



Exploring Agricultural Production and Marketing in the Bodoland Territorial Region: Challenges and Opportunities for Farmers

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Abstract

Agricultural marketing plays an important role in determining farmers' market access, selling opportunities, and returns from agricultural production. This study examines agricultural production and the marketing challenges and opportunities experienced by farmers in the Bodoland Territorial Region (BTR), Assam. The aim of the study is to identify the major agricultural crops cultivated by farmers and examine the challenges and opportunities associated with marketing their produce. The study adopted a quantitative, cross-sectional survey design with a descriptive and exploratory approach. Primary data were collected in 2025 from 400 farmers in the Udalguri and Chirang districts of BTR, supplemented by secondary agricultural statistics. Descriptive frequencies and percentages were used to analyse the data. The findings indicate that rice dominates the cropping pattern, while potato, rapeseed and mustard, and other crops contribute to agricultural diversification. Farmers reported substantial marketing difficulties, particularly low market prices, price fluctuations, high competition, transportation costs, limited market information, and post-harvest losses. Primary and secondary wholesale markets were commonly preferred for obtaining better prices. Market distance, ease of access, prices offered, payment reliability, and the volume of produce handled were important considerations in marketing-channel selection. The findings also revealed limited participation in processing and packaging activities,

indicating scope for strengthening post-harvest management and value addition. The study concludes that improving market access, information availability, handling practices, and marketing arrangements could help address farmers' marketing constraints and enhance agricultural marketing opportunities in BTR.

Keywords: *agricultural marketing, price realization, marketing challenges, marketing opportunities, farmers, market access*

Introduction

Agricultural marketing connects agricultural production with the exchange, distribution and sale of farm produce. It influences the markets farmers can access, the costs of moving produce to buyers, the information available when making selling decisions, and the returns received. Evidence from India shows that transport and communication networks are relevant to farmers' marketing-channel choices and the prices realised from those channels (Negi et al., 2018). Consequently, the economic outcome of cultivation depends not only on production but also on the marketing arrangements through which produce reaches consumers, traders and other buyers. Marketing constraints can be particularly important when farmers have limited access to transport, storage, processing facilities or alternative buyers. Negi et al. (2018) found that transport and market information were associated with channel choice and price terms for paddy and wheat. It is also suggested that transport access alone may be insufficient if farmers lack useful market information. In Assam, Sarma et al. (2018) examined horticultural marketing channels and reported that



transaction costs, physical capital and supporting services influenced farmers' channel choices. The study also identified price spreads as a factor affecting farmers' profit shares. These findings provide a relevant background for studying agricultural marketing in the selected districts of BTR. Post-harvest infrastructure is another important consideration. Hussain and Guha (2023), studying rural Assam, discussed the role of storage and agro-processing infrastructure in agribusiness during a period of disruption. Research on horticultural farmers in Assam has also examined marketing-channel efficiency and factors associated with channel choice, including transport and market facilities (Das & Singh, 2026). In a crop-specific Indian study, Thakur et al. (2023) examined marketing performance and output-channel choice among garden-pea farmers, demonstrating the value of studying constraints alongside farmers' channel decisions.

Identifying the crops cultivated by surveyed farmers provides an important context for understanding their marketing circumstances. The survey included food grains, oilseeds, vegetables, tubers and horticultural products. Different products may require different handling and selling arrangements, although crop type alone does not determine marketing outcomes. This study therefore combines crop-identification results with farmers' reported marketing challenges, channel preferences and post-production activities.

Statement of the Problem

Agriculture is an important source of livelihood for rural communities in the Bodoland Territorial Region (BTR), Assam. Farmers cultivate various agricultural crops that contribute to household income and regional economic development. However, agricultural production alone does not ensure better economic returns, as farmers' livelihoods also depend on their ability to market their produce efficiently. Challenges such as price fluctuations, transportation costs, inadequate market infrastructure, limited market information, and intermediary involvement may affect farmers' access to markets and price realisation. At the same time, opportunities such as improved marketing channels, direct sales, and better market linkages may help enhance farmers' returns. Therefore, it is important to identify the crops cultivated by farmers in BTR and examine the challenges and opportunities they encounter in marketing their agricultural produce.

Literature Review

Agricultural production in Assam encompasses a variety of crops that contribute to rural livelihoods and the agricultural economy. De and Bodosa (2014) examined cropping patterns in Assam and identified paddy, jute, mustard, sugarcane, pulses, and tea as major agricultural outputs. Their findings indicated that Assam is predominantly a food grain-producing state, although certain secondary crops exhibited relatively slow growth. Potato and mustard accounted for only 2.24% and 6.83% of the gross cropped area, respectively. In the context of Bodoland, Mochahari (2016) identified rice as the principal agricultural product of the Bodo community, distinguishing between *Asu* paddy, cultivated during the hot-weather season, and *Sali* paddy, cultivated during the cold-season period. The study also documented the cultivation of vegetables, pulses, cotton, jute, and sugarcane and reported that agriculture was the primary livelihood of approximately 90% of the Bodo and tribal populations in the Bodoland Territorial Council (BTC) area. Extending this perspective, Patangia (2025) examined the relationship between Bodo culture, identity, and traditional farming practices through an ethnographic study based on primary field data and historical secondary references. The study highlighted the significance of language, social rituals, and farming traditions in preserving Bodo cultural identity and identified rice, jute, and mustard as important agricultural staples supporting local livelihoods and cultural continuity.

