IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Off- Season Agriculture For A Sustainable Livelihood: Economic Benefits Of Cucumber Cultivation In Aliba Village Under Mokokchung District, Nagaland.

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Abstract

Aliba is a small village located in the South of Ongpangkong circle under Mokokchung district, Nagaland. This village is well known for growing organic off-season cucumber which is very unique. This paper investigates and explores to understand how this cultivation has enhanced the livelihood of the village people. Data were collected through purposive sampling, field visits and interaction with the villagers. The study was conducted with the aim to understand the characteristics of the cucumber growers, their methods of growing and also the problems faced during the growing season. The data also revealed that majority of the growers were dependent on this cultivation for their seasonal income which raises their standard of living. Cucumber in the village is grown in three major areas: Tzüvi Valley, Arshiong and Tzüba where the study area was concentrated more on Tzüvi valley and Arshiong Valley.

Keywords: Rural Livelihood, Off-season, Cucumber, Organic, Economic benefits, Aliba village.

I. INTRODUCTION

"Off-season" is defined as a time period of the year in which crops are grown apart from their growing season and when that particular crop is scarce (Kaplex et.al., 2024). Growing fruits, flowers, and other crops in the off-season has several advantages for the region, including increased yield and better prices, food security, decreased reliance on imports, and—above all—economic benefits. The ability to cultivate vegetables and fruit during off-season times is a result of crop variety as well as a good climate, precipitation, and temperature.

This paper presents a study on the off-season cucumber cultivation practices employed by farmers in Aliba village, located in the valley of Tzüvi, Ashiong, and Tzüba. Cucumbers are cultivated in various regions of Mokokchung district as a kharif crop, typically from April to August, within jhum fields alongside other crops like maize, bitter gourd, hill rice, and tapioca. In the case of Aliba, it is cultivated in regions where wet paddy rice is produced. After the completion of the rice harvesting season in November, the field is reused for cucumber cultivation. This practice contributes to sustainable agriculture and serves as an alternative income source, enhancing the standard of living. The seeds are typically sown between December and January, with harvesting occurring from April to May. The successful cultivation can be attributed primarily to the climate conditions. The valley designated for cucumber cultivation is encircled by hills and exhibits a climate that is

comparatively warmer than that of the Village. The introduction of off-season cucumber cultivation has provided both illumination and respite, benefiting not only the local village but also adjacent communities. This innovation, developed many years ago, continues to produce sweet and juicy cucumbers today.

Cucumis Sativus L. often known as cucumbers, belongs to the Cucurbitaceae family of plants, which has 750 species and 90 genera (Tatlioglu, T. 1993). It is a warm season plant that grow best below 18°c to 23°c. Cucumbers are high in Water content, and it provides a good source of vitamin K and has a small amount of minerals. With its crisp texture and refreshing taste, cucumbers are primarily eaten raw, and it can also be pickled to enhance their shelf life and flavor. In addition to its culinary uses, it also benefits our health in many ways such as hydration, blood clotting, skin health etc. (Westcott, P. 2010). Their versatility in both culinary and medicinal applications has made cucumber a popular and indispensable part of diets all around the world. In many rural societies, off- season cucumber can be grown as a source of livelihood especially among the marginal farmers where income generated out of it can be utilized when no other crops are grown during that time.

The state of Nagaland with its moderate temperature for most month of the year provides an ideal environment for the growth of cucumber plants. Cucumber in Mokokchung district of Nagaland holds a significant agricultural importance enhancing livelihood of farmers, and consistent supply of fresh cucumbers throughout the year. Aliba village of Mokokchung district now embrace a new frontier in agriculture by cultivating off season cucumber beyond the monsoon month. In addition to utilizing the district distinct subtropical highland environment, the creative strategy gives local farmers the ability to expand their farming practices and strengthen their financial stability. Besides satisfying the year- round demand for this crisp and nutrient – dense vegetable, farmers from Aliba village_Mokokchung_district are fostering sustainable future and community prosperity.

