

## Economy of Millet Cultivation in Noklak District

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**Abstract:** With an aim to encourage and educate the farmers about the importance of millets, an attempt has been made in this research study entitled “Economy of Millet Cultivation in Noklak District: Problems and Challenges” to examine the overall production and marketing aspects of millets and the problems and challenges associated with cultivation of millets in Noklak district, Nagaland. Both primary and secondary data has been used for the study. Primary data was collected through a well-structured questionnaire from a sample size of 100 households of millet farmers. Secondary data was collected from various published and unpublished sources. The study revealed that annual income stemming from millet cultivation has displayed fluctuations over the years. Nonetheless, the study results unveiled that millet farming makes a noteworthy contribution to the rural economy by generating income through sales in the local market and that with proper marketing management it has a high potentials outside the ambit of local markets.

Keywords: Millets, Noklak, cultivation, farmers, problems, challenges

**Introduction:** Millets are a group of small-seeded grasses that are grown as grain crops primarily on dry areas and belong to the Poaceace family. Millets are one among the ancient food grains domesticated for food and form part of the traditional food for many countries. India is one among the highest producer and the 5<sup>th</sup> largest exporter of millets (Ministry of Commerce and Industry, 2018). Millets can grow in harsh climatic conditions with low rainfall and poor soil. Due to greater roughage content among the nutrients present they are called coarse grains. They are important food crops after rice and wheat and in spite of being coarse grains, they have high nutritional value and are known as the ‘poor man’s cereal’.

Millets are not new to Nagaland; it was part of the traditional food of the Nagas and one of the most important cereals crop grown in Nagaland. Blended with diverse range of nutrients-rich value, the crop is indeed a keystone crop which survives through climate variations in hilly terrains of Nagaland. Traditionally millets were commonly known for brewing and are an integral part of community diet. Millets have long been largely cultivated in the hilly terrain of the eastern part of Nagaland. In recent times, the value of millets has increased to a large extent. Millets increase soil fertility, consume less water and have high nutrients values. They were also particularly known to be insurance crop during natural calamities like food scarcity and climate change. Millets crops do not require much water and get matured in a very short period. It contains plenty of proteins, fiber, and minerals. Along with reducing obesity, they also reduce

the risk of diabetes, hypertension, and heart related diseases. Millets are also beneficial in fighting malnutrition since they are packed with energy as well as protein.

The study is based at Pangsha Old Village under Noklak District situated in the eastern most part of Nagaland bordering Myanmar. Rain fed agriculture is the mainstay of the people consisting of about 250 households with approximate population of 1200 involved in millet farming. In this region, millets are sown in the month of February - March and after four-five months, the harvest takes place in the month of June – July.

### **Statement of the Problem**

In the past few decades, millet production has witnessed a decline in Noklak district, primarily due to the active promotion of rice and maize in the markets coupled with a dearth of efforts to promote millet cultivation. In rural villages, lack of awareness regarding the health advantages of millets has led to the reduction of its cultivation. The problems encountered are susceptibility to insect attacks, changes in humidity and temperature in recent years and inadequate post-harvest management and lack of marketing facilities. The challenges of prevention of birds attack and proper handling of the crops further compound the issue. Farmers are presently channeling their focus towards the cultivation of rice and maize, relegating millets to a secondary role.

### **Literature review:**

Patil (2016), in his review on various types of millets such as, sorghum, pearl millets, finger millets, foxtail millets, etc. stated that because of the ability of many of them to thrive in low moisture situation they represent the world foods. Similarly, Thapliyal and Singh (2015) discussed the structure, properties, harvesting, and processing the different type of millets in India and stated that a further comprehensive overview of the status of millets processing, quality and nutraceutical product manufacture is required.

According to Madhusudhana et al. (ICAR-IIMR 2017-18) wheat and other grains have replaced millets which were once considered a staple cereal option. They stated that millets serve as an ideal food for the people of all ages and that its cultivation can be a solution to combat climate change on a sustainable farming practice. Das and Padmaja (2017), pointed out that new disease and insect pests are likely to increase as a result of changing weather in millets and suggested for non-chemical resistance through the development of resistant cultivars, as the use of the chemicals is cost – prohibitive to many of those producing millets in developing countries where it is of most valued food source.