While agricultural production is important for rural livelihoods, the effectiveness of agricultural marketing also influences farmers' economic returns. Dantwala (1957) examined structural deficiencies in agricultural marketing agencies in India and identified unfair market practices, unregulated markets, unreasonable pricing mechanisms, and the absence of standardised commodity grading systems as major concerns. The study further highlighted inadequate storage infrastructure, poor transportation networks, and substantial intermediary involvement as constraints affecting marketing efficiency. Similarly, Rathod (2011) investigated the socio-economic conditions of rural weekly markets in Kolhapur district using primary field data. The findings indicated that vendors selling fresh, locally sourced vegetables frequently reduced their prices towards the evening to minimise losses from product spoilage. The study also documented pricing disputes between buyers and sellers and identified inadequate municipal governance and weak



enforcement of market regulations as factors affecting vendor security. Together, these studies highlight the importance of effective market infrastructure, transparent pricing, appropriate regulation, and efficient handling of agricultural produce.

In addition to these challenges, marketing arrangements can create opportunities for improving farmers' price realisation. Das (2025) conducted a value chain analysis of selected organic crops in Assam and found that direct sales enabled farmers to obtain higher prices for organic pineapple and pumpkin. The study also reported that organic pineapple farmers received premium prices during the early harvest period compared with later sales. Furthermore, four marketing channels were identified in the organic pumpkin value chain, alongside an examination of price spreads and information flows for five selected organic crops. Similarly, Das and Singh (2025) examined marketing-channel efficiency and the factors influencing channel choice among horticultural farmers in Assam using marketing-efficiency models and price-spread analysis. Their findings indicated that direct marketing enabled farmers to obtain higher net prices for potato, cabbage, brinjal, and tomato, whereas the involvement of retailers and multiple intermediaries reduced farmers' returns. These findings suggest that marketing-channel selection and distribution arrangements play an important role in determining farmers' price realisation.

Research Gap

Existing studies have examined agricultural production in Assam, traditional farming practices among the Bodo community, and the efficiency of agricultural marketing channels (De & Bodos, 2014; Mochahari, 2016; Das & Singh, 2025). However, the literature reviewed provides limited integrated evidence on the agricultural crops cultivated by farmers and the challenges and opportunities associated with marketing their produce specifically in the Bodoland Territorial Region (BTR), Assam. In particular, the relationship between the region's agricultural production patterns and farmers' marketing experiences requires further empirical investigation. Therefore, the present study seeks to address this geographical and empirical gap by identifying the various agricultural crops cultivated by farmers in BTR and examining the challenges and opportunities they encounter in marketing their agricultural produce.

Objectives of the Study

- i. To identify the major agricultural crops cultivated by the farmers in Bodoland Territorial Region (BTR).
- ii. To examine the challenges and opportunities associated with marketing agricultural produce among farmers in the Bodoland Territorial Region (BTR), Assam.

Methods

Research Design and Study Area

The study adopted a quantitative, cross-sectional survey design with a descriptive and exploratory approach. The study was conducted in Udalguri and Chirang district of Bodoland Territorial Region (BTR), Assam. The study used both primary and secondary data to examine agricultural production patterns and the marketing challenges and opportunities experienced by farmers in the study area. Primary data were collected in 2025 from 400 farmers engaged in agricultural production in the selected districts using a structured questionnaire. The questionnaire covered the major crops cultivated, agricultural marketing challenges, preferred marketing channels, factors influencing choice and participation in post-harvest activities such as processing and packaging. Secondary data on agricultural production and related statistics were obtained from relevant government publications to supplement and contextualise the primary survey findings. The collected data were organised and analysed using descriptive statistics. Frequencies and percentages were used to summarise the crops cultivated by respondents, reported marketing challenges, preferred marketing channels, factors influencing channel choice, and participation in post-harvest activities. The analysis focused on understanding agricultural production patterns and the marketing challenges and opportunities experienced by farmers in the selected districts.



Data Analysis and Results

Agricultural Crops Cultivated by the Farmers

The Bodoland Territorial Region (BTR) exhibits a diverse and rich agricultural base shaped by favorable agro-climatic conditions, fertile soils, and the predominance of traditional farming practices. Understanding the cropping pattern is essential to assess marketing challenges. Farmers in Bodoland Territorial Region cultivate a diverse range of crops, including cereals, fruits, vegetables, spices and tuber crops.

Table 1.1 Distribution of Farmers Cultivating Rice and Total Area Under Rice Cultivation in BTR

Crop	Frequency	% of Farmers Cultivating	Total Area (In Bighas)
Rice	388	97	2652

Source: Researcher's Survey, 2024

Note: Percentage is calculated based on 400 respondents.

The data presented in Table 1.1 reveals that rice is the most dominant crop in the region, cultivated by 97% of the respondents, covering a total area of 2,652 bighas. This highlights the central position of rice in the region's farming system, both for subsistence and commercial purposes.

