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## **Towards Doubling Farm Income: Myths or Reality for the North East Hilly Region**

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### **Abstract**

Farming systems in north-eastern states are complex and characterized with high degree of risk and uncertainty. At household level, particularly in upland conditions, the farming systems are highly diverse with multiple crops (mixed cropping), but at aggregate level the cropping pattern is skewed to paddy only. At the aggregate level, the extent of crop diversification appeared quite low in the north-eastern states. But, at the micro-level, the studies indicate the possibility of a very high level of crop diversification, particularly at highland regions. This dichotomy is prevailing in the north-east agriculture. Improvement of farming system through selection and promotion of suitable crop-mix in compliance with the existing socioeconomic as well as topographical situations would certainly enhance farm income. However, those crops were mostly cultivated at a very small scale and the economies of scales were restricted as those farm lands were primarily managed by the family labour and the scope of farm mechanization was limited. There is a growing need for prioritization of sub-sectors with potential of short-term as well as long-term growth and framing strategies to sustain these growths through appropriate institutional support and public- private partnership (PPP). The process will help reduce economic inequality and provide social stability where the voice of local community will be the major guiding force.

**Key words:** Farm income, crop diversification, income sources, livestock sector, North East region

**JEL Classification:** Q13, Q18, R11

### **Introduction**

North East Hilly Region (NEHR) endowed with 8 per cent of the country's geographical area and account for about 34 per cent of the country's water resources. The area possesses almost 40 per cent of India's hydro power potential. The nature of agricultural practice and the livelihood process in NEHR are based upon their topography and agro-ecology where land belongs to the 'people'. The Socio-Economic Caste Census (SECC), 2011, shows that 24 per cent households in Meghalaya and 60 per cent households in Sikkim possess land and rest of the households is landless. The farmers in NEHR cultivate fruits, vegetables and spices as homestead farming (particularly at upland

cultivation) and the opportunity to enjoy scale economy is highly restricted, unlike in the plain areas. Moreover, due to limited labour migration and limited scope for farm mechanization, the agricultural operations are primarily performed by the available family members; these features also restrict area expansion for large scale cultivation. Despite possessing 34 per cent water resources, the coverage under irrigations and usage of ground water are very low and poor in the NEHR. The low levels of cropping intensity, problems of acidic soil, and large scale soil and water erosions make the total region as disadvantaged zones.

Interestingly, a high level of literacy consequent to the wide access to education, along with high infant mortality and poor health facilities for women and children are some of the paradoxical issues which co-

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**Table 1. Growth rates of population and food grains in different state of NEHR from 1991 to 2015**

(in percentage)

State	Population growth		Food grains growth		Cropping intensity	
	1991-2001	2001-2011	1991-2001	2001-2014	2000-2001	2013-2014
Arunachal Pradesh	2.42	2.33	-0.83	4.92	160	131
Assam	1.75	1.58	1.07	2.85	149	148
Manipur	2.25	1.72	2.79	2.11	149	100
Meghalaya	2.71	2.49	3.59	2.15	120	119
Mizoram	2.57	2.07	4.12	-7.96	100	102
Nagaland	5.11	-0.05	1.88	4.21	105	125
Sikkim	2.88	1.17	-1.81	0.75	133	196
Tripura	1.51	1.39	0.87	2.41	153	137

Source: Basic Statistics for the North Eastern Region 2015

exist in the NEHR. The vast region, being a good source of livelihood and food security for the majority of low income, poor and vulnerable sections of society, we need to study in-depth the growth patterns and the dynamics of the regions over the decades.

### Complexities of North East Hilly Regions

This section attempts to find whether the population growth and agricultural growth in NEHR go hand in hand or not. If both are slow for some deep structural reasons, the growth will inevitably come down. Table 1 presents population growth, food grains growth and cropping intensity in different states of the NEHR for the period 1991 to 2015.

To achieve food security, the growth rate of food grains production should exceed the population growth rate at individual state level. But that did not happen in Arunachal Pradesh, Assam, Nagaland, Sikkim and Tripura during 1991 to 2001. However, during 2001-2014, the growth of food grains exceeded the growth of population in selected states. Over the years, the variability in foodgrains production was minimum in Meghalaya and maximum in Mizoram. Table 1 reveals that during 1990 to 2001, the growth rate of food grains was much more in Mizoram and Meghalaya than in other states of the region. However, during the period 2001-2014, the growth rate of foodgrain production in Mizoram became negative.

Studies have shown that proportion of food-insecure households was highest (64.28%) in the NEHR compared to the other regions of the country and 56.39 per cent food insecure households are not in

food production self-sufficient in food production. It could be inferred that the questions of food security in the regions are associated with the production and distribution of food crops, and various agro-ecological factors and resource constraints (Singh and Datta, 2013). The analysis has provided evidence that at farm household level, food availability did not ensure the food accessibility, whereas the accessibility was directly linked with the available *resources* (land) and *income*. In order to bridge or narrow down the gap, the diffusion of technology and know-how in agriculture is essential. But, in reality even after two to three decades, the situation has not changed much. May be it is a myth that the growth of food grain productivity will ensure food availability in the NEHR states.

The problem of food security for the states in NEHR could be attributed partly to the deficiency in food production and partly to the distribution failures. Besides improving foodgrains production, an efficient public distribution system (PDS) is equally essential to achieve the desired food security of the region (Datta and Mandal, 2011).

The gaps between the share of agricultural GDP in total GDP and the share of employment in agricultural in the total employment are often associated with the process of structural transformation. In the initial phases of development, the agricultural sector might have employed a majority of labour force, but its contribution became less and less to the total GDP. Some of the noted works by Rao (1979), Bhattacharya and Mitra (1997), Kaur and Dhindsa (2000), Gandhi and Gansan (2002), Papola (2005), and

Dev (2008) have demonstrated the features. A situation might emerge where a structural imbalance in the economy becomes prominent, resulting in a low agricultural productivity and a high income inequality and consequently, social instability.

