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Resource use Efficiency of Turmeric Production in Karbi Anglong District of Assam

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ABSTRACT :

Karbi Anglong District is one of the sixth Schedule Constitutional Districts of India. The District is surrounded with hills and plains situated in the central part of Assam. Agriculture is the main source of income in the District. The Industrial sector of the District is not yet developed as compared to other Districts of the state. The main reason for the backwardness of the District is due to the lack of infrastructure, limited Resources, Entrepreneurial motivation and demand. So, most of the people are getting unemployed and their standard of living is very poor. But with the turmeric cultivation their standard of living is slightly improved.

Keywords: Backwardness, Resources, Cultivation,

Introduction:

Assam is one of the prominent states where a major spices like turmeric is cultivated extensively. Turmeric from Assam accounted for over 2.57 billion Indian rupees in the Indian economy in fiscal year 2021-22. In Assam, there are mainly six Districts- Nagaon, Golaghat, Karbi Anglong, Sonitpur, Barpeta and Lakhimpur District where significant quantity of turmeric is produced. Karbi Anglong District is one of the turmeric-producing belts of Assam and it can play a major role in the fast expanding organic turmeric market not only within the country but also abroad the country.

Turmeric is grown well in warm and humid climate. It can be grown both under rain fed and irrigated conditions. However being an exhausting spice it is not desirable to grow turmeric in the same soil year after year. The suitable time for planting turmeric in the district is March to April and crop duration seven to nine months.

Objectives of the Study:

The study is designed with the following objectives-

1. To analyze the various types of Turmeric Cultivation in Karbi Anglong district of Assam
2. To analyze the Resource use Efficiency of Turmeric Production in Karbi Anglong District of Assam.

Methodology:

The study is based on both primary and secondary data. Out of the four Sub-Divisions- Diphu, Bokajan, Howraghat and Hamren. Of the District (Undivided District) Primary data is collected from two block Howraghat and Lumbajong under Diphu Sub-Division. From the selected block 8 villages from Lumbajong block and 6 village from Howraghat block were purposively selected. Out of these 14 villages from these two selected block, a sample of 142 households from Lumbajong block and 120 households from Howraghat block turmeric cultivation household were selected randomly and data are collected from the respondents through personnel interview with the tools of pre-structure schedule and observation. The Secondary data are collected from GINFED Ltd., Directorate of Horticulture Assam, NERAMAC, Spice broad of India etc.

Data Analysis both Qualitative and Quantitative data was analyzed in the backdrop of the project objectives. Quantitative data was tabulated and statistically analyse and Qualitative data was interpreted based on the information collected from the field.

Types of Turmeric Cultivation:

Different varieties of turmeric are cultivated in Assam. In the study area due to its diverse geographical location, Agro-climate condition, *cultural heritage* and *market opportunities* three different varieties of turmeric are cultivated- Megha Turmeric-1, Lakadong Turmeric and Curcuma Longa Turmeric.

1. Megha Turmeric-1

The cultivation of Megha Turmeric-1in Karbi Anglong district is beneficial due to increased yield, superior quality and improved economic returns. Megha Turmeric-1 is a high-yielding variety of turmeric developed by the ICAR Complex for NEH Region, Meghalaya. It's well-suited for cultivation in Karbi Anglong district, a hill zone in Assam. The variety matures in 300-315 daya and has a potential yield of 270 quintals per hectare.

Benefits of Megha Turmeric-1 in Karbi Anglong District:

I. **Increased in Yield:** Megha Turmeric-1 is known for its high yield potential, contributing to increased production in the region.
II. **Better Quality:** The variety offers high curcumin content, contributing to the superior quality of the turmeric produced in Karbi Anglong District.
III. **Improved Economic Returns:** The high yield and quality of Megha Turmeric-1 translate to better economic returns for farmers, encouraging its adoption in the area.
IV. **Suitable Agro-climate Conditions:** The climate and soil condition of karbi Anglong district is well suitable for Megha Turmeric-1, ensuring consistent yield and quality.