Table 1.2 Area and Production of Different Rice Seasons in Bodoland Territorial Region

Type of Rice	Area (Ha.)	Production (MT)
Autumn Rice (Ahu)	17,404	48,026.43
Winter Rice (Sali)	272,706	980880.43
Summer Rice (Rabi, Boro and Early Ahu)	29,591	122405.14
Total	319,701	1,151,311.99

Source: Directorate of Agriculture, BTC (2024)

Table 1.2 presents the area and production of different rice seasons in Bodoland Territorial Region (BTR) based on secondary data. The primary survey findings are consistent with the secondary agricultural statistics provided by the Directorate of Agriculture, BTC. According to the secondary data, rice cultivation in BTR comprises Autumn Rice (Ahu), Winter Rice (Sali), and Summer Rice (Rabi, Boro and Early Ahu). Autumn Rice is cultivated over 17,404 hectares, with a production of 48,026.43 MT. Winter Rice is cultivated over 272,706 hectares, with a production of 980,880.43 MT, while Summer Rice is cultivated over 29,591 hectares, with a production of 122,405.14 MT. Thus, the total area under rice cultivation in BTR is reported as 319,701 hectares, with total rice production of 1,151,311.99 MT. Among the three rice seasons, it is observed that Winter Rice accounts for the largest area of cultivation and production followed by Summer Rice.

Further, as reported by the Joint Director of Economics and Statistics, (BTC,2023), farmers in the region cultivate both traditional and High-Yielding-Variety (HYV) rice varieties, depending on land type and availability of agricultural inputs. The crop is predominantly marketed in the form of paddy, with limited involvement of processing and branded packaging.

The findings from both primary and secondary sources collectively indicate that rice occupies a dominant position in the agricultural production system of BTR. While the primary survey demonstrates its widespread cultivation among the sampled farmers, the secondary statistics indicate the substantial scale of rice cultivation and production across BTR as a whole. Thus, the prominence of rice observed among the sampled farmers corresponds with its overall importance in the agricultural structure of the region.

Table 1.3 Distribution of Farmers Cultivating Jute and Total Area Under Jute Cultivation in BTR

Crop	Frequency	% of Farmers Cultivating	Total Area (In Bighas)
Jute	42	10.5	96

Source: Researcher's Survey, 2024

Note: Percentage is calculated based on 400 respondents.



The data presented in Table 1.3 indicated that crops like Fibre crop jute (10.5%) are cultivated by a smaller proportion of respondents, with total area coverage of 96 bighas. Compared with rice, Jute was cultivated by a relatively smaller proportion of the sampled farmers. The finding indicates that Jute constituted a relatively less prominent crop among the sampled farmers, although it formed part of the agricultural production pattern of the study area. It is mainly grown as a cash crop and used for fibre extraction. As evident from Table 1.3, although Jute has a stable market demand for packaging and industrial purposes, farmers face challenges such as retting, labour availability, and fluctuating prices. Jute cultivation in Bodoland Territorial Region remains small-scale but significant for supplementary income.

Table 1.4 Agricultural Production Statistics of Jute in BTR

Year	Area (Ha.)	Production (MT)	Productivity (Kg/Ha.)
2022-2023	12693.75	23585.1	1858
2024	6499	15062.15	-

Source: Director of Agriculture, BTC, Kokrajhar (2022-23)

Note: Productivity data for 2024 were not available in the source provided.

Table 1.4 presents the area, production and productivity of Jute in BTR based on secondary data obtained from the Director of Agriculture, BTC. It is observed that in 2022-2023, Jute was cultivated over an area of 12693.75 hectares, with a production of 23,585.1 MT and productivity of 1,858 kg per hectare. In 2024, the reported area under Jute cultivation declined to 6,499 hectares, while production declined to 15,062.15 MT. The secondary statistics provide a broader regional context for the primary survey findings on jute cultivation in Bodoland Territorial Region.

Table 1.5 Distribution of Farmers Cultivating Oilseeds and Total Area Under Oilseeds Cultivation in BTR

Crop	Frequency	% of Farmers Cultivating	Total Area (In Bighas)
Rapeseed and Mustard	170	42.5	679
Sesamum	59	14.75	165

Source: Researcher's Survey, 2022-2025

Note: Crop-wise responses are not mutually exclusive because some farmers cultivated more than one crop. Percentage are calculated based on 400 respondents.

The data presented in Table 1.5 indicated that rapeseed and mustard are grown by 42.5% of the respondents, accounting for 679 bighas, reflecting their importance as key oilseed crops in the region. These oilseed crops are widely grown during the rabi season. Their relatively low input requirement, moderate drought tolerance, and favorable market demand make them important secondary crops in Bodoland Territorial Region. Rapeseed and mustard contribute to household oil consumption and are regularly sold in local markets. They show strong marketing potential due to rising edible oil demand. The responses demonstrate that limited presence suggests that these crops may be cultivated in specific agro-ecological pockets or for supplementary household income. On the other hand, sesamum (14.75%), are cultivated by a smaller proportion of respondents, with total area coverage of 165 bighas. Sesamum is grown by a smaller segment of farmers as supplementary oilseed crop. It thrives in well-drained soils and warmer climates. Despite its market value as a nutritious oilseed, sesamum cultivation remains low due to sensitivity to heavy rainfall and poor post-harvest handling facilities.

Table 1.6 Area, Production and Productivity of Rapeseed & Mustard and Sesamum in BTR

Crop	Year	Area (Ha.)	Production (MT)	Productivity (Kg/ Ha.)
Rapeseed and Mustard	2022-2023	48,635	38,120.4	1,709
	2024	44,457	40,322.24	-
Sesamum	2022-2023	2,352.9	1704.49	724
	2024	2361.9	1894.59	-

Source: Statistical Handbook BTC (2023), Director of Agriculture, BTC, Kokrajhar (2024)

Note: Productivity data for 2024 were not available in the source provided.



