barren. All these factors have reduced the interest of the people in agricultural activities. The young generation is not interested in eating the nutritious food that they get from the traditional food habits. They are getting addicted to fast food which gives results in poor health and many diseases. The older generation did not know about the nutritional value of the food, but directly used the food from the surrounding nature and also believed in the traditional food habits which made them healthy and disease free.

At present, the awareness about food nutrition among the people has increased due to increasing obesity, diseases and viruses. People want nutritious food and organic food which fulfil the nutrient requirements and makes them healthy. Ragi provides the nutrition required diet for people who want to lose weight as it is low in fat and mainly contains unsaturated fat. Ragi is a rich source of fiber, protein, calcium, iron, and other minerals; it is also a gluten free food (Table-4). Due to the abundance of fiber in it, it is useful diet for people who suffer from diabetes, asthma, heart weakness, liver disease, and high blood pressure. Earlier generation in the study area used ‘*Madua Ki Baadi*’ for cough problems.

Table-4: Proximate composition and dietary fibre (per 100g) (Source: Indian food Composition table, 2017)

| Food Name | Moisture | Protein | Ash | Total Fat | Dietary Fibre | | | Carbohydrate | Energy |
|-----------|------------|-----------|-----------|-----------|---------------|-----------|-----------|--------------|---------|
| | | | | | Total | Insoluble | Soluble | | |
| Ragi | 10.89±0.61 | 7.16±0.63 | 2.04±0.34 | 1.92±0.14 | 11.18±1.14 | 9.51±0.65 | 1.67±0.55 | 66.82±0.73 | 1342±10 |

5.5 Marketing Prospects: Presently most of the farmers are focusing on cash crop which provides them some income. It is a difficult task to carry out such agricultural activities in a hilly area that is completely dependent on rain. These areas are suitable for Ragi production as this crop can be grown in dry and poor soil. It has great properties of adaptability. Almora district is a good producer of this crop but the marketing of this crop is very limited, whereas, the price of Ragi flour is much higher than that of wheat flour. Due to a lack of market facilities, farmers produce this crop only for their own use but some farmers sell this crop in the local market in the form of flour. Due to the health benefits of this food, many people want to buy it but it is not easily available in the market. Currently, it is a trending food; it has many marketing possibilities in different ways. If small



factories are opened by the government in the main center for developing, packaging, distribution and marketing of Ragi then producers can get maximum benefits from the same. These small-scale factories will be suitable for hilly areas and will also provide employment to many local people which can help in controlling migration up to a great extent. Various forms such as Ragi flakes, Ragi flour, biscuits, bread, sweets, etc can help to manage the production as well as distribution and marketing system of Ragi. These products can also be sold with the help of online sites which is the best platform for marketing at national and international platform.

6.0 CONCLUSION

Almora district lies under the Kumaun Himalayan region with many possibilities for millet production as there are many river valleys in this district, which are famous for rice production. Most of the district comes under the rain-fed area in which Ragi is the main crop. Many types of millets are grown in the region like Ragi, foxtail millet, Jowar millet, Pearl millet, Kodo millet, etc. Agro-diversity is high in this region, but production is very low due to traditional crop varieties. There are many certified varieties of Ragi which are especially for the Himalayan region as well. If the farmer grows these varieties, it can help in increasing the production. Ragi contains a lot of nutrients required for good health. These qualities make it a sought-after food in the market. This crop can be helpful for hill farmers because it is a dry area crop and has great adaptability to grow in poor to good soil and also without irrigation facilities. There is a lot of marketing potential of this crop all over the country but the need is awareness and interest of the farmers which can play most important role in this context.

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