

Role Of Agriculture In Rural Development In Northeast India: Prospects And Challenges

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Abstract

The Northeastern region comprising of eight states is strategically important as it shares international boundary with other eastern countries. Rooted in diversity, the region is blessed with untapped natural resources, hills, wetlands, flora and fauna, rich indigenous knowledge and techniques, diverse farming practices that are unique in nature. Agriculture remains a major occupation of the people in the region with over 70% of the population is dependent on it for livelihood (NITI Aayog, 2021). The practice of sustainable indigenous farming practices is dormant in this part of the country where the farmers use age-old techniques of cultivation, irrigation that are scientific in nature. The impact of green revolution, modernisation of agriculture has escaped the northeast region to a larger extent making the agricultural practices ecologically safe and sustainable. Despite the fact that the region is abundant with natural resources, sustainable farming the region is lagging behind on several fronts. To meet the challenges faced by the farmers and making the region self-sufficient, the government is taking active interventions through various innovative schemes and policies that helps the farmers in developing. With the increased attention towards organic farming, climate-resilient agricultural practices that are already practiced in these states the government is striving to unleash the huge potentialities existing in the northeastern region and establish international market linkages.

The paper is a humble attempt to understand the present agricultural scenario in the Northeastern states and the challenges faced. Further, the study aims to understand the prospects of agricultural growth and rural development in the Northeastern states. Secondary source of data was employed for the study. Data are collected from government websites, government reports, various international, national and regional research articles.

Keywords: *Agriculture Scenario, Northeast India, Sustainable practices, Traditional Knowledge, Market Linkages*

Date of Submission: 03-12-2024

Date of Acceptance: 13-12-2024

I. Introduction

The Northeastern states comprising of eight states of Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland, Sikkim, Tripura is strategically important region as it shares international boundary with other eastern countries. The region is most culturally and ethnically diverse encompassing indigenous knowledge practices, numerous tribes, diverse food habits, agricultural practices, languages, etc. Rooted in diversity, the region is blessed with untapped natural resources, hills, wetlands, flora and fauna, rich traditional knowledge and techniques, diverse farming practices that are unique in nature. With this immense potential and abundant resources, the region is emerging into an economic hub promising a good opportunity for rural development and working population in this part of the country.

Agricultural sector plays a crucial role in providing livelihood and also ensures food and nutritional security to people thereby reducing poverty and malnutrition. Agriculture has always been a major occupation of the people in the region with over 70% of the population is dependent on it for livelihood (NITI Aayog, 2021). The agricultural landscape of the region is deeply intertwined with the history, culture and well-being of the diverse communities. Like the diverse communities, the cultivation of crops exhibits a wide range of diversity and resiliency to varying climatic condition that sustain the distinct biodiversity. Along with agriculture, fisheries and horticulture are other contributors to the region's Gross Domestic Product in the country. The impact of Green Revolution and modernisation of agriculture has escaped the northeast region to a larger extent making the agricultural practices ecologically safe and sustainable. The escalating challenges posed by climate change, population growth, rising dominance of mono cultivation underscore the need for prioritising localised and sustainable practices in agriculture (Brahma, 2023). Food and Agricultural Organisation (FAO) defines agricultural sustainability as "sustainable management of resources for agriculture to satisfy the changing human

needs while maintaining or enhancing the quality of the environment and conserving natural resources.” (Jain, Sheekha, & Mandal, 2022). Rethinking in the line of sustainable approaches such as smart agriculture, natural farming is imperative that will help not only in building pathways out of the growing challenges but will also foster in the development of rural communities, empower youth, inspire agri-entrepreneurs to view agricultural sector as an aspirational avenue for employment. The application of the sustainable approaches in Northeast India harmonises with the long-standing tradition of sustainable indigenous farming. The farmers employ age-old techniques of cultivation such as *Jhum* Cultivation, Wet Terrace Cultivation, Fish cum Paddy Cultivation, etc. that are not only sustainable in nature but also scientifically sound and well-suited to the rugged terrain and climatic condition.

