



Impact of the current crisis on agriculture growth and sustainability in Manipur

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Abstract

Manipur in India is endowed with rich biodiversity and abundant natural resources. Despite inaccessibility, marginality and heterogeneity, the state has made good progress in agriculture and allied sectors. About 80% of the state population depends on agriculture for livelihood. However, agriculture sector in Manipur is facing the consequences of climate change. Climate change is a reality and an increasing trend in temperature, precipitation and emission of greenhouse gases has been observed in Manipur. The state is also projected to experience more of extreme rainfall and reduction in crop yields. As subsistence level farming is coupled with prevalent shifting cultivation, the small and marginal farmers will be most affected due to climate change. Hence, there is an urgent need for devising climate proof plan and climate ready policy for climate compatible agricultural development in Manipur. Location-specific climate smart technology baskets need to be devised or introduced and should be demonstrated through participatory approach, for ensuring a climate resilient production system, and a climate resilient ecosystem. The present article seeks to examine the problems of agricultural development in Manipur by using selective parameters—distribution of workers, area under cultivation, production of crops, land utilisation, land holdings, etc. The study suggested that the traditional based agriculture of Manipur can be transformed into a modern based agriculture by adopting science-based technology, making efficient pricing system within agriculture, providing economic incentives, prioritizing agriculture, reducing general strikes and bandhs, utilizing manpower optimally, making communication and disseminating knowledge among farmers, providing good infrastructural transport, making a congenial social institutions and financial inclusion. Modernisation of agriculture will accelerate the pace of economic development by enhancing economic growth and reduction of poverty.

Keywords: Agriculture and allied sectors, land holdings, farmers

Introduction

Manipur is nestled in the northeast corner of India. It is bound by Myanmar (Burma) on the east, Nagaland on the north, Assam on the west and Mizoram on the south. The state lies between 92°58'E and 94°45'E long. and 23°50'N and 25°42'N lat. Altitude varies from 40 m (Jiribam) to 3114 m (Mount Iso) amsl. The hill and valley terrains in the state represent a distinct geographical entity. The central valley region is surrounded by hills all around along with isolated hillocks. The north and south analogous ridges represent an alignment of hill ranges. Compared to the western aspects (1800–2500 m amsl), the eastern aspects (800–100 m amsl) of hilly terrains are more elevated. According to the 2011 census, the state's population is 27.21 lakhs with a sex ratio of 987 and literacy rate of 79.85%.

Manipur's economy has historically been characterized as an agrarian one (Singh, 2005) ^[9], with a large emphasis on agriculture in both the valley and the hill regions. The state had a total net sown area of 234.14 thousand hectares in 2016–17, according to the Economic Survey: Manipur, 2018–19; the hill area contributed the remainder 48% and the valley area shared 52%. Regarding the hill area, jhum agriculture makes up a significant share of the net sown area. There is no official data on land revenue because no proper land revenue survey has been conducted in the hill area, despite the valley area having completed land surveys under "the Manipur Land Revenue and Land Reform Act, 1960."

The average holding size in the states has been smaller than the national average, and these smaller size holdings make up more than four-fifths of all holdings. In 2015–16,

Manipur's operational holdings accounted for 59.88 percent of the total area operated in small and marginal holdings, with an average size of 1.14 hectares (Economic Survey: Manipur, 2018–19).

Food grains have historically dominated the agricultural landscape in both the hill and valley regions. Despite declining over time, the area planted to food grains accounted for 74.01 percent of all net sown area in 2016–17. The state has been dealing with the issue of a food grain shortfall since the drought years of 1978 and 1979, even though food grains, especially rice, dominate the agricultural picture. Due to the state's restricted production capacity not being able to keep up with the expanding population's need for more, this deficit has persisted.

When it comes to crop rotation, rice is the most significant crop grown in both hilly and valleyous areas. Nonetheless, it is thought that the hill's climate is better suited for horticulture crops, such as a wide range of fruits and spices. This has long been acknowledged, and efforts date back to the first Five Years.

In the states in the northeastern region, horticulture development has received renewed attention. The integrated horticultural development program was highlighted in the 10th Five Year Plan, and in 2005–06, "the Mission for Integrated Development of Horticulture" was launched.