The data presented in Table 1.6 indicate that Rapeseed and Mustard occupied a considerably larger cultivated area than Sesamum in both reported years. For Rapeseed and Mustard, the reported cultivated area was 48,635 hectares in 2022-2023, with production of 38,120.4 MT and productivity of 1,709 kg/ha. In 2024, the reported area declined to 44,457 hectares, with production of 40,322.24 MT.

For Sesamum, the cultivated area was 2,352.9 hectares in 2022-2023, with production of 1,704.49 MT and productivity of 724 kg/ha. In 2024, the area increased slightly to 2,361.9 hectares, while production increased to 1,894.59 MT. The secondary data provided supporting evidence for the cultivation pattern of Rapeseed & Mustard and Sesamum and also complement the findings obtained from the primary survey.

Overall, the secondary statistics show that Rapeseed and Mustard had a substantially larger area and production base than Sesamum in BTR.

Table 1.7 Distribution of Farmers Cultivating Horticultural Crops and Total Area Under Horticultural Crops Cultivation in BTR

Crop	Frequency	% of Farmers Cultivating	Total Area (In Bighas)
Banana	34	8.5	118
Papaya	1	0.25	2
Assam Lemon	79	19.75	164

Source: Researcher's Survey, 2022-2025

Note: Crop-wise responses are not mutually exclusive because some farmers cultivated more than one crop. Percentage are calculated based on 400 respondents.

The data presented in Table 1.7 shows that Assam lemon (19.75%) are moderately cultivated, with land areas of 164 bighas. Assam lemon (*Citrus limon*) is one of the most important horticultural crops grown in Bodoland Territorial Region. Known for its aroma and shelf life, it has high demand in local and neighboring markets. Farmers commonly cultivate Assam lemon in homestead gardens and small orchards. These crops hold great potential for income diversification and value-added products like lemon pickles, squash, and essential oils. On the other hand, fruits such as banana (8.5%), and papaya (0.25%), are even less prevalent, occupying only 118 bighas, and 2 bighas. The very low levels of adoption may be attributed to limited local demand, market access constraints, or agronomic challenges. Banana is cultivated by farmers mainly at a small scale due to its perishability and market volatility. It thrives in the region's warm, humid climate. Although banana has excellent market potential, constraints such as lack of cold-chain infrastructure and high post-harvest losses limit participation. Papaya is grown in small quantities, typically for household consumption or local sale. It is fast-growing and suitable for BTR's climate, but farmers often avoid large-scale cultivation due to fragility, perishability, and low market access for horticultural produce.

Table 1.8 State-Level Area, Production and Average Yield of Selected Horticultural Crops in Assam

Crop	Year	Area (Ha.)	Production (MT)	Average Yield (Kg/Ha.)
Banana	2023-2024	59,380	1,139,589	19,191.46
	2024-2025	59,861.79	1,148,631.00	19,188.05
Assam Lemon	2023-2024	16,276	164,261	10,092.22
	2024-2025	16,456.37	166,150.15	10,096.40
Papaya	2025	7,347	1,08,479	14,765

Source: Directorate of Horticulture and Food Processing, Assam, Statistical Handbook, Assam 2025; Agri Vision 2025 Assam

Note: The data presented in the Table 1.8 are Assam level statistics and do not represent only the BTR.

The data presented in Table 1.8 indicate that Banana recorded the largest area and production among the selected horticultural crops at the state level. In 2023-2024, banana covered 59,380 hectares, with a production of 1,139,589 MT and an average yield of 19,191.46 kg/ha. In 2024-2025, the area increased to 59,861.79 hectares, while production



increased to 1,148,631 MT; however, average yield declined slightly to 19,188.05 kg/ha (Statistical Handbook, Assam, 2025).

Assam Lemon covered 16,276 hectares in 2023-2024, with production of 164,261 MT and an average yield of 10,092.22 kg/ha. In 2024-2025, the area increased to 16,456.37 hectares, production increased to 166,150.15 MT, and average yield increased marginally to 10,096.40 kg/ha (Directorate of Horticulture and Food Processing, Assam, n.d.). The state level statistics indicate papaya production in Assam was 1,08,479 MT covering 7,347 hectares with an average yield of 14,765 kg/ha (Agri vision, 2025).

The state-level statistics provided a broader context for understanding the production of selected horticultural crops alongside the primary survey findings from Bodoland Territorial Region

Table 1.9 Distribution of Farmers Cultivating Vegetable and Tuber Crops and Total Area Under Vegetable and Tuber Crops Cultivation in BTR

Crop	Frequency	% of Farmers Cultivating	Total Area (In Bighas)
Potato	175	43.75	543
Cassava	12	3	19
Taro Tuber	33	8.25	82

Source: *Researcher's Survey, 2022-2025*

Note: Crop-wise responses are not mutually exclusive because some farmers cultivated more than one crop. Percentage are calculated based on 400 respondents.