II. STUDY AREA

The present study is accentuated in Aliba, a small village confined to the South of Ongpangkong RD block under Mokokchung district, Nagaland. It is an Ao inhabited village located South of 16 kms away from Mokokchung Town. It shares the boundaries with Chungtia village in the East, Mangmetong and Kupza on the South, Changki Village to the North and Okutsu village in the West. The village has a total population of 536 with 220 households (Micro Plan, JICA,2022-2027). Agriculture dominates the major source of livelihood of the people where it is Wet Terrace Cultivation (WTC). There is no record on the practice of Jhum cultivation in the region. Aliba is very peculiar and famous for being able to grow its off-season cucumber which is known for its sweetness and juicy.

III. METHODOLOGY

Aliba is well marked for growing organic off-season Cucumbers. This village was therefore purposively selected for studying. Out of a total of 67 farmers practicing the cucumber cultivation, 40 farmers were selected randomly for study. Primary Data were collected through interview and structured questionnaire method. These methods have been used to collect information regarding various socio-economic parameters, different cultivation practices, expenditure and income as such. Literatures were reviewed through secondary sources such as publications, reports, journals as such. Data obtained has been arranged and tabulated systematically using different statistics and bar and pie charts have been prepared to represent different parameters. Regression analysis has been done to get an empirical idea on the economic viability of this off-season cultivation.

IV. RESULTS AND DISCUSSION

Through data collection and interaction with the cultivars, the study revealed that this off-season cucumber is slowly emerging as an important source of livelihood for many families in the village and many has surplus which is sold off as an alternative source of livelihood. Study also revealed that there were 4 major varieties of cucumbers grown in the village- Pangrong, Narep, Tongten, Rongma. Out of the four, Pangrong was found to be the most common one for commercial use. This cucumber is characterized by light green in color with juicy, tender and sweet taste.

Different parameters such as Age, occupation, Farming experience, types of manure used, marketing, expenditure, area under cultivation were taken to examine and understand the relationship with the livelihood through income generation.

1. Distribution of Respondent's Age

An important factor to consider while studying income is age. Given that they are under the category of working population, the middle-aged group have the greatest income proportion followed by above 55 categories. Being among the first to cultivate cucumbers, this group possesses a sizeable percentage.

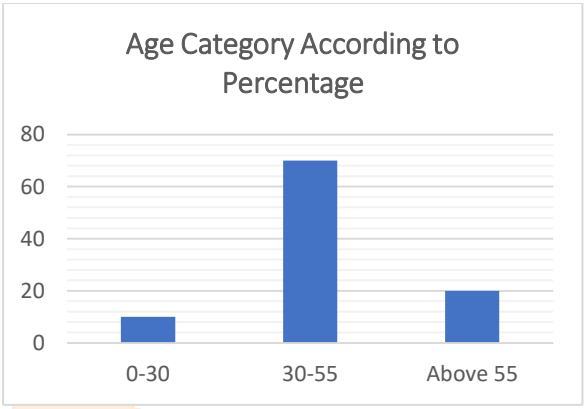

Fig 1. Representation of Respondent's Age in accordance with Percentage

2. Occupation of the respondents.

It has been found that 77.5% of the population under study area are farmers who solely depend on farming for their sustenance. While 22.5% of the population are holding other occupations alongside farming. Other occupation includes teachers, government servants and other private workers.