According to Rao et al. (2016), the decline in sorghum millet production from 9.86 million in 1969-70 to 7.29 million in 2009-10 in India was mainly a result of laboriousness to prepare, in combination with the paucity of available processing technologies and lack of awareness of its nutritional benefits.

Sharma and Niranjana (2018), stated that once labeled as orphan crops, millets and pseudo-cereals are known as miracle grains due to their adaptation to harsh condition and high nutritional quality and are now seen to occupy special niches through their ability to adapt to challenging conditions. They also contribute to the diversity richness and production stability of agro-ecosystem. It also gives information on the genetic architecture of important economic traits and the genomic resources for gene enabled breeding and status.

Duodu and John (2015) in their study on the history of domestication, taxonomy, current distribution and production trends of sorghum and millets, opined that there are requirements for complete revamping of the deals with breeding and agronomy with the emphasis on end-use quality of millets and postharvest technologies.

Muthamilarasan et al. (2016) stated that millets are low-cost cereal grains and widely used in the food industry and animal husbandry as important sources of food and feed. As a rich source of starch, proteins, minerals, vitamins, and specific bioactive compounds that contains beneficial antioxidant properties, they have gained considerable attention as a botanical dietary supplement and various foods. Millets: properties, processing, and health benefits explores millets production formulations, and more.

Saleh and et al. (2013) had highlighted that the phytochemical levels in millet foods and beverages are considerably lower than in the other cereal grains. According to them, there are evidences showing millet foods and beverages having functional and health-promoting effects, specifically anti-diabetic, anti-obesity, cardiovascular disease, due to the actions of these phytochemicals which play a role in body immune system. However, direct evidence of health-enhancing effects is lacking as most studies have been carried out on the grains and their extracts and not particularly on food and beverage products, they stated.

Kumar et al (2018) also pointed out that millets are one of the best solutions to be found highly nutritious and having health benefits and that value added products of millets are possible to solve negative effect of agriculture and food security. Describing many nutritional characteristics of millets seeds and their derivatives that are important to human health, antioxidant, immune modulatory or anti-inflammatory, Kajuna (2001), stated that millets is gaining popularity throughout the world due to its valuable dietary energy source. In the same vein, in their review on the potential health benefits of pearl millet, Himanshu et al. (2018), stated that pearl millet has now gained popularity, nutritionists and dieticians recommends it for the better health options. Bajra, a very cheap millet known as "Poor People's food" too has enormous health benefits that it is being recommended to the patients of celiac disease, constipation and several non-communicable diseases.

**Research Gap:** Despite the significant advantages of millets, there is a notable dearth of comprehensive academic research in the context of Nagaland state. While several studies have examined the broader aspects of millets in different regions, there is a clear gap in the existing

literature regarding the millets farming, market trends, consumer demands and problems and challenges relating to millets cultivation in Nagaland. The central issue addressed in this study is thus, local specific to match the context of Nagaland state.

**Significance of the study:** As millets can grow in harsh climatic conditions with low rainfall and poor soil condition and gets matured in a very short period having tremendous health benefits, the significance of the study on millets can be enumerated as under:

**Economic importance:** Individuals can understand the market dynamics, supply chains, and economic impact of millets farming.

**Consumer demands and trends:** As millets are used for curing and preventing various health problems due to its high nutritional value, the study can help one gain a deeper understanding of the consumer demands and emerging trends.

**Environmental significance:** As millet is considered a keystone crop cultivated in hilly terrain which survives through climate variations and increases soil fertility, the study can help individuals and community make informed decisions that enhances their environmental impact.

**Entrepreneurial opportunities:** Due to its health benefits and insurance during food scarcity, millet farming offers numerous entrepreneurial opportunities. The study, we hope, will give insights to individuals to explore different marketing strategies and operational aspects of running successful millet business.