In the state of Manipur, the agriculture industry in general and the food-grain economy in particular continue to be significant issues. Agrarian structures with a high percentage of small holdings, differences in production circumstances between hill and valley areas, and ways to increase agricultural productivity, yield rate, and revenue are all strongly related to one another.

The impact of the current crisis on agriculture and related industries

Farming activities have been severely disrupted by the prolonged fighting in Manipur, which has had a significant effect on all sectors, including agriculture and related sectors. A large segment of the population that is economically disadvantaged is made up of agricultural laborers, who are facing many difficulties at this difficult time.

Agriculture has all but stopped due to the generalized dread and insecurity in the severely affected areas, especially in places where the two populations used to coexist peacefully. Crop failure and income loss result from farmers' inability to properly care for their livestock and crops.

In addition, supply chain disruptions make it difficult for farmers generally to access supplies like fertilizer, seeds, and other necessities. Farmers' financial security will be impacted by this drop in agricultural productivity, which will fuel more hostilities and tensions.

Seasons play a major role in agriculture and related activities. For instance, the season for growing paddy, other horticulture crops, fisheries, and cattle operations all align with the continuous conflict. Furthermore, the psychological fallout from these disputes has seriously harmed everyone in the state's productivity and efficiency at work.

The current crisis has had a major effect on marketing channels as well, creating a number of difficulties and roadblocks.

Farmers are finding it more difficult to sell their produce as

a result of interruptions in trade and transportation. The Kuki inhabitant area's ability to supply the valley's need for agricultural items such as ginger, turmeric, pineapple, passion fruit, king chilli, and so on has been negatively hampered. Traditionally, these products were sold by valley merchants to customers in the valley or to distant areas.

In a similar vein, there is a negative impact on the production of rice, legumes, fresh vegetables, and other commodities from the valley or other regions that are provided to suit the needs of Kuki inhabitants.

Not only does this interrupt agriculture, but it also affects other essentials like home goods, medical supplies, transportation, etc. The already unstable situation has been made worse by the high cost of necessities due to their limited supply and increased demand. Valley-based farmers' organizations, including LOUSAL, Irabot Foundation, Kangleipak Progressive Farmers Association, and All Manipur Progressive Farmers Association, the current crisis in the valley region has caused losses estimated to be around Rs 388.39 crore in the agriculture and allied sector production (agriculture, horticulture, animal husbandry, fisheries, and sericulture). These figures will become even more alarming when the losses incurred by farming within the areas inhabited by Kuki are summed up and measured.

As of right now, government agencies have not released any precise information about the projected losses brought on by the current crisis.

Agriculture's role in conflict resolution and peace restoration

"You cannot build peace with empty stomachs" - Norman Rockwell The father of the green revolution, Ernest Borlaug In the current violence in Manipur, agriculture and related industries have the power to spark peace and healing. The following are some significant ways that agriculture can aid in the settlement of disputes and the restoration of peace:

- **Public dialogues:** Arrange for inclusive and cooperative dialogues or forums with members of various communities impacted by agricultural issues. Emphasize how agriculture promotes community development and exhort interested parties to work together to tackle shared problems. While effective communication is essential, it's also critical to get rid of any biases that might be preventing cooperation and understanding.
- **Livelihood Restoration:** Farmers can reestablish their source of income and lessen the socioeconomic strain that could fuel violence by starting up their farms again. However, significant funding would be required for these steps to be implemented successfully.
- **Establish Common Objectives and Coordinated Planning:** Promote community involvement to jointly establish and strive toward shared agricultural objectives. By encouraging inclusive planning, we foster unity and promote communication and compromise amongst various groups. It is imperative to resolve issues and priorities that have led to division.
- **Community Infrastructure:** Building cooperative agricultural infrastructure, such storage facilities or irrigation networks, requires the cooperation of several organizations. This all-encompassing procedure fosters connection, the development of trust, and a sense of

group responsibility. Communities will also need to invest a significant amount of money and specialist knowledge in building infrastructure.