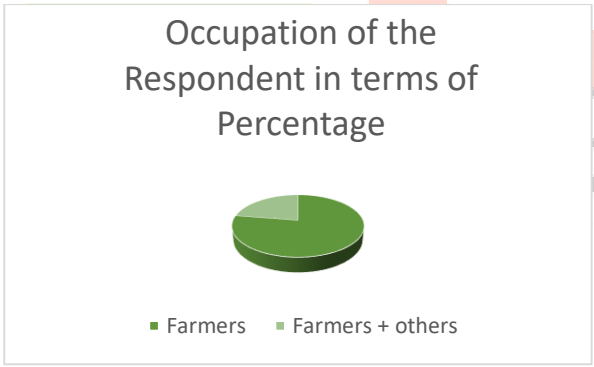

Fig 2: Occupation Structure of the Respondents

3. Farming experience in Cucumber cultivation

The introduction of off-season cucumber cultivation in the village dates back to the 1980s. since then, the farmers had been practising this cultivation successfully. The data collected from the study indicates that 45% of the population possesses less than 10 years of experience, 40% has between 10 and 20 years, while only 15% has more than 20 years of experience. The level of farming experience tends to correlate with age, as individuals in middle and older age groups generally possess more experience than their younger counterparts. With age comes a greater accumulation of experience.

4. Types of Manure

An integral part of every agricultural operation is manure. According to the data, the greatest percentage of farmers employed chicken manure (almost 68%), followed by a mix of vermicompost and poultry (22.5%). Pig and cow dung manures were utilized by a sizable population (10%). The availability of a vermicomposting unit and a poultry farm in the hamlet is the primary driver behind the usage of poultry manure and

vermicompost liquid fertilizer. Pig manures and cow dung were used by very few farmers. This is mostly because these animals have been domesticated.

5. **Marketing**

For agricultural production to be effective, the produce must reach consumers through the market. In this case, over 70% of the cucumbers are sold directly to wholesalers before even entering the open market, while only about 30% are sold in the local market. One major advantage for the farmers is their ability to sell produce without personally going to the market. This is largely due to the village's proximity—just 16 kilometers from Mokokchung Town—which allows wholesalers to come directly to the village and purchase the produce for resale in nearby town markets. Additionally, a portion of the produce is sold through local vendors who transport the goods to town and sell them in weekly markets.

6. **Expenditure Incurred**

This covers all costs from seeding to cultivation, such as labour, purchasing manures, fertilizer, equipment, and tools, among other things. Of the research population, 50% spent between ₹5,000 and ₹10,000, 27.5% spent more than ₹10,000, and 22.5% spent less than $5,000. This is directly related to the amount of land used for agriculture because the larger the area, the higher the cost of all the resources.

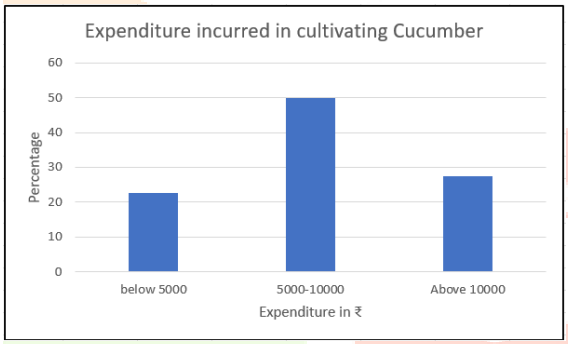

Fig:3 Expenditure incurred on Cucumber cultivation

7. **Income from Cucumber Cultivation**

Farmers involved in cucumber cultivation generate income through the sale of cucumbers, saplings, and seeds. In wholesale markets, a bundle of 6–7 cucumbers are typically sold for ₹100. Some farmers further increase their earnings by selling cucumber seeds in packets or saplings prepared through poly bagging. Among the cultivators, about 40% earn between ₹30,000 and ₹60,000, 30% earn less than ₹30,000, and around 27% make more than ₹60,000 from this activity. Higher earnings are generally linked to a larger area under cultivation and increased investment in capital and labor. The income derived from cucumber farming has played a crucial role in supporting household expenses and enhancing the overall standard of living for many farming families.