With the increased attention towards organic farming, climate-resilient agricultural practices that are already practiced in these states, it provides a compelling opportunity to the farmers in the region to build a thriving agricultural ecosystem for the promotion and commercialisation of the organic products. Embracing the rich indigenous techniques and strategically leveraging the locally available resources the agricultural products can cater to the demand of both domestic and international market, therefore, empowering the local communities for an economically viable, agriculture-based livelihood that is deeply rooted in the region’s unique indigenous identity. Combining the traditional knowledge with modern knowledge can provide a scope not only for economic and rural development but also for environmental sustainability.

The government is taking active interventions through various innovative schemes and policies to help the farmers to tap the huge potentialities existing in the northeastern region and establish international market linkages. Therefore, growth in agricultural sector is crucial for the overall development of the economy and has positive implication in poverty reduction. As a vast majority of the population is dependent on this sector as primary source of income therefore this sector is a major source of food security for the vulnerable section.

Objective

The objectives of the present study are-

- To understand the present agricultural scenario in the Northeastern states and the challenges faced.
- To study the prospects of agricultural growth and rural development in the Northeastern states.

II. Research Methodology

Secondary source of data was employed for the study. Data are collected from government websites, government reports, various international, national and regional research articles.

Agricultural Scenario in Northeast India

The Northeastern states are largely agrarian in nature. The soil condition and the hilly terrain gave rise to two types of dominant agricultural practices namely Settled Cultivation and Slash and Burn locally called as *Jhum* cultivation in the region. The *Jhum* cultivation is practiced mainly in the states of Arunachal Pradesh, Nagaland, Meghalaya and Mizoram (NITI Aayog, 2021). Settled cultivation is mainly practiced in the alluvial soil in the plains of Assam i.e., Brahmaputra and Barak valley, some plains in Tripura, central Imphal valley of Manipur (Seitinthang, 2014). In terms of net sown area, Assam with 34.1% has the highest net grown area followed by Tripura 23.5% while Arunachal Pradesh with 2.1% is the lowest (Deka, 2020). Further in terms of cropping intensity, the overall percentage by the Northeast region is 135 and among that Tripura has the highest share with 185% followed by Manipur at 145% (Deka, 2020).

The main crops that are cultivated in the region are cereals, pulses and oilseeds with rice dominating the crop cultivation. In terms of rice production, Assam comes under the top 10 states in India. Through rice is a dominant crop cultivated by the farmers in these states still the production of rice is below the national average. It is mainly because of varied ecological conditions that are predominant in this part of the country. Despite that, there are numerous indigenous varieties of rice crops that are cultivated in *Jhum* fields as well as in plains that are majorly consumed by the people. Various other delicacies are prepared from rice that are popular among the tribal and non-tribal population in the region. Age old techniques are used by the farmers in these states for the cultivation, storing of seeds of different varieties of rice for cultivation in coming seasons. The practices are versatile in nature as it varies from one state to another and within the state from one tribal group to another. Varieties such as sticky rice, black rice, red rice, ahu rice, *bao* rice etc. are cultivated in different states using traditional techniques in the northeastern states. The prevalence of this practice deduces the fact that seems to be rooted in their traditional and culture understanding that reflects their food sovereignty over their cultivation and land.

State	2020-21*					2019-20					Area
	Area	% to All-India	Production	% to All-India	Yield	Area	% to All-India	Production	% to All-India	Yield	Under Irrigation (%) 2018-19*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
West Bengal	5.58	12.38	16.65	13.62	2984	5.49	12.58	15.88	13.36	2892	51.08
Uttar Pradesh	5.68	12.60	15.66	12.81	2759	5.74	13.14	15.52	13.05	2705	86.3
Punjab	2.79	6.19	12.18	9.96	4366	2.92	6.69	11.78	9.91	4034	99.7
Odisha	4.03	8.95	8.77	7.17	2173	3.94	9.03	8.36	7.03	2122	31.5
Andhra Pradesh	2.32	5.16	7.89	6.45	3395	2.30	5.27	8.66	7.28	3765	96.9
Telangana	2.31	5.14	7.70	6.30	3327	2.01	4.61	7.43	6.25	3694	99.3
Tamil Nadu	2.04	4.52	7.28	5.96	3574	1.91	4.37	7.17	6.03	3760	93.2
Chattisgarh	3.79	8.41	7.16	5.86	1889	3.67	8.40	6.77	5.70	1848	37.0
Bihar	3.02	6.71	6.88	5.63	2276	2.89	6.61	6.30	5.30	2182	72.1
Assam	2.36	5.24	5.26	4.30	2224	2.29	5.25	4.98	4.19	2176	15.9
Others	11.13	24.70	26.84	21.95	2411	10.51	24.08	26.02	21.89	2475	
All India	45.07	100.00	122.27	100.00	2713	43.66	100.00	118.87	100.00	2722	62.7