2. Lakadong Turmeric:

The cultivation of *Lakadong Turmeric* in *Karbi Anglong district* is associated with increased yield, better quality, and enhanced economic returns for farmers. Although Lakadong Turmeric is native to the Lakadong area in Meghalaya, its cultivation has been successfully extended to neighboring regions, including parts of Assam, due to its high curcumin content and adaptability to similar agro-climatic conditions.

Benefits of Lakadong Turmeric in Karbi Anglong District:

I. *Increased Yield*: In the study area Lakadong turmeric help the farmers to improve their turmeric productivity. In the Karbi Anglong district, turmeric production increased from 288 tonnes to 27,000 tonnes between 1999 and 2018, with per-hectare productivity rising from 0.75 tonnes to 2.04 tonnes during the same period.
II. *Superior Quality*: Lakadong Turmeric is renowned for its high curcumin content, ranging from 6.8% to 7.5%, compared to the 2% to 3% found in other varieties. This makes it particularly valuable for medicinal and culinary purposes.
III. *Enhanced Economic Returns*: The high curcumin content and quality of Lakadong Turmeric allow farmers to command premium prices in the market. Processed forms, such as dried slices and powder, can be sold at significantly higher rates, increasing profitability.

3. The Curcuma Longa Turmeric:

The Curcuma longa turmeric cultivated in Karbi Anglong is traditionally grown under shifting (jhum) cultivation systems. However, recent interventions promoting high-yielding varieties like Megha Turmeric-1 and Lakadong, along with improved agronomic practices, have significantly enhanced turmeric yields and quality. This shift has helped farmers achieve greater economic returns while ensuring sustainability and reducing pressure on forested land.

Table:1 shows Block-wise different varieties of turmeric grown of the selected household.

Table: 1

Block-wise Varieties of Turmeric Distribution

HH-Household
% -Indicate percentage of the total households

Varieties	Lumbajong Block		Howraghat Block		Total	
	HH	%	HH	%	HH	%
Megha Turmeric-1	83	55.34	66	58.93	149	56.87
Lakadong Turmeric	59	39.33	38	33.93	97	37.02
Curcuma Longa	8	5.33	8	7.14	16	6.11
Total	150	100.0	112	100.0	262	100.0

Source: Primary data

The table shows that out of the total 262 households, 56.87 percent households have cultivate Megha Turmeric-1 varieties of turmeric, 37.02 percent household have cultivate Lakadong Turmeric, 6.11 percent households have cultivate the Curcuma Longa varieties of turmeric and no household is found who has cultivate Finger varieties of turmeric.

The main reasons for the different varieties of turmeric are cultivated in the study area are-

I. **Geographical location:** The district topography including hills, plains and valleys creates a variety of microclimates suitable for different varieties of turmeric cultivation.
II. **Agro-climatic Suitability:** The district has well-drained loamy and sandy loam soil, ideal for turmeric cultivation. Sub-tropical climate with good rainfall (above 1500 mm annually) supports healthy turmeric growth.
III. *Traditional and Indigenous Knowledge: T*he indigenous tribes in Karbi Anglong such as the Karbi and Dimasa have been cultivating turmeric for generations. They often preserve local landraces (native varieties) that are well adapted to specific niches within the district.

IV. *Market and Economic Reasons:* Different markets prefer different types of turmeric- for example: High curcumin content used in health supplements and exports and specific color or aroma used in cooking or rituals. Growing multiple varieties allows farmers to diversify their income and access various markets.

V. **v.** *Resistance to Pests and Diseases:* Some local varieties of turmeric are naturally resistant to diseases like leaf blotch or rhizome rot. Mix variety of turmeric cultivation helps reduce risk of crop failure.