**Area of the study:** The study was carried out at Old Pangsha Village under Noklak District, Nagaland, India. Noklak District is the 12<sup>th</sup> district in Nagaland and Old Pangsha Village is situated in the easternmost part of the state bordering with Myanmar. According to 2011 census, the village has a total population of 1121 with 239 households and literacy rate at 63.64%. The working population engaged in millets cultivation as per 2011 census is 70%.The village is situated 31 km away from district headquarter, Noklak. The nearest town for all major economic activities is Tuensang town, which is approximately 87km from the village.

**Objectives:**

1. To study the economic impact of millets cultivation in Noklak district.
2. To examine the problems and challenges of millets cultivation in Noklak district.

**Methodology:** The study integrates both primary and secondary data. Primary data was collected directly through well-structured questionnaire and personal interview. Secondary data were collected from books, journals, magazines, newspaper, Govt. publications, etc. The sample size consisted of 100 households of millet farmers from Old Pangsha Village. Staistical charts, averages and percentages were the tools used for the analysis.

## Data Analysis and Interpretation

**Table 1: Age Profile (in %)**

Age	Male	Female	Total
below 30	10	8	18
30-40	8	17	25
40-50	18	14	32
50 above	15	10	25
<b>Total</b>	<b>51</b>	<b>49</b>	<b>100</b>

Source: field survey 2018

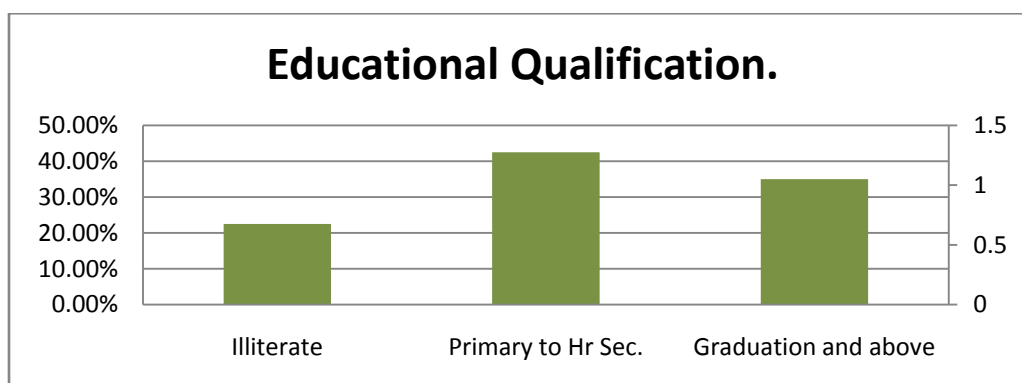
The study revealed that the highest percentage (32%) of millets farmers fall in the age group of 40 – 50 years followed by 25% each in the age group of above 50 years and between 30 – 40 years respectively and 18% below 30 years (Table 1). It was also revealed that 97% of the farmers are married with living couples at 68%, widow much higher than widower at 20% and 5% respectively, divorcee at 4% and unmarried at meager 3% (Table 2).

**Table 2: Marital Status (in %)**

Marital	Frequency	Percentage
Married (living couple)	68	68
Unmarried	3	3
Widow	20	20
Widower	5	5
Divorce	4	4
<b>Total</b>	<b>100</b>	<b>100</b>

Source: field survey 2018

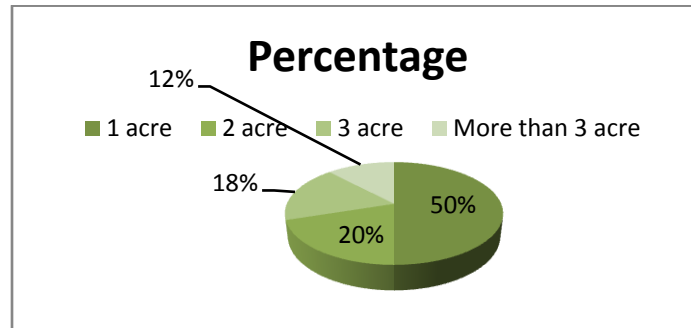
**Figure 1: Educational Qualification (in %)**



Source: field survey 2018

On educational qualification of farmers, the study revealed that the least percentage, 22.5%, of farmers are illiterate, whereas a nearly half of the farmers had attained primary to higher secondary level education and a substantial 35% of them are graduate and above.