Source: Directorate of Economics & Statistics, DA&FW
 Note: States have been arranged in descending order of percentage share of production during 2020-21.
 # Fourth Advance Estimates.
 *-Provisional

Source: Agricultural Statistics at a Glance (Government of India, 2021)

The above table represents the top 10 rice production states in India. Though Assam is at the bottom in terms of percentage share but it can be seen that there has been growth in production from 2019-20 to 2020-21.

Apart from rice cultivation, the cultivation of cash crops such as arena nuts, rubber, ginger, turmeric, tea, palm oil, cardamon is also in practice. Tripura is in the forefront of natural rubber cultivation in the region and the second largest producer in the country after Kerala (Government of Tripura, 2023). Apart from rubber cultivation, bamboo and bamboo handicrafts are considered to be the best in the country. Out of 130 bamboo species available in the country, 21 species are found in Tripura (Government of Tripura, 2023). Further reference can be made to Meghalaya where the Lakadong variety of turmeric that contains 6.0-7.5 of curcumin which is the chief constituent of turmeric is grown in the Jaintia hills of Meghalaya (Devi, 2020). Tea is one of the most important plantations that is practiced in the region dates back to 1833 bringing a good revenue in the region. In comparison to other cash crops, tea cultivation is done in large scale on commercial basis. Assam alone contributes to almost half of the total domestic production in tea cultivation (Global South, ActionAid, Solidarity for Sustainable North East, 2019). The cultivation of Palm oil in the region made a new entrance in comparison to rubber, tea plantation. Reference can be made to Mizoram where the cultivation has been done in Public Private Partnership (PPP) model. Recently, the cabinet also approved the National Mission on Edible Oils- Oil Palm (NMEO-OP) and provided a funding of Rs. 5850 crores covering 3.38 lakh hectare in NER and Andaman & Nicobar Island (Ministry of Development of North Eastern Region, 2021-22).

The agro-climatic condition and the soil condition gave rise to another practice of cultivation that is Horticulture. The horticulture cultivation is practiced in all the northeastern states but the quantities vary. Different varieties of temperate and tropical horticultural crops are produced in the region that are loaded with nutrition. With the extension of the market linkages, the horticultural sector of the region is getting a boost in recent years and a slow shift towards horticultural cultivation supporting a large number of farmers.

States	Fruits	Spices
Arunachal Pradesh	Apple, Banana, Guava, Kiwi, Orange, Pear, Pineapple, Walnut	Ginger, Large Cardamom
Assam	Banana, Guava, Jack fruit, Lemon, Litchi, Mandarin Orange, Mango, Papaya, Pineapple, Sapota	Black cumin, Black pepper, Chillies, Coriander, Cumin, Fennel, Fenugreek, Garlic, Ginger, Mint, Onion, Turmeric
Manipur	Banana, Lemon, Orange, Passion fruit, Peach, Pear, Pineapple, Plum	Chillies, Garlic, Ginger, Hatkora, Onion, Turmeric
Meghalaya	Banana, Guava, Lemon, Mandarin Orange, Pear, Pineapple, Plum	Bay leaf, Black pepper, Chillies, Ginger, Turmeric
Mizoram	Banana, Hatkora, Orange, Papaya, Passion fruit, Pineapple	Chillies, Ginger, Turmeric
Nagaland	Banana, Guava, Jack fruit, Lemon, Litchi, Mandarin Orange, Mango, Papaya, Pineapple, Plum, Pomegranate	Black pepper, Cardamom, Chillies, Garlic, Ginger, Turmeric
Sikkim	Banana, Kiwi, Mandarin Orange, Papaya, Passion fruit, Pear	Cherry pepper, Ginger, Large cardamom, Turmeric
Tripura	Banana, Ber, Guava, Jack fruit, Lemon, Litchi, Mango, Musambi, Orange, Papaya, Pineapple, Sapota	Black Pepper, Betel vine, Chillies, Ginger, Onion