The data presented in Table 1.9 shows that potato is the second most widely cultivated crop, with 43.75% of the farmers engaged in its production, occupying 543 bighas of land. Potato is a commercially significant crop cultivated during the winter season. It has high market demand and contributes substantially to farm income. The favorable climate of BTR supports good yields; however, lack of cold storage facilities and post-harvest losses pose major challenges. Potato also demonstrates strong potential for value-added processing. Farmers cultivating tuber crop such as cassava (3%) are even less prevalent with total area coverage of 19 bighas. The very low levels of adoption may be attributed to limited local demand, market access constraints, or agronomic challenges. On the other hand, crops like taro tuber (8.25%) are cultivated by a smaller proportion of respondents, with total area coverage of 82 bighas. Taro (*Colocasia*) is grown on a modest scale in homestead fields and moist lowlands. It is consumed locally and has steady market demand. Farmers appreciate the crop for its resilience and low maintenance requirements. However, marketing remains limited to local vendors and village markets.

Table 1.10 Area, Production and Average Yield of Selected Vegetable and Tuber Crops

Crop	Year	Area (Ha.)	Production (MT)	Average Yield (Kg/Ha.)
Potato	2022-2023	27,224	378,238	13,894
	2024	27150	495817.77	-
Cassava (Tapioca)	2025	2,798	13,261	4,739

Source: *Director of Agriculture, BTC; Statistical Handbook of BTC, 2023 (For Potato); Agri Vision 2025 (For Cassava)*

Note: Potato statistics relate to BTR, whereas cassava statistics relate to Assam as a whole. Secondary data on the area, production and average yield of Taro Tuber were not available; therefore, the analysis is based on the primary survey findings.

The data presented in Table 1.10 shows that Potato covered 27,224 hectares in BTR during 2022-23, with production of 378,238 MT and an average yield of 13,894 kg/ha. The area under Potato cultivation in BTR decreased by 74 hectares, from 27,224 hectares in 2022-2023 to 27,150 hectares in 2024, whereas production increased by 117,579.77 MT, from 378,238 MT to 495,817.77 MT, indicating a substantial increase in output despite a marginal decline in



cultivated area. The state-level statistics for Cassava indicate an area of 2,798 hectares, production of 13,261 MT and an average yield of 4,739 kg/ha in 2025. The agricultural statistics supplement the primary survey findings; however, the cassava statistics represent Assam as a whole, whereas the primary survey covers sampled farmers in BTR.

Table 1.11 Distribution of Farmers Cultivating Condiment and Spice Crop and Total Area Under Condiment and Spice Crop Cultivation in BTR

Crop	Frequency	% of Farmers Cultivating	Total Area (In Bighas)
Chillies	77	19.25	173
Turmeric	54	13.5	125
Ginger	3	0.75	12

Source: *Researcher's Survey, 2022-2025*

Note: Crop-wise responses are not mutually exclusive because some farmers cultivated more than one crop. Percentage are calculated based on 400 respondents.

The data presented in Table 1.11 indicated that spice crops such as chilly (19.25), and turmeric (13.5%) are moderately cultivated, with land areas of 173 bighas and 125 bighas respectively. Chilly cultivation is moderately prevalent in Bodoland Territorial Region due to its high market demand and use as both a fresh and dried spice. Farmers typically grow indigenous varieties suited to the climate. The crop has strong potential for value addition such as drying and powdering but limited infrastructure restricts expansion. Turmeric is a promising spice crop cultivated by a small percentage of farmers. The soil and climate are favourable, and the region is known for producing good quality turmeric. It offers high market value and potential for processing (powder, dried rhizomes), but adoption remains limited due to high labour requirements and lack of marketing networks. These crops indicated growing interest in horticulture and spices, possibly due to their market potential and adaptability to local agro-climatic conditions. On the other hand, ginger is cultivated by only 0.75% of the respondents over a total area of 12 bighas, reflecting minimal engagement in high-value spice cultivation, possibly due to weak marketing infrastructure, lack of institutional support, or limited awareness about its commercial potential. Farmers who grow ginger do so on very small plots. The crop has high commercial potential for fresh and processed markets. However, risks such as disease susceptibility and lack of organized marketing channels discourage large-scale cultivation.

Overall, the cropping pattern reveals that the majority of farmers in Bodoland Territorial Region rely heavily on staple and food crops, while a smaller segment engages in horticultural and commercial crops. This indicates a potential area for diversification and value addition through targeted extension services, post-harvest support, and access to markets.

Table 1.12 Area, Production and Average Yield of Selected Condiment and Spice Crops in BTR

Crop	Year	Area (Ha.)	Production (MT)	Average Yield (Kg/Ha.)
Chillies	2022-2023	2,630	10,887.1	4,139.6
	2024	2,633	13,043.67	-
Turmeric	2022-2023	3,145	69,300.10	19,524
	2024	3,124	69,300.1	-
Ginger	2022-2023	2,742	35,530.3	12,958
	2024	2,702	36,323.2	-

Source: *Statistical Handbook of BTC, (2023); Director of Agriculture, BTC (2024)*

Note: The table presents area, production and average yield for 2022-2023, and area and production data for 2024 based on the respective agricultural records of BTC.

The data presented in Table 1.12 show variations in the area and production of chillies, turmeric and ginger in between 2022-2023 and 2024. For Chilli, the cultivated area increased slightly from 2,630 hectares in 2022-2023 to 2,633 hectares in 2024. Production increased from 10,887.1 MT to 13,043.67 MT during the reported periods. For Turmeric, the cultivated area decreased from 3,145 hectares to 3,124 hectares, while the reported production remained



unchanged at 69,300.1 MT. For Ginger, the cultivated area declined from 2,742 hectares to 2,702 hectares, whereas production increased from 35,530.3 MT to 36,323.2 MT.