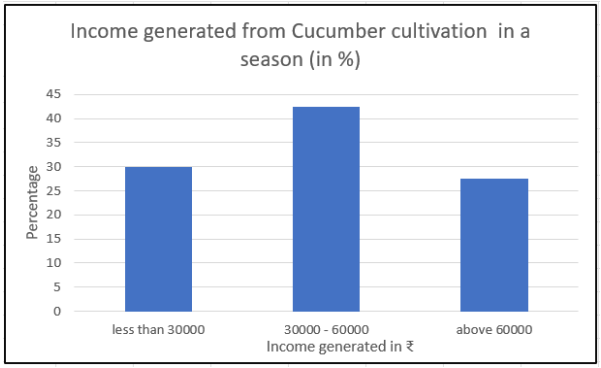

Fig:4 Income generation through Cucumber cultivation

8. Area under cultivation

Wet paddy agriculture is practiced in the "Tzüvi valley," a valley in Aliba village that is bordered by two minor rivers. The farmers used a small section of this valley to grow cucumbers in the off-season. Around 40% of the farmers were growing in area more than an acre, while majority i.e., more than half of the study population were growing in less than an acre. It has been found that, for easy accessibility, majority of the cultivation side were found near the river and streams where the valley is located. This has eased the farmer in watering purposes.

9. Purpose of Cultivation

Alongside with revenue creation, this is the most significant factor taken into account for the study. According to data gathered, over 70% of households have been growing this off-season cucumber as a source of income, and many of them pay for their costs out of the money they make from this cultivation.

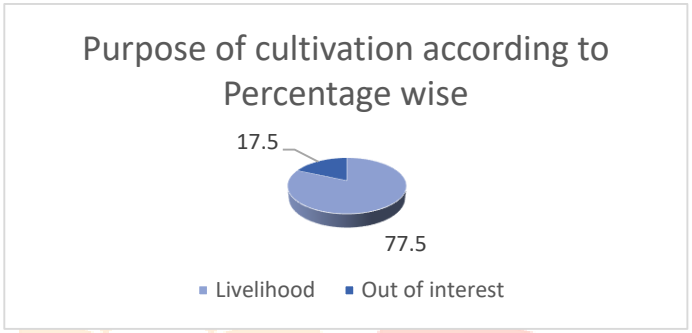

Fig 5: Purpose of Cultivation among the Respondents

Table 1: Socio-economic parameters of the respondents of the Village

Parameters	Category	Frequency	Percentage
	Below 30	4	10
Age	30-55	**28**	**70**
	Above 55	8	20
Occupation	Farmers	**31**	**77.5**
	Farmers + others	9	22.5
Farming experience	Less than 10 years	**18**	**45**
	10-20 years	16	40
	20 years and above	6	15
Types of Manure	Poultry + vermicompost	9	22.5
	Poultry	**27**	**67.5**
	others	4	10
Marketing	Local vendors	11	27.5
	Wholesale	**29**	**72.5**

Expenditure incurred	Below 5000	9	22.5
	5000-10000	**20**	**50**
	Above 10000	11	27.5
Income generated	Less than 30000	12	30
	30000 – 60000	**17**	**42.5**
	Above 60000	11	27.5
Area under cultivation	Less than 1 acre	**24**	**60**
	Above 1 acre	16	40
Cultivation purpose	Livelihood	**31**	**77.5**
	Out of interest	7	17.5
	Others	2	5

Regression Analysis: Relationship Between Expenditure and Income from Cucumber Cultivation

Table 2: Relationship of Experience and Expenditure with Income generation

Sl. No	Independent variable	Co- efficient Co-efficient "r"	Meaning
1	Experience in Farming	0.375565768	Moderate co-relation
2	Expenditure Incurred	0.869550836	Strong positive relation

Table 3: Summary Analysis of Regression Output

Statistics	Value	Interpretation
Multiple R	0.8696	Very strong co-relation between income and expenditure.
R square	0.7561	76% of the variation is explained by expenditure.
Standard Error	9861.709	The average deviation of predicted income from actual values.