Source: Growth Trend and Potential of Horticulture in Northeast India (Das Gupta, 2022)

The above table shows the varieties of fruits and spices that are cultivated in the northeastern region. The states have recorded an increase in their annual growth from 3404.4 in 2009-10 to 4722.31 in 2018-2019 (Das Gupta, 2022).

In spite of ample natural resources, the production in the region is low in comparison to the rest of the country. Several factors including political insurgency, topographical conditions, small landholding of the farmers are interlinked that act as a stumbling block in the progress and development of the region. The region produces only 1.5% of country's food grain production and imports food grains for its domestic consumption (Deka, 2020).

Prospects and upscaling of agriculture in the region

The northeast region is a vast untapped market for economic growth. The government as well as the international bodies are putting much emphasis on rapid development of the region. Initiatives are been taken to promote niche products from these states for export to other states and countries. Being strategically located, the northeastern states are the gateway to South-East Asia and ASEAN countries. The presence of such lucrative market in the neighbour can be a game-changer for the northeastern countries if proper strategies and market linkages are established.

The development of the northeastern region got a major boost up with the adoption of 'Look East Policy' in 1990s. The identification of the region as a zone for trade expansion with the neighbouring countries and growth and economic development of India and Southeast Asian countries helped in development of the region on several fronts. The policy was changed from 'Look East Policy' to 'Act East Policy' in 2014 under the new ministry and is a continuation of the previous policy. Roads and connectivity infrastructure plays a crucial role in the development of trade and economic transformations that remain an important agenda of the Act East Policy. The connection of ASEAN countries with the Northeastern region has got some cultural and traditional history, commonness that is shared across the borders (Barua, 2020). There has been increased attention towards the Northeastern region in the Act East Policy through commerce, connectivity, cultural sharing, infrastructure development. The total earmarked funds for Northeast region have been increased by 110% from Rs 36,108 crore in 2014-15 to Rs 76,040 crore in 2022-23 for the overall development (Ministry of Home Affairs, 2022). Agriculture remaining a dormant part of the economy of the region can harness a good economic growth with the help of the policy. The region produces good quality fruits and is an exporter of fruits within the country and outside such as banana, kiwis, queen pineapples, jackfruits, lemon and others that can be capitalised and accentuated for export purpose. Recently, PM Modi talked about 8 pillars of development for the northeastern region and among that natural farming is one parameter for development. The already existing practice of sustainable farming in the region can be a great opportunity for the region to enhance their productivity and export it. Connectivity through rail, road, airways, digital connectivity is already underway that can further help the farmers in the region to exporting their products.

Sustainable Development Goals (SDGs) and agricultural practices are also closely interlinked as improvement and sustainable development of agriculture is linked with the achieving of other goals. Goal 1 (No Poverty), Goal 2 (Zero Hunger), Good Health and well-being (Goal 3), Gender Equality (Goal 5), Climate Change (Goal 13), Life on Land (Goal 16) are some of the SDGs that are specially linked with agricultural development. Agricultural development can help the poor vulnerable section by lifting them out of poverty and ensuring food security, livelihood opportunities and income. Accessibility to nutritious food is critical to fight against malnutrition, hunger, Maternal mortality and infant mortality rate and achieving the set targets in SDGs. To achieving this, one of the ways is to enhance organic and local farming, diversified farming, reviving traditional food practices that are in consonance with the local environment and loaded with health benefits and further limiting the use of chemical fertilisers. Along with this, sustainable farming practices are also helpful in limiting greenhouse gas emissions as the affect of climate change has a profound impact on agricultural practices. Therefore, sustainable farming practices and promotion of agrobiodiversity are not only beneficial to the farmers but also to restoring the ecosystem.