- **Training and Workshops:** Hold training sessions and workshops on contemporary and sustainable farming methods. All community members should be able to attend these workshops, which will give people from all backgrounds a chance to collaborate and learn from one another. In addition to teaching practical skills, these meetings could operate as safe spaces for communication and conflict resolution amongst different groups.
- **Economic Integration:** Value chains associated to agriculture, like those involved in food processing, packaging, and marketing, can generate employment opportunities for a number of communities. Interdependencies between various communities foster collaboration to preserve steady livelihoods, which lowers the likelihood of violence.
- **Monitoring and Evaluation:** Constantly assess agricultural programs' efficacy by taking into account how they affect community dynamics. Put feedback mechanisms in place to quickly see and resolve any possible conflicts.
- **Documentation and Communication:** Keep track of the achievements and fruitful results of projects aimed at resolving conflicts through agriculture. Disseminate these narratives using several platforms to motivate neighboring communities and exemplify the capacity of agriculture to foster peace.

The government, non-governmental organizations (NGOs), civil society organizations (CSOs), and community leaders should work together to guarantee the ongoing support of agricultural activities aimed at resolving conflicts. These groups can also be very helpful in raising money and other resources to promote and carry out agricultural initiatives. The persistence of violence limits the efficacy of agriculture and allied activities in promoting peace and resolving conflicts. The ongoing violence jeopardizes public safety, ruins infrastructure, and destabilizes communities while undermining agricultural endeavors. Thus, the implementation of these tactics requires the prioritization of a ceasefire or non-violent atmosphere.

Review of Literature

The dissemination of new agricultural technology is examined in terms of the adoption level of HYV seeds, fertilizer consumption and trend in cropped area, production and productivity of major food-grain and non-food-grain crops, and regional variations in agricultural development in a significant study of mountainous states conducted by Sharma et al. (1997)^[10]. They analyze secondary level data of major Himachal Pradesh, Jammu and Kashmir, Nagaland, Assam, Sikkim, Meghalaya, and Manipur. The study discovered significant differences in the gross irrigated area, fertilizer use, and HYV seed application between the hill states. The variations in infrastructure facilities available in these states can be used to determine disparities in gross irrigated area. With the exception of Manipur, the northern mountainous states outperform the other eastern states in terms of fertilizer usage and wheat

and rice productivity. The study found that there were significant production gaps throughout India's mountainous states overall, with the socioeconomic and topographical distinctions between the northern and eastern mountainous regions serving as the primary causes of these gaps.

In the book's second chapter, Provides an explanation of the northeast's economic foundation. Based on CSO data from 1980–81 to 1995–96, his analysis was conducted. According to the report, the underdeveloped agrarian societies in all of the northeastern states are characterized by a bloated services sector and a very weak industrial sector. The region's economy is still mostly focused on agriculture. In the lowlands, traditional farming is mostly focused on a single crop, while Jhum agriculture is practiced in the hills. He has determined how the states in the area compare to the averages for all of India. The study found that: (i) despite the region's large geographic area, there is little area suitable for cultivation; (ii) the area under agriculture has been less than the national average in terms of the area available; (iii) all states in the region have lower gross irrigated area percentages; (iv) despite having a large proportion of gross area under food grains, all states, with the exception of Arunachal Pradesh, have deficits in food grain production; (v) the level of chemical fertilizer consumption has been significantly lower in the 1990s; and (vi) all states, with the exception of Manipur, have lower food grain yield rates. He also mentioned some of the states' advantages, such as their favorable agroclimatic conditions for growing horticulture and spices and their significant contribution to the production of other spices on a smaller scale, particularly ginger.

Agrarian Structure, Changes and Transition Singh and Sharma (1997)^[10] investigated the current agrarian system and its developing alterations, attempting to establish a connection between the structural changes at the village and state levels in the Manipur valley region. The 2010 Wabagai village field survey and census serve as the study's foundation. The settlement is situated in a fertile area with access to irrigation systems and is a technologically proficient agricultural community. Together with the occupational structure, they looked at the current ownership structure and operational holding pattern. According to the study, modest holdings have accounted for the bulk of ownership holdings because of fixity of land, intergenerational land transfers, and subdivision of land among the progeny. Due to the following factors, the majority of operational holdings are small holdings: (i) a high percentage of households do not own land; (ii) a high percentage of households rely on agriculture as their primary source of income; and (iii) a majority of other occupational households continue to rely on agriculture as a major source of income and livelihood. They contended that neither "consolidation and expansion of operational holdings, the rise of big farms and the commoditization of agriculture" nor "the sign of capitalist land accumulation" had occurred, given the structure of ownership and operational holdings and the low Gini coefficient ratio for both ownership and operational holdings (Singh and Sharma, 1997: 296)^[10]. The study also discovered that young people in the state of Manipur are choosing to cultivate high-value cash crops because of their high net returns and the generally depressing and unfavorable

employment situation, which refers to either government jobs or the informal labor market.