Overall, the figures indicate that the reported production of chilli and ginger increased between the two periods, while turmeric production remained unchanged despite a slight reduction in cultivated area. These agricultural statistics complement the primary survey findings by providing additional information on the area and production of selected spice crops in BTR

Agricultural Marketing Challenges

Agricultural marketing plays a central role in ensuring that cultivators receive fair and timely returns for their produce. In the Bodoland Territorial Region (BTR), marketing is shaped by a complex interplay of infrastructural, socio-economic, institutional, and market-related factors. While agriculture remains the primary livelihood of the rural population, the marketing system continues to face several constraints that limit farmers' ability to participate effectively in competitive markets. The data presented in Table 1.13 shows the frequency and percentage distribution of major challenges encountered by farmers in marketing their agricultural produce in the Bodoland Territorial Region (BTR). It can be seen that most pressing issues faced by farmers is the problem of low market prices, reported by 99.75% of the respondents, followed by price fluctuations 99.5%. High competition in the market was identified by 98.5% of the respondents, suggesting that farmers often struggle to secure favorable prices due to the oversupply of produce and lack of bargaining power. A significant proportion of farmers 87.5% reported high transportation costs, highlighting the burden of moving produce from farms to markets. Furthermore, 35.75% of the respondents identified general transportation challenges, such as lack of vehicles or poor road connectivity. Post-harvest losses, affecting 73.75% of respondents, are often linked to inadequate infrastructure, such as insufficient storage and delayed transportation. These issues reflect a weak logistics and supply chain framework that adversely impacts the efficiency and profitability of agricultural marketing in the region. Nearly half of the farmers reported facing intermediary related challenges 46.75% and a similar share 46.5% identified high commission rates as a barrier. These findings suggest that middlemen play a dominant role in the marketing system, often controlling price negotiation and influencing the distribution process. Although only a small proportion 2% mentioned unethical practices, the combined data points to systemic inefficiencies and power imbalances in the intermediary-dominated marketing challenges. Limited access to relevant market information is another significant barrier, with 79.75% of farmers indicating that they do not receive adequate or timely updates on prices, demand, or buyer requirements. In addition, 24.25% noted as poor distribution network, which hinders their ability to sell produce effectively or reach broader consumer bases. These limitations reduce farmers' ability to make informed decisions, resulting in reduced income and limited market participation.

Table 1.13: Challenges Faced by the Farmers in Agricultural Marketing

Marketing challenge	Frequency	Percentage
Low market prices	399	99.75
Price fluctuations	398	99.5
High transportation costs	350	87.5
Intermediary-related challenges	187	46.75
High commission rates	186	46.5
Post-harvest losses	295	73.75
Limited market information	319	79.75
Transportation challenges	143	35.75
Lack of transparency in pricing	16	4
Poor distribution network	91	22.75
Lack of access to markets	97	24.25
High competition	394	98.5
Unethical practices	8	2
Delayed payments	4	1

Note: $N = 400$. Percentages are based on the total sample.

Source: Primary Data, (2025)



Preferred Marketing Channels

The data presented in Table 1.14 shows the distribution of farmers' preferences for different distribution channels that offer the best prices for their agricultural produce in the BTR.

Table 1.14: Preferred Distribution Channels Providing the Best Price to Farmers

Preferred channel for obtaining a better price	Frequency	Percentage
Primary markets	331	82.75
Secondary wholesale markets	297	74.25
Village markets	30	7.5
Total Respondents	400	100%

Note: Multiple responses were permitted; therefore, the sum of frequencies and percentages exceeds the total number of respondents. Percentages are calculated based on the total number of respondents (N=400).

Source: *Researcher's Analysis*

Among the 400 respondents, primary markets emerged as the most preferred distribution channel with 82.75% of farmers indicating it as the best option for securing higher prices. The high preference for primary markets suggested that farmers in BTR perceive these as more accessible, cost-effective, and beneficial in terms of price negotiations and direct selling. The second most preferred option was secondary wholesale markets, chosen by 74.25% of the respondents. These markets are likely to attract a wider pool of buyers, enabling farmers to benefit from competitive pricing and better market exposure. Additionally, village markets were selected by a smaller share of respondents, accounting for only 7.5%. This lower preference could be attributed to the limited scale, low price realization, and fewer buyers in local village markets.

Factors Influencing Marketing-Channel Choice

The data presented in Table 1.15 shows the major factors that influence farmers' choice of distribution channels for marketing their agricultural produce in the Bodoland Territorial Region (BTR).

Table 1.15 Factors Influencing Farmers' Choice of Distribution Channels

Factor influencing channel choice	Frequency	Percentage
Distance to market	398	99.5
Ease of access	396	99
Price offered	392	98
Payment reliability	391	97.75
Volume of produce handled	382	95.5
Total Respondents	400	100%

Source: *Researcher's Analysis*

Note: Multiple responses were permitted; therefore, the sum of frequencies and percentages exceeds the total number of respondents. Percentages are calculated based on the total number of respondents (N=400).