**Figure 2: Cultivated Land/Areas.**



**Source: field survey 2018**

It was found that 50% of farmers cultivate millets on an area not less than 1 acre land, 20% of farmers cultivate millets on an area not less than 2 acre land, 18% of farmers not less than 3 acre land and 12% of farmers on an area not less than 3 acre land for cultivation of millets (Figure 2).

**Table 3: Annual quantity harvested.**

Sl. No	Weight (in Kg.)	No of farmers (in %)
1	Below 80	14
2	80-120	43
3	120-160	36
4	160-200 +	7
<b>Total</b>		<b>100</b>

**Source: field survey 2018**

Nearly half of the farmers, i.e., 43% of them harvest 80-120 kg. of millets annually. A substantial percentage of them, 36%, harvest 120-160 kg. annually. While 14% of them harvest less than 80 kg., only 7% of the farmers harvest above 160-200 plus kg millets annually (Table 3).

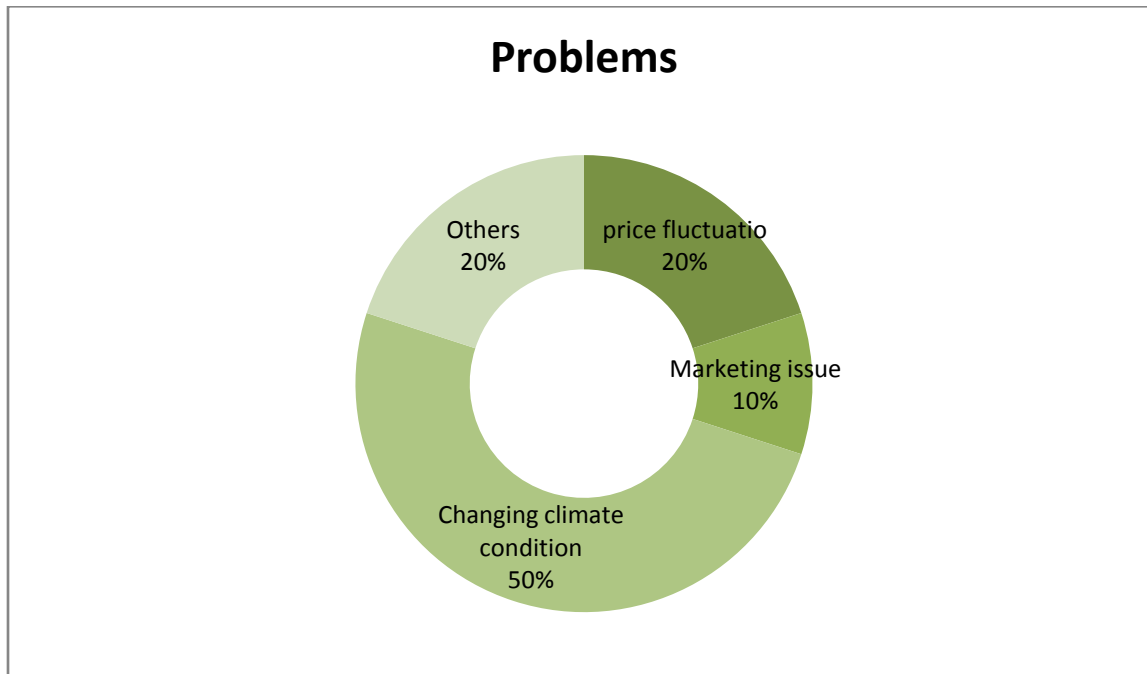
**Table 4: Annual Income from Millets**

Sl. No	Amount (in Rs.)	No. of farmers (in %)
1	0-1000	4
2	1000-3000	7
3	3000-6000	12
4	6000-10,000	57
5	Above 10,000	20
<b>Total</b>		<b>100</b>