Table 4: Anova Table

Element	Value	Meaning
F- statistic	117.81	Statistically strong
Significance F	333 E-13	Highly significant

To assess the economic viability of off-season cucumber farming in Aliba village, a simple linear regression analysis was conducted to understand the relationship between expenditure incurred and income generated by farmers. The regression model showed a strong positive correlation between the two variables, with a Pearson correlation coefficient (R) of 0.8696, and an R-squared (R^2) value of 0.7561. This indicates that approximately 76% of the variation in income can be explained by the expenditure on cultivation inputs made in manure, labour, and tools. The p-value associated with the expenditure coefficient is 3.33×10^{-13}, which is highly significant ($p < 0.05$), which confirms the statistical strength of the regression model. The ANOVA F-test value of 117.81 and a Significance F of 3.33×10^{-13} further validate the reliability.

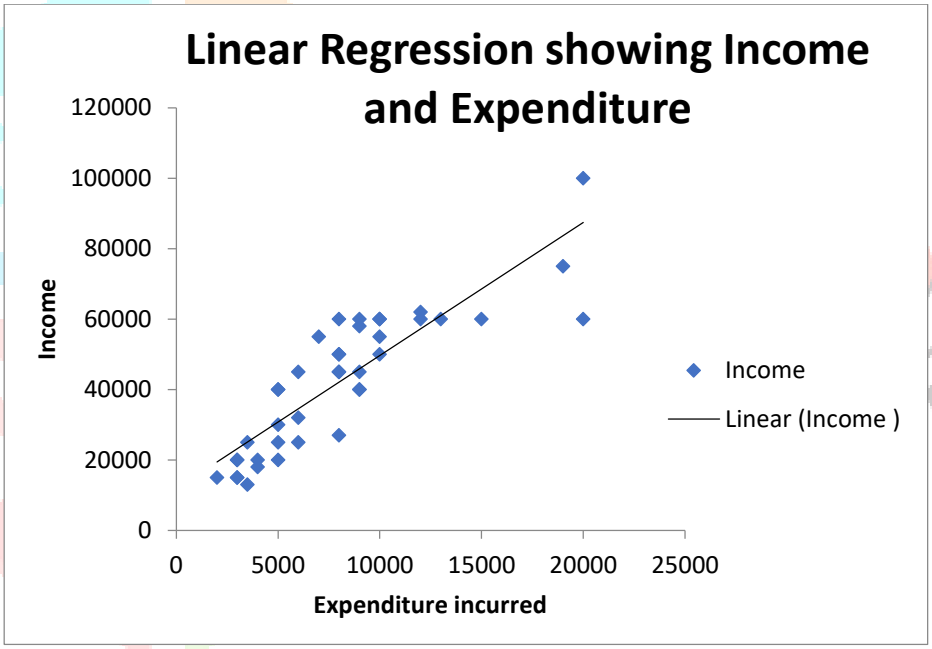

Fig 6: Regression Analysis showing the relationship of Income and Expenses of the Respondents

The figure 6 shows an upward trend, which indicates a strong positive co-relation. Overall, the regression analysis confirms that higher investment in cucumber cultivation significantly contributes to increased income, highlighting the economic potential of off-season farming practices in enhancing rural livelihoods.

V. CONCLUSION

Off-season cucumber production in Aliba village has enhanced the rural livelihood in Mokokchung district Nagaland. The utilization of post-harvest paddy land has made it viable for the farmers to harvest cucumber despite unproductive agricultural seasons for farming. The positive relationship between investment and revenue indicates the economic sustainability of the crop. More investment in quality inputs such as poultry manure and labor invariably generates more returns. This indicates that cucumber farming has helped in generating domestic revenues by making a supplementary income with some earning Rs.30,000 to Rs.60,000 for every season. Utilization of available resources like manure from poultry and mix vermicompost has made

the practices both environmentally friendly and affordable. Besides, Aliba village near Mokokchung town ease convenient access to the market, allowing farmers to sell product directly to wholesalers. This shows the viability of off-season agriculture as a low-cost, high income creation technique. This innovation along with indigenous knowledge, favorable climatic conditions and easy accessibility to the market areas has made potential for other regions having similar set up which can improve the over all aspects of life both in achieving food security as well as resilience in agriculture.

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