The data revealed that farmers do not base their decisions on a single factor, but rather consider a combination of economic, logistical, and institutional criteria when choosing where and how to sell their produce. Among the factors influencing channel choice, distance to market emerged as the most important, mentioned by 99.5% (n = 398) of respondents. This finding highlighted the importance of proximity in determining market choice, especially in rural areas where transportation costs, road conditions, and time taken to reach markets can directly affect profitability. Closely following this, ease of access was reported by 99% (n = 396) of the farmers as a determining factor, emphasizing the role of physical connectivity and transport infrastructure in market participation.

Another dominant consideration was the price offered, acknowledged by 98% (n = 392) of the sample. This underlines the fundamental motivation of farmers to maximize income through channels that offer better price realization. Additionally, reliability of payment, identified by 97.75% (n = 391), emerged as a critical factor, pointing to the need for assurance of timely and full payment, a concern particularly relevant to small and marginal farmers who often face financial vulnerabilities.

The volume of produce handled was also taken into account by a substantial majority 95.5% (n = 382), suggesting that farmers assess whether a market has the capacity to absorb their produce, especially during peak harvesting seasons.



Participation in Post-Production Activities

The data presented in Table 1.16 analyse and show the extent to which farmers in the Bodoland Territorial Region (BTR) are engaged in various agricultural marketing activities beyond cultivation. The findings reveal that while all respondents are actively involved in primary production activities, participation decreases significantly as the marketing value chain progresses.

Table 1.16: Farmers' Engagement in Various Agricultural Activities in BTR

Activity	Frequency	Percentage
Growing/farming/harvesting	400	100
Processing	66	16.5
Packaging	109	27.25
Total Respondents	400	100%

Note: Multiple responses were permitted; therefore, the sum of frequencies and percentages exceeds the total number of respondents. Percentages are calculated based on the total number of respondents (N=400).

Source: *Researcher's Analysis*

The data shows 100% engagement in both growing/farming and harvesting, confirming that all respondents are primarily cultivators who are directly involved in the core production processes. This result reflects the dominance of primary agriculture in the region and affirms the respondent profile as being made up entirely of active farmers. A moderate level of involvement was observed in packaging activities, with 27.25% (n = 109) of farmers reporting participation. This suggested some awareness or access to basic post-harvest handling techniques, possibly for local or regional sale. However, only 16.5% (n = 66) of farmers were involved in processing, indicating that value addition through processing remains limited. This points to a critical gap in the post-production phase that could be transformed into an opportunity with appropriate infrastructure and training. Overall, the results suggest that while farmers in BTR are fully engaged in production, their involvement in value chain activities such as processing, packaging, marketing, and exporting remains limited. This represents a substantial untapped opportunity that can be addressed through strategic capacity-building programs, infrastructure development, and promotion of collective marketing models to ensure better price realization and market expansion for farmers.

Sales Channels and Product Handling

The data presented in Table 1.17 shows the distribution of farmers based on the primary sales channels through which they market their agricultural produce in the Bodoland Territorial Region (BTR). The data reflects the dominant market types where the majority of produce is sold by the farming community.

Table 1.17: Major Markets Where Agricultural Produce is Sold

Sales Channel	Frequency	Percentage
Primary and secondary markets	385	96.25
Paikar at village	161	40.25
Village market	1	0.25
Total Respondents	400	100%

Note: Multiple responses were permitted; therefore, the sum of frequencies and percentages exceeds the total number of respondents. Percentages are calculated based on the total number of respondents (N=400).

*Paikar- Village level middleman, itinerant trader

Source: *Researcher's Analysis*

Out of the 400 respondents, 385 farmers (96.25%) reported selling their produce at marketplaces, which include both primary and secondary markets. This overwhelming preference indicates that organized markets remain the principal avenue for agricultural transactions in the region. These markets likely provide better access to buyers, price competition, and a wider scope for bulk selling. 161 farmers (40.25%) reported selling produce to paikars (village-level middlemen) at the village level. The findings indicate that a substantial share of farmers continue to depend on informal market agents, largely because of convenience, instant cash availability, and inadequate transport facilities.



Although this approach eases logistical challenges, it often diminishes farmers' bargaining strength and restricts price realization. Only 1 respondent (0.25%) reported selling in the village market, indicating minimal dependence on localized informal markets for primary sale. This could be due to lower prices, limited demand, or small buyer networks in village-level markets. Broadly, the results confirm that farmers in BTR are largely integrated into formal market structures, but a considerable portion still sells through intermediaries. This presents both a challenge and an opportunity while market access is evidently available, enhancing farmers' direct participation and bargaining strength could improve income outcomes and reduce dependency on village-level middleman.

Packaging Practices

Packaging plays a crucial role in the post-harvest management and marketing of agricultural produce, serving both functional and economic purposes. It not only facilitates safe handling, storage, and transportation but also influences the shelf life, market value, and consumer appeal of agricultural commodities. In the context of the Bodoland Territorial Region (BTR), where traditional farming practices dominate, the extent and nature of packaging adoption vary significantly across different crops.

This study presents a detailed assessment of product-wise packaging adoption among farmers for a diverse set of crops cultivated in the region, including both food grains and horticultural produce. The crops considered in this analysis include rice, jute, rapeseed and mustard, sesamum, banana, papaya, Assam lemon, potato, cassava, taro tuber, chilly, turmeric, and ginger. These crops were selected based on their prominence in the agricultural profile of BTR and their market relevance.