The survey also noted that all sizes of holding households were involved in the village's active land lease market. They have provided several explanations, including (i) the fact that a sizable fraction of households without land relied on agriculture as their primary and secondary source of income, (ii) the shift away from rice monoculture toward cash crop cultivation on paddy land and improved irrigation, and (iii) the growing involvement of younger generations in cash cropping. Due to a variety of factors, including the need to get credit by mortgaging land in order to satisfy investment funding requirements and other financial exigencies, land owners participated in the land lease market on the supply side. With regard to tenancy and tenurial relations, the study discovered a high prevalence of tenancy, wherein pure tenants accounted for over 25% of all operational holdings; tiny holdings made up a significant share of these pure tenant holdings. According to the survey, the composition of tenancies has been shifting recently, with fixed-rent tenancies historically accounting for the largest share of all tenancy types. Even though fixed-rent tenancies are still common, usufructuary tenure systems have become the most common type of tenancy. According to the study, the rise in usufructuary mortgages can be attributed to two factors: (i) the owner's instant access to cash credit for meeting various investment requirements and other financial exigencies without having to give up the land permanently, and (ii) the growing demand for land due to the need for food and employment security. Additionally, the village's ability to raise more than three crops is made possible by the availability of low-interest agricultural credit and an effective irrigation system. The study went on to note that all of these variables led to an expansion of higher value addition to village income on the one hand, and an intensification of agricultural activities and a branching out of agricultural productive activities towards fisheries on the other.

"State, community, and the agrarian transition in Arunachal Pradesh" is an important study. Mishra (2015) [8] examines how the traditional agrarian system-in which community institutions have been governing the collective control over access to resources and means of subsistence in a flexible and diverse way-has changed and how the process of bringing in private capital and hydroelectricity investment, commercializing the agrarian economy, and the elite section of tribal communities' rent-seeking opportunistic motives have undermined it.

The study is based on data from the Agriculture Census as well as household, socioeconomic, and village institutions surveys that were carried out between 1999 and 2007. This paper explains the traditional community institutions of the tribes, how property rights have changed and how tribal communities have come to recognize private property rights over land, how the process of commercialization and the resulting rise of the wage labor market have affected the tribes' traditional cooperative way of life in their traditional agrarian system, and how all of this has occurred over time. He said that the entire process has resulted in the rise of a small number of elite groups and produced an environment where tribal members of the community are being displaced, leading to accumulation. By defending the framework of

ethnocide governance, the chosen elite groups attempt to secure their rent-generating prospects from competitors from both inside and outside the tribal ethnic group as well as against any action taken by the state and private capital. The study found that the process itself has consistently weakened the traditional tribal institutions and recommended the implementation of a comprehensive policy to protect people's collective rights and place restrictions on the concentration of land and other resources in the hands of a few elite.

Agriculture growth and sustainability in Manipur

Singh et al. (2010) [11] outlines the obstacles to Manipur's agricultural progress and provides an explanation of them. They used information from the Manipur Statistical Abstracts and Economic-Survey to refer to the years 1990–1991 and 2006–2007. They noted that food grains, particularly rice, have been the mainstay of the state's agriculture, and that these crops have been expanding in both plain and hilly regions. The term "rice economy" refers to the state's agrarian economy (Singh et al., 2010) [11]. According to the study, during the first half of the 2000s, there was an increase in overall rice production and a subsequent stagnation.