Resource use Efficiency:

To estimate the contribution of each input or resources for turmeric production or output, Cobb-Douglas production model is used. Regression line has been run with turmeric production (Y) as dependent variable and Labour (X1), Land (X2), Seed (X3) and other (X4) as independent variables. The analysis based on the selected surveyed households in the following logarithmic functional model:

Y = A. Log X1 + Log X2+Logx3+Logx4

Where,

Y=Output (turmeric)

Logx1=Land (Hectare)

Logx2=Human labour wage (Hectare)

Logx3=Seed cost

Logx4= Other cost

In order to study the Efficiency of Resource used or resource productivity in turmeric production with the help of Cobb Douglas type production function (OLS estimate of production function) was carried out to run the regression model. Table: 2 shows the resource use efficiency for turmeric cultivation, where turmeric production is dependent variable and human labour, seed, land and other cost is independent/productive variable.

Table: 2

Resource use Efficiency in Turmeric Production

Farm size (Hectare)	HH	Intercept	Land (X1)	Labour (x2)	Seed (X3)	Other (X4)	R2
Below-1	62	2.013	0.305**	0.088*	0.278*	0.009	0.380
1-2	129	1.625	0.070	0.122**	0.253**	0.002	0.373
2-4	71	3.082	0.299**	0.005	0.134	0.145*	0.212
Overall	262	2.556	0.173**	0.056**	0.195**	0.057*	0.241

Source: Primary Data

From the table it is observed that the coefficient of all variable i.e. land, labour, seed and other cost are found to be impacting positively to turmeric cultivation. R^2 which ranges from 0.380 for below-1 hectare (marginal farm) farm size to 0.373 for 1-2 hectare (small farm) farm size to 0.214 for 2-4 hectare (medium farm) farm size indicates that Ordinary Least Square (OLS) fits well in the regression function. Regression coefficient of land i.e. area has found positive impact across all category sizes used for turmeric cultivation. It ranges from 0.305 for below-1 hectare land to 0.070 for 1-2 hectare land and 0.299 for 2-4 hectare sizes of land. For marginal and medium sizes coefficients are found significant at 1 percent level of significance which means area of land has positive and significant contribution towards production in marginal and medium farm sizes, while contribution of land is not significant for small category of farm size even though it has positive impact.

Regression coefficient of labour used ranges from 0.008 for below-1 hectare farm size to 0.124 for 1-2 hectare farm labour and 0.005 for 2-4 hectare farm. All coefficients are positive signifying that labour has positively impacted the turmeric production. For Marginal farm size again coefficient was found significant at 1 percent level of significance while for small farm size coefficient was found significant at 5 percent level of significance. Thus labour has got significant contribution towards turmeric production. But for medium farm size labour does not play significant role towards overall turmeric production.

In case of seed; marginal farm size coefficient was found 0.278 and significant at 5 percent level. For small size farm, coefficient is positive 0.253 significant at 1 percent level of significance while for medium size farm coefficient is 0.136. This signifies for marginal and small farm size seed has got major role to play in overall turmeric production.

For others variables which include rental value of land and transportation cost, coefficient was found 0.009 for marginal size farm, 0.002 for small size farms and 0.145 for medium size farms. While impact of other variables is less for marginal and small farm sizes, it is significant at 5 percent level of significance for medium land size signifying that other variable contribute to overall turmeric production in a significant way.

Among all farm sizes, marginal farm size coefficients of all independent variables was found to be positively impact the production however land has most important contribution with coefficient 0.305 (1% level of significance) followed by seed with coefficient 0.278 (5% level of significance) then labour 0.088 (5% level of significance) and followed by other variables with no significance level.

For small farm size, seed plays major role with coefficient 0.253 (1% level of significance) followed by labour with coefficient 0.122 (1% level of significance). Land and other variable positively impact the production of turmeric.

For medium farm size, land contributes majorly with coefficient 0.299 (1% level of significance) and other variables contribute with coefficient 0.145 (at 5% level of significance) and other two variable i.e. labour and seed though positive was contributing less towards overall turmeric production.

Conclusion:

To conclude, it can be said that, one of the primary source of livelihood of the people living in the study is turmeric cultivation. But due to the lack of awareness of the people they are not use maximum utilization of their resources. Government should provide suitable policies to the farmers to proper utilization of their resources and improves their standard of living.

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