Understanding the pattern of packaging adoption across these commodities offers critical insights into farmers' preparedness for market-oriented production, access to packaging materials, and awareness of value addition. It also helps identify gaps and opportunities for intervention in post-harvest infrastructure and training to enhance marketing efficiency and price realization.

Table 1.18 Product-Wise Adoption of Packaging Practices Among Farmers in BTR

Crop	Mode of Packaging Material	Frequency	Percentage of Sample
Rice	Jute sack	3	0.75
Jute	Bundling	8	2
Rapeseed and Mustard	Plastic sack	34	8.5
Sesamum	Plastic sack	14	3.5
Assam lemon	Leno mesh bag	54	13.5
Potato	Leno mesh bag	17	4.25
Taro Tuber	Leno mesh bag	22	5.5
Chilli	Leno mesh bag	12	3
Turmeric	Leno mesh bag	5	1.25
Ginger	Leno mesh bag	1	0.25
Total Respondents	400	100%	

Note: Percentages are calculated based on the total number of respondents (N=400). Since farmers could cultivate more than one agricultural crop, product-wise frequencies are not mutually exclusive.

Source: *Researcher's Analysis*

The data presented in Table 1.18 shows the distribution of packaging adoption practices across selected agricultural crops cultivated in the Bodoland Territorial Region (BTR). The data revealed considerable variation in packaging behavior, depending on the type of crop, market orientation, perishability, and farmers' access to packaging materials. Among the listed crops, Assam lemon shows the highest level of packaging adoption, with 13.5% (n = 54) of farmers using leno mesh bags. This indicates a relatively stronger market preparedness and handling requirement for this high-value horticultural product, which is perishable and often sold in fresh markets. Rapeseed and mustard follow, with 8.5% (n = 34) of farmers adopting plastic sacks for packaging. The use of such packaging likely facilitates bulk handling and transport for oilseed markets. Taro tuber and potato were packaged by 5.5% (n = 22) and 4.25% (n = 17) of respondents, respectively both using leno mesh bags. These crops, though bulky, benefit from mesh packaging that



allows aeration and reduces spoilage during storage and transit. Sesamum (3.5%) and chilly (3%) also showed limited but notable packaging adoption, primarily through plastic sacks and mesh bags respectively, suggesting some market-oriented post-harvest handling practices among producers. Other crops like jute and rice exhibited minimal packaging activity. Only 2% ($n = 8$) of farmers packaged jute, mainly using bundling, while a mere 0.75% ($n = 3$) of rice cultivators used jute sacks. The very low packaging rate for rice, despite its widespread cultivation, suggests that most farmers likely sell in bulk to intermediaries or process it through local mills without individual packaging responsibility.

Similarly, turmeric (1.25%) and ginger (0.25%) showed marginal adoption of packaging practices using leno mesh bags, reflecting limited engagement in value addition or market-level presentation among producers of these high-potential spices. The survey conducted by the scholar reported that banana, papaya, and cassava despite being commonly grown in BTR received zero responses for packaging adoption. This suggests that farmers do not engage in any formal packaging for these crops, possibly due to factors such as local consumption or short-distance marketing, lack of knowledge or access to appropriate packaging materials, perishability and fragility making packaging less practical without cold chain support. This absence of packaging highlights a significant gap in post-harvest handling and market readiness for perishable produce. Improving awareness, providing low-cost packaging options, and strengthening cold chain logistics could create opportunities for farmers to better preserve quality and command higher market prices for such products.

Conclusion

This paper examined agricultural marketing challenges and opportunities reported by 400 farmers surveyed in Udalguri and Chirang districts of BTR, Assam. The analysis of cropping patterns in the Bodoland Territorial Region reveals a clear dominance of rice cultivation, both in terms of the percentage of farmers engaged and total area under production. This confirms rice as dominant staple crop of the region. In addition to rice, a significant proportion of respondents cultivate crops such as potato, rapeseed and mustard, and to a lesser extent, turmeric and chilly, indicating a moderate level of crop diversification. However, the data also highlighted limited cultivation of high-value crops such as fruits and spices, including banana, papaya, cassava, and ginger. These crops occupy relatively small areas and are grown by a small fraction of the farming population, suggesting untapped potential for horticultural expansion and agro-diversification. The cultivation of oilseeds, and tuber crops remains modest but consistent, likely serving as supplementary sources of food and income.

This research paper also incorporated available agricultural statistics on area, production and average yield for selected crops from the Directorate of Agriculture, BTC, the Statistical Handbook of BTC, the Directorate of Horticulture and Food Processing, Assam, and Agri Vision 2025. These statistics provided additional information on crop production at the BTR and Assam, depending on the source and availability of the data. Low market prices, price fluctuations and high competition were reported by nearly all respondents, while high transportation costs, limited market information and post-harvest losses were also widespread. In terms of marketing choices, primary and secondary wholesale markets were commonly selected as channels for obtaining better prices. Distance, ease of access, price offered, payment reliability and volume handled were also frequently identified as considerations in channel choice.

The findings further show that all respondents reported production-related activities, while fewer reported processing and packaging. These results highlight the value of considering challenges and opportunities together: farmers' market choices occur within constraints relating to price, access, transport and handling, while post-production practices and market-linkage options may warrant further assessment.

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