The topic of sustainable agriculture development is discussed by Singh et al. (2010) [11] with regard to Manipur's agricultural sector. According to the report, Manipur's agricultural land holding sizes have been dropping dramatically, to the point that the state's medium- and large-sized holdings have all but vanished. Due to the scarcity of food grains and the disproportionately high number of marginal and small farmers, small farmers have shifted to intensive input farming practices. In permanent locations, the application of high dosage chemical fertilizer inputs resulted in soil degradation. Soil degradation has resulted from jhum farming in hilly places. Singh et al. (2010) [11] proposed a shift in valley agriculture from "technology farming" to "ecology farming," incorporating the use of organic manure, biofertilizers, vermiculture, biopesticides, and bioresources, among other practices (p. 42). Making the agriculture in the valley sustainable was the goal.

Farm size and agricultural productivity

Research indicates that, while not always the case, the inverse association between farm size and productivity is supported by numerous studies. The existence of covert unemployment and imperfections in the agricultural input market account for the inverse link between farm size and production under the traditional form of agriculture cultivation. Other studies in the context of the current agricultural system suggested that the inverse relationship might be attributed to the more productive use of land by small farmers in the form of guaranteed year-round irrigation, a larger percentage of irrigated land, intensive input use, higher cropping intensity, and a larger percentage of cropped area under high value cash. Others noted that the relationship's presence is the result of things that were left out, such as variations in the biological and environmental factors, the quality of the land, and the statistical mistakes in the land size estimates provided by farmers. Studies have, however, also cast doubt on the validity of the inverse association. Assuming that the association exists, other

research suggested that the new agricultural technology system weakens or eliminates it. Large farmers could overcome some of the limitations in the market for agricultural inputs by substituting technology for labor in the form of additional machine labor, fertilizer, and biochemical inputs. Others countered that the inverse link is not the result of tiny farmers' higher productivity or the quality of their land, but rather the economic pressure that impoverished farmers face in their frantic attempts to survive.

From an alternative vantage point, some begin to doubt the ecological viability of the current industrial agriculture system and begin to explore alternatives. Nonetheless, it has remained divided between the ideas of labor-intensive small farming by the new peasantries, which is characterized by independence from the market and sustainability of natural resources, and the ideas of a more energy-efficient mechanized agriculture. From a different angle, there are concerns about small farmers surviving in an increasingly globalized world. It is suggested that attitudes toward small farmers be changed, and that creative land reform be implemented to increase farm size. Additionally, public institutions should be reformed to provide small farmers with better access to technology, marketing, and credit. Promoting diversification also plays a significant role in helping small farmers increase their income, facilitate urban-rural migration, and foster the growth of the rural non-farm sector.

Indian agriculture's performance has been studied and divided into three stages. The first is the early phase of the green revolution. The maturing comes in second. Third is the post-economic reform era, followed by the Green Revolution phase. Significant variations were observed in the performance of Indian states. During the first phase, only the northwest states had the high increase rate in agricultural output. During the developing green revolution, agricultural output growth rate was enhanced in all regions of India. Gujarat was an anomaly in its growth history because the state was experiencing a drought. With the exception of Gujarat and Maharashtra, all of India has decelerated from the post-reform era to the early 2000s. The slowdown in investments in irrigation and other agricultural facilities was linked to the downturn.

Between the 1960s and the first decade of the twenty-first century, the cropping pattern in the agriculture sector saw significant changes both at the regional and All-India levels. It has been discovered to have shifted in favor of commercial crops, and the experiences in India's four regions have varied. In addition to the modifications in the cropping pattern, diversification has also occurred. Still, it has mostly been limited to the country's western and southern regions. The discrepancy has been attributed to differences in the socioeconomic and agroclimatic circumstances between the regions. The National Horticultural Mission, which was launched in 2005–06, has further increased the diversification.

Shifting cultivation

The predominant land use technique in the hilly regions of northeastern India, including Manipur, is still shifting agriculture. Rather than abandoning the state's agricultural system, the population growth has led to a decrease in the

size and an increase in the number of holdings under Jhum cultivation.

Studies on the energy budget under various cycles of the typical Jhum and the various Jhum systems practiced by socio culturally diverse tribes revealed that a ten-year Jhum cycle with mix cropping of high diversity and characterized by a high rate of biomass accumulation in relation to economic output is necessary for the system to be both sustainable and energy efficient.