The Government is also taking innovative steps to help the farmers in the Northeast region to establish value chain and market linkages for their agro products. Some of the schemes are-

- Recently the Krishi UDAN 2.0 initiative was launched by the government (PIB Delhi, 2021). The scheme aimed to facilitate and incentive the agricultural produce by air transportation. The scheme will be implemented in 53 airports across the country and special focus on Northeast and tribal region. In the first phase of the initiative, 7 locations from northeast are selected. Apart from this, another 7 focus routes and products will be exported to rest to India and international market. Among the 7 focus routes, organic products from Sikkim to be marketed to all over India, Mandarin and Oranges from Dibrugarh to be exported to Delhi and Dubai, Pulses, fruits and vegetables from Guwahati to Hong Kong.
- PM DevINE (Prime Minister's Development Initiative for North-East) is a 100% central funding scheme that will create infrastructure, support industries, livelihood creation for youth and women and social development projects (PIB, Delhi, 2023). Promoting Scientific Organic Agriculture in North East Indian is an initiative under the scheme.
- National Mission for Sustainable Agriculture: It focusses on enhancing agriculture that is mostly rainfed, integrated farming, soil health management etc. It caters to the key themes namely efficient water use, livelihood

diversification, nutrient management through sustainable technologies, conservation of natural resources and so on. Under this scheme some other sub themes are developed (Deka, 2020)-

- Rainfed Area Development
- Soil Health Management
- National Rainfed Area Authority
- Mission Organic Value Chain Development in North Eastern Region
- Paramparagat Krishi Vikas Yojana

SWOT Analysis can be done to understand the potentialities and prospects of agricultural upscaling in rural development in the region.

Strength

The favourable climatic environment provides opportunities to the farmers to cultivate various kinds of crops such as millets, paddy, cash crops, *Rabi* and *Kharif* vegetables, varieties of chillis, fruits. As the region is blessed with heavy rainfall, the agricultural practices are mostly rainfed. Various indigenous techniques such as Bamboo Drip Irrigation, Bench Terrace Irrigation and so on are used by the farmers in the region since a long time. Therefore, these techniques intermixed with modern rainwater harvesting techniques can be introduced with the participation of the farmer that can increase crop yields and agricultural productivity. Farming practices used by farmers in the region such as *Zabo* system in Nagaland, Contour Trench farming in Mizoram, Rice-Fish system of cultivation of *Apatani* tribe of Arunachal Pradesh, *Bari* (backyard farming) in Assam etc. are some practices that are sustainable in nature and utilise the local resources. Thus, these techniques of farming that are location specific are unique in nature that can be promoted by the government to optimise production without adversely affecting the nature. Apart from these, the region is blessed with perennial rivers, streams, *Beels* that provides varieties of local fishes. There are more than 3000 varieties of fishes in the region and Assam in 2019 produced 3,27,000 metric tonnes of fishes (Global South, ActionAid, Solidarity for Sustainable North East, 2019). Fishes are widely consumed globally and with such production this can be a good opportunity for the region to meet the demand and supply. Along with this, the consumption of dry fish is widely popular within the region and also outside. Proper mechanisation of drying, storing, packeting can establish a good market value. Further, as horticulture plays a crucial role in the economic growth of northeastern region therefore investing and venturing in this field is a good prospect for rural development. Hi-tech horticulture such as climate resilient production technology, conserving existing germplasm, using the underutilised plant, development of value chain to deal with post-harvest loss are some of techniques that are applied under it (Deka, 2020). Horticulture based farming system is a viable option for farmers cultivating in *Jhum* fields.

Linking modern knowledge with the indigenous farming practices and techniques used by the farmers in the region can augment the expansion of the market. Increased attention is given to natural farming and chemical free farming in the Budget 2023 where the government established National Mission on Natural Farming for promotion on a larger scale (Ministry of Agriculture and Farmers Welfare, 2023). The concept of natural farming and organic farming is already practiced by the farmers in the northeastern region. Further, setting of industries for these allied products such as processing centres, preservation industries etc. can increase employment as well as value addition of the products. Therefore, with the help of proper technology, marketing the production can be increased helping the small landholding farmers in development.