**Source: field survey 2018**

It was found that the average price of millets per kilogram was Rs. 80.00 at the local market. Over and above self-consumption, majority of the farmers, 57%, gets Rs. 6000-10,000 annually from the sale of millets. A substantial percentage (20%) of them received above 10,000/- annually from the sale of millets over and above self-consumption, while only 4% of them received less than 1000/- over and above self-consumption (Table 4).

**Figure 3: Problems faced by the Farmers**



**Source field work 2018**

The study found that 20% of the farmers suffers from price fluctuations, 10% of the farmers faced marketing issues, 50% of the farmers face the problem of changing climatic conditions and 20% of the farmers face others types of problems.

It is also revealed that there was no support initiation taken from any government agency till date. Farmers have not heard of any program or seminar/workshop/training on millets been conducted in the village or adjoining areas till date.

As the farmers cultivate millets in a traditional way by simply broadcasting the seeds on the onset of monsoon and harvest the crop after 3 - 4 months, the challenges of weeds, birds attack and rough handling of the crops further compound the issue. Besides, sowing/transplanting on time, weeding on time, proper nutrient management and using improved varieties are the other challenges faced by the farmers.

## Findings

- ❖ The study found that the predominant millet cultivators are aged 50 years and above and 97% of them are married. However, widows were much higher than widowers at 20% and 5% respectively
- ❖ The percentage of illiterate farmers were found to be 22.5%, whereas a nearly half of the farmers had attained primary to higher secondary level education and a substantial 35% of them are graduate and above.
- ❖ The land used for cultivation of millets by the farmers was mostly 1 acre.
- ❖ The average annual quantity harvested by the farmers was about 80-120 Kg.
- ❖ The average annual income of the farmers ranges between of 6000-10,000.
- ❖ Though price fluctuations, marketing and other issues confront the farmers, majority of the farmers were found encountering the problem of climate change in the form of unpredictable rainfall and extreme weather conditions.

## Suggestions

- ❖ To promote and increase millets production, there is requirement to sensitize the health benefits and advantages of cultivation of millets.
- ❖ Provide marketing avenues to the farmers to sale their products beyond the local markets.
- ❖ The state government should give more awareness, sensitization and value added product training at the village level.
- ❖ Training for package and post-harvest management should be given.
- ❖ Establishing retail and distribution networks for millet products can be a lucrative opportunity. This can include setting up dedicated millet stores, partnering with grocery chains to stock millet products, or developing an online presence for e-commerce sales.
- ❖ Millets can be processed into various food products as a substitute for wheat and rice such as flour, flakes, porridge, and snacks. Entrepreneurs can set up millet processing units to manufacture these value-added products and cater to the increasing demand.
- ❖ To cater to the international market, the shelf life of millets is to be enhanced by adopting scientific methods.

## Conclusion

Considering millet cultivation, dry season proves to be particularly favorable. At times, climatic conditions such as reduced rainfall are advantageous, as millets naturally flourish in environment characterized by lower precipitation levels.

However, with few presence of millet cultivation in the region, its role in boosting the economy of rural people was found much below the mark. Whereas, in reality, millets cultivation



can provide employment and generate sustainable income to the rural people if proper awareness on the various advantages of millets is created and proper marketing channels were developed.

Due to limited prevalence of millet cultivation in Nagaland, the cultivation faces multitude of problems and challenges. Nevertheless, in spite of the problems faced, some farmers persist in their efforts to keep alive the traditional practices of millets cultivation and tried to contribute to the growth of the state economy.

To overcome all the challenges in the millet sector, there is a need for constant efforts from all the stakeholders and institutions toward mainstreaming millet. It is important to build forward and backward linkages by creating a better millet ecosystem so as to bring millets to the plate of all.

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