Research also revealed that government policy initiatives aimed at changing jhum cultivation in the 1970s were a failure. The Jhum system has been found to be a more effective risk management strategy for ensuring food security and preventing the total loss of crops due to disease. The factors that contribute to transformation failure include unstable markets, unappealing prices, and exploitation; additionally, the lack of universal access to information and extension services, as well as the distribution of programs. On the other hand, Jhumias have also been noted to have changed with time and to undergo some transformations of their own. Shifting cultivation has undergone a variety of changes throughout the world, which have been attributed to a number of factors including population growth, government control over resources held in common, institutional and policy changes, physical infrastructure, technology, and essential services.

Research investigating potential substitutes for shifting cultivation also shown that agro-horticulture and agro-forestry are superior choices. The most effective strategy for addressing the issues related to the shorting of the jhum cycle is the prudent and thoughtful application of commercial fertilizer.

Regional differences

In terms of gross irrigated area, fertilizer use, adoption of HYV seed technology, output and productivity of food grain and non-food grain crops, and disparities in infrastructure facilities, there have been significant discrepancies throughout the hilly state of India. The disparities between the mountainous states in the north and east are also influenced by their respective socioeconomic and topographical contexts.

With the exception of Manipur in the 1990s, the northeastern states have been found to have less land under cultivation, a smaller percentage of gross irrigated area, and a lower use of chemical fertilizers when compared to the average for all of India. It is also acknowledged that the area offers ideal agroclimatic conditions for growing spices and horticulture.

Agrarian changes

Significant agrarian changes have been observed in the Manipur valley region, where people who had previously given up farming as their primary occupation—including young and educated members of the peasantry—have begun to resume agricultural activities.

Additionally, it has been noted that private capital investment, the commercialization of the agricultural economy, and the elite segment of the tribal communities' rent-generating opportunistic motives have all contributed to a situation where the traditional tribal institutions and cooperative way of life in the tribal agrarian system have

been steadily undermined in the tribal society of Arunachal Pradesh.

Significance of the study

The body of research on agriculture and the hill economy that is currently available focuses on identifying issues and offering fixes for enhancing the rural economy. The poor performance of the agriculture sector is the reason for the high rate of poverty in the hills of Manipur. The agrarian problem in the hills is caused by a number of issues, including the community land tenure system, a primitive form of agriculture, poor technological penetration, a lack of usage of high-yielding variety seeds, a lack of water, and reliance on rainy or monsoon seasons. It is acknowledged that the primary deterrent to the hill economy is the communal land ownership structure. It is determined by calculating the land's economic efficiency and the institution's sustainability. Ownership of communal land is unsustainable because it promotes jhum production among hillside farmers. Large forests are annually cleared for shifting cultivation, which degrades the environment by disrupting ecosystems, causing soil erosion, siltation in the plain, and deforestation. People's natural capital is diminished by the environmental impact, which has an effect on their standard of living further states that the "uncertain tribal land ownership system, and low agricultural productivity has been one of the factors behind persistent poverty in tribal or hill areas of Manipur." It also claims that "the persistent predominance of shifting cultivation, low proportion of use of HYV or improved varieties of seeds, low degree of mechanization, and low proportion of gross irrigated area in the hills are closely linked with the issue of land ownership related incentive system." Farmers are unable to boost production and profit because the communal institution of property rights is unable to provide members with incentives to make long-term investments. Jhum is an economically inefficient and non-sustainable practice. The hill represents a "primitive economy" because jhum cultivation is founded on an antiquated form of agriculture. High-yielding cultivars, fertilizer, and little to no use of technology are all part of a primitive economy. The productivity of rice production in the hills is significantly lower than the overall Manipur yield of 2432 kg/hectare, at 1942 kg. In Manipur's hills, low agriculture production productivity is identified as the main cause of underdevelopment and the perpetuation of poverty. Only 6.43 percent of the state's total fertilizer use in 2000–01 was used in the hills, whereas 8.24 percent of the state's total land is covered by high yielding variety seeds. Without all of the enriching factors that contribute to farm productivity, production would be quite low. "CPRs on agricultural land would face serious management challenges, such as incentives to squander investment expenses. There wouldn't be any incentives to innovate and invest, which would cause stagnation or even decay. Farmers who lack official documentation of their land records (both private and communal) that can be utilized as loan collateral also have limited access to institutional finance. This limits the amount of goods and services that farmers can buy to enhance their farming methods. Instead of offering shifting cultivators or forest dwellers incentives to be true stewards of the land and its resources, the

institution offers disincentives.