Weakness

Despite such advantages, the farmers in the northeastern states face innumerable challenges. As the farming practices are mostly rainfed therefore excessive dependency on the natural resources stands as a problem. Further the hilly terrain where the *Jhum* cultivations are done, using of machineries are not possible. Thus, the entire process spanning from clearing of land to harvesting of the products are done manually that is time consuming and labour intensive in nature. Additionally, small landholdings, unorganised markets for selling products, unavailability of cold storages are other challenges faced by the farmers in the region. These limitations impede production efficiency ultimately incurring financial loss to the farmers. Thus, as the geographical topography in this part of the country is different from the rest of India, therefore context specific technologies for *Jhum* fields, storage facilities can be adopted by the government depending on the location. Thus, the government along with the NGOs must identify these challenges and implement proper mechanism to deal with it.

Opportunity

Close proximity with international borders is a great opportunity for the farmers in the region to offer markets for local organic products that can generate foreign revenue. The Northeast region has seen a significant rise in the export of agricultural products from USD 2.5 million in 2016-17 to USD 17.2 million in 2021-22 (Goswami, 2022). The NER is the gateway of Southeast Asian countries and shares international boundaries with

five countries that makes the region conducive for international trade. The major destination of export of the products are Bangladesh, Bhutan, Middle East, Europe and the UK (Goswami, 2022).

North Eastern Regional Agricultural Marketing Corporation Limited (NERAMAC) is providing helping hand to the farmers in the region in marketing their finished products. The farmers can sell their products to NERAMAC where they are provided the MSP and establish a supply chain that helps them in getting good price. Further, NERAMAC helped the farmers in 15 GI registration of their agro-horti products (Ministry of Development of North Eastern Region, 2021-22). The GI tag helps in increasing the demand of the products and promote export helping in development of marginal farmers associated with it. Products such as king chillies or indigenous *Naga Jolokias*, assam lemon (*Kaji nemu*), Joha rice, Black rice, Jackfruit, bananas, queen pineapple, kiwi wine are gaining popularity and the exports of these products has significantly increased. Therefore, wholesome efforts should be made for larger production of these agro-horti products maintaining and complying with the international standards and market.

Threat

The location of the northeast region is a boon as well as bane for the entire region. In absence of proper mechanism of the agro-horti products, the neighbouring countries like Bangladesh which is a rapidly developing country can strategically use this opportunity to import fruits, vegetables etc on a cheaper rate and further make value addition by processing it on large scale making a profitable business for their own. Therefore, to meet this threat situation, it is necessary to increase production, establish proper market chains that can be used for early entry in the exporting industry and international linkages.

Apart from these, establishing post-harvest supply chains of highly perishable agro-horti through fruit processing like jams, pickles, jellies, processing of spices such as turmeric, ginger into dry powder, natural dyes etc., proper workshops and distribution of machineries to use the learned techniques in ground level, proper road connectivity, formation of FPOs and registering the farmers under that, formation of marketing cooperatives at the community level, etc. are extremely important to meet the demand and development of the region and also fulfilling the goal of 'Atmanirbhar Bharat'.

III. Conclusion

The promotion and expansion of agriculture is important for the development of the entire northeastern region. Strategies such as Promotion of home gardens from the government to increase household food security and nutritional intake among the women, Terrace cropping, SALT (Sloping Agricultural Land Technology), organised market, engaging rural youth and women in mass level at decision making, value addition of finished products, capacity building trainings, research, blending of traditional and modern technology and so on can be helpful in generating income and employment, poverty reduction, rural development. Along with this, embracing agroecological approaches, supporting local food systems and small-scale farmers will be beneficial in achieving the targets set in SDGs and fostering sustainable agricultural practices and rural development. Recognising the interconnections between the traditional farming practices and addressing the complex challenges of food security, food sovereignty, poverty, social inequities can be a way forward to a sustainable and resilient future. Thus, the strategic location of the region can be utilised to develop an economic corridor between the South-East Asian countries that would bring boost and development to the country's economy and farmers' development as well in the region.

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