Share of agriculture to total GSDP

With its one-seventh GDP contribution and its employment of fifty percent of the workforce in the early years of this decade, the agriculture sector is crucial to the Indian economy (Dev, 2014) [12]. Agriculture and related industries continue to be essential to the economies of Manipur and other northeastern states.

In this section, the percentage share of the agriculture sector to the total GSDP is described using a three-year moving average. The analysis was conducted within a comparative framework, comparing the contributions of the agriculture sector in both the northeastern states of India and Manipur to the other northeastern states.

Table provides the three-year moving average percentage share of agriculture to total GDP/GSDP (by factor cost at current price). The agriculture sector, which comprises agricultural and livestock production, was responsible for more over 30% of the Gross State Domestic Product (GSDP) in five states: Assam, Manipur, Arunachal Pradesh, Sikkim, and Tripura, in the early 1990s. The average proportion of agriculture to GSDP in these states was higher than the average for all of India, which was 30.24 percent between 1990 and 1992. Among all the northeastern states during that time, Sikkim had the largest share of agriculture production to the gross state product (GSDP), accounting for 38.91 percent. In descending order, it was followed by Arunachal Pradesh, Manipur, Assam, and Tripura. The agricultural sectors of Assam and Tripura accounted for more over one-third of the GSDP. More than thirty percent of the shares are held by Manipur (32.79%) and Arunachal Pradesh (31.0%). Meghalaya and Nagaland had agriculture sectors that shared less than one-fourth of GSDP, while Mizoram's agriculture sector contributed slightly more than one-fourth on average. These states had lower percentages of agriculture than the All-India level average.

Table 1: Percentage share of agriculture to total GSDP, 1990-92 to 2014-16

States/Year	1990-92	1995-97	2000-02	2005-07	2010-12	2014-16
Arunachal Pradesh	31.00	28.40	27.68	16.97	29.08	18.65
Assam	35.16	35.16	28.80	22.65	20.32	14.06
Manipur	32.79	28.61	24.62	18.55	17.38	12.14
Meghalaya	22.94	23.73	20.84	16.79	12.37	9.86
Mizoram	26.23	24.53	18.23	12.98	14.22	8.54
Nagaland	23.13	19.83	29.35	22.89	20.41	20.71
Sikkim	38.91	29.92	20.16	15.39	9.49	7.48
Tripura	35.85	26.73	23.37	18.74	16.54	16.37
All-India Average	30.24	26.32	21.05	16.33	16.67	10.21

The percentage of agriculture's GDP that has been studied has consistently decreased at the average level for all of India. During the same time period, the average percentage share of agriculture in all of the northeastern states decreased. Nevertheless, the decrease is not as significant. With the exception of a few years in the case of the second state, the average percentage share of agriculture to GDSP in Mizoram and Meghalaya has stayed lower than the All-India average for the entire study period. Early in the 1990s, Nagaland's agriculture industry contributed 23.13 percent of

the state's gross state product (GSDP); since then, the percentage has fluctuated between 20 and 25 percent. The example of Sikkim is really intriguing. A fairly notable shift was seen in the agriculture sector's contribution to the GSDP at factor cost. The agricultural sector in the state contributed 38.91 percent in the early 1990s, the most of any northeastern state, but it fell to 7.43 percent in 2010–112 (2010–11 to 2012–13). Meghalaya has likewise seen a precipitous decrease, going from 16.79 in 2005–07 to 9.68 in 2010–12. Droughts may also be connected to the fall in the share of agriculture that occurred in 2010–11 (Kumar, 2013). The agricultural shares of the other two states, Mizoram and Meghalaya, are likewise less than 10 percent of their respective GSDPs.

In the early 1990s, agriculture made up 32.79% of the state of Manipur's gross state product. As time has gone on, it has decreased; from 2014 to 2016, it was 12.14%. During the study period, the state's agriculture contribution to the gross state product (GSDP) remained greater than the corresponding All-India average percentage share. Analysis of the agriculture sector's percentage share of GDP reveals that, for the majority of the northeastern states, the sector continues to contribute more to state income (as a percentage of GSDP) than it does to the average for all of India.

Share of agriculture to total workforce

This section provides a comparative context for explaining the share of the agriculture sector to the overall workforce across the study period. The analysis makes use of data from the Population Censuses conducted in 2001 and 2020.

In India, a sizable share of the workforce has historically been supported by the agriculture industry (Dev, 2014) [12]. The proportion of cultivators and agricultural laborers to all main workers is given in Table. As of 2011, the agriculture sector (both rural and urban combined) employed 50.2% of the country's primary labor force. This indicated that almost half of the primary workers were working in the agricultural sector exclusively. The agriculture sector employed 52.5 percent of major workers in Manipur, 57.1 percent in Mizoram, 55.2 percent in Nagaland, and 57.1 percent in Meghalaya, among other northeastern states. These numbers exceed the corresponding national average. Less than half of the primary workers in each of the remaining four states- Arunachal Pradesh, Assam, Sikkim, and Tripura-are employed in this sector; this percentage is also lower than the All-India average. With 31.3 percent, the lowest percentage of any state-less than one-third of all primary workers-is found in Arunachal Pradesh. Merely 34.8% of the total primary labor force has been contributed by agriculture and related activities combined.

Cultivators made up 26.5% and agricultural laborers, respectively, of all primary workers at the disaggregated level at the All-Indian level average in 2011. In comparison to the 2001 data, it demonstrates that the share of cultivators has dropped while the share of agricultural laborers has climbed. With the exception of Manipur and Meghalaya, the same pattern is seen throughout the northeastern states. The proportion of labor employed in agriculture has declined in these two states. An intriguing finding is that, in 2011 relative to 2001, the share of cultivators has somewhat grown.

Table 2: Percentage of cultivator and agricultural Labourers to total main workers, 2001 and 2011

States/Year	Cultivators		Agricultural Labourers		Total Agriculture	
	2001	2011	2001	2011	2001	2011
Arunachal Pradesh	56.6	51.7	2.6	4.2	59.2	55.9
Assam	37.7	36.1	8.9	10.4	46.6	46.5
Manipur	43.3	47.9	6.3	4.7	49.7	52.6
Meghalaya	50.2	44.6	12.5	12.4	62.8	57.1
Mizoram	56.0	48.8	3.0	6.4	59.0	55.2
Nagaland	65.2	56.7	1.7	3.0	66.9	59.8
Sikkim	47.5	35.9	4.3	5.0	51.8	40.9
Tripura	27.7	22.9	18.5	18.7	46.1	41.6
All-India	33.1	26.5	20.3	23.8	53.4	50.2

At the All-India level, there was a difference of fewer than three percentage points in the percentage share of laborers and cultivators in agriculture in 2011. Tripura's state-level percentages of cultivators (22.9%) and agricultural laborers (18.7%) are somewhat similar. In comparison to the corresponding amount of agricultural labor, the other northeastern states have a comparatively high percentage of cultivators. In the states of Arunachal Pradesh, Assam, Sikkim, Meghalaya, Manipur, Mizoram, and Nagaland, the percentage of cultivators was 27.1 percent, 36.1 percent, 36.3 percent, 44.7 percent, 47.8 percent, 48.8 percent, and 56.7%, respectively. Out of the eight states, Manipur has the third-highest percentage of cultivators. In Manipur, agricultural laborers made up a pitiful 4.7% of the population. The other states with lower percentages are Arunachal Pradesh (4.1%) and Nagaland (4.0%). While Assam and Meghalaya have more than 10 percent of their labor force engaged in agriculture, it is still far less than that of Tripura, which in 2011 had the highest rate of 18.7 of all the northeastern states.

Conclusion

It may be concluded here that the traditional based agriculture of Manipur can be transformed into a modern based agriculture by adopting science-based technology, making efficient pricing system within agriculture, increasing areas under cultivation, providing economic incentives, prioritising agriculture, reducing general strikes and bandhs, utilising manpower optimally, making communication and disseminating knowledge among farmers, increasing the expenditure on agriculture and allied activities, providing good infrastructural transport, making a congenial social institutions and financial inclusion. Modernisation of agriculture will accelerate the pace of economic development by enhancing economic growth and reduction of poverty.

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