The evidence from the NEHR suggests (see Table 2) that in Arunachal Pradesh, the percentage share of

employment in the non- agricultural sector increased between the period 1993-94 and 2009-2010, and the shift of labour force from 13.6 to 24.3 per cent indicated a shift in labour force of around 11 per cent which is considered to be a desirable path of shifting the labour force from agriculture to non- agricultural sector. In Assam it was to the tune of 8.7 per cent and in Manipur it was 10.4 per cent. In Mizoram, Meghalaya,

**Table 2. Percentage share of employment in agriculture and nonagricultural sectors in the NEHR**

(in percentage)

State	Years	Agriculture	Non-agriculture			Shift of labour force
			Industry	Services	Total	
Arunachal Pradesh	1993-1994	86.4	6.4	7.2	13.6	
	1999-2000	83.4	8.3	8.3	16.6	3.0
	2004-2005	81.5	8.3	9.8	18.1	
	2009-2010	75.3	13.5	10.8	24.3	6.2
Assam	1993-1994	79.2	12.9	7.9	20.8	
	1999-2000	67.7	16.9	15.4	32.3	1.15
	2004-2005	74.3	17.4	8.3	25.7	
	2009-2010	70.5	19.5	10.0	29.5	3.8
Manipur	1993-1994	63.8	21.6	14.6	36.2	
	1999-2000	75.3	14.0	10.7	24.7	-11.5
	2004-2005	69.3	21.0	9.7	30.7	
	2009-2010	53.4	35.7	10.9	46.6	15.9
Meghalaya	1993-1994	86.0	8.2	5.8	14.0	
	1999-2000	86.5	8.3	5.2	13.5	-0.5
	2004-2005	81.8	14.1	4.1	18.2	
	2009-2010	70.7	21.5	7.4	29.3	11.1
Mizoram	1993-1994	88.9	3.5	7.2	11.1	
	1999-2000	85.5	5.4	9.1	14.5	3.4
	2004-2005	87.4	5.5	6.7	12.6	
	2009-2010	80.6	10.9	8.5	19.4	6.8
Nagaland	1993-1994	74.9	8.0	17.1	25.1	
	1999-2000	79.7	6.3	14.0	20.3	- 4.8
	2004-2005	79.3	10.4	10.3	20.7	
	2009-2010	74.1	14.3	11.6	25.9	5.2
Sikkim	1993-1994	58.6	18.8	22.6	41.4	
	1999-2000	60.8	18.8	20.4	39.2	-2.2
	2004-2005	60.5	25.1	14.4	39.5	
	2009-2010	53.9	28.6	17.5	46.1	6.6
Tripura	1993-1994	47.6	26.9	25.5	52.4	
	1999-2000	45.7	26.1	28.2	54.3	1.9
	2004-2005	43.2	31.1	25.7	56.8	
	2009-2010	30.6	59.6	9.8	69.4	12.6
All India	1993-1994	63.84	15.01	21.15	36.16	
	1999-2000	60.27	16.22	23.5	39.73	3.57
	2004-2005	56.50	18.7	24.79	43.50	
	2009-2010	51.76	21.93	26.30	48.23	4.74

Source: Computed by the author from various rounds of NSS reports and various issues of NASO.

Nagaland, Tripura and Sikkim, the shifts of the labour forces during the period 1993 -94 to 2009-10 were 8.3 per cent 15.3, per cent 0.8, per cent, 17 per cent and 4.7 per cent, respectively. It may be pointed out that in some of the disadvantaged states of the NEHR, such as Meghalaya and Tripura; the percentage shifts of labour forces were much higher than at all-India level during the reference period. But, if we consider the accelerated growth of States Domestic Product (SDP) of the NEHR, we find that it was not accompanied by growth in employment.

### Researchable Issues

Within the paradigm of agriculture-led development for the disadvantaged areas of NEHR, the study has addressed the following questions:

- Whether there is any scope to formulate specific policy parameters that can correct the structural imbalances in the NEHR?
- What kinds of investor-driven economic models are suitable for the NEHR's stage of development? And whether those are suitable for doubling farmers' income, despite different inequalities in levels of development?
- How far the policy changes can meet people's food needs and livelihood requirements? Whether the policy changes could be based on a system of democratic decision-making, following the local governance structures? Where is the scope to bring in the voice of local people, local communities, vulnerable groups, and women of the locality, in particular?

### Results and Discussion

To address the above issues, we need to analyse several factors including the nature of allocation of funds and the contributions of different sectors toward GDP.

#### Allocation of Funds to Different Sectors

To analyse the pattern of investment in different sectors in the North East region, we need to note that the service sector has received much importance, where allocation of funds is around 63 per cent to 85 per cent of the total funds within the period 2004-05 to 2013-14 (see Table 3). The importance of service sector was

prominent during 2004 to 2009 and then declined, but the sector holds a major share. It has also been observed that the percentage share of funds released to other sectors, especially to the industrial sector, became erratic and from 2012 onwards, the agricultural sector got a momentum with two digital percentile changes.

Apart from substantial investments on infrastructure, a special package of incentives aimed at industrial development was announced in 1997. This was followed by the more comprehensive North East Industrial and Investment Promotion Policy in 2007. Despite special assistance schemes of the government, the states in this region have largely remained laggard in comparison to other states of the country. They have registered an annual average growth rate of 6.9 per cent since 2005-06, which was below the national average of almost 8 per cent. In 2004-05, the region's contribution to the overall national GDP was about 3 per cent. It was mere 2.66 per cent in 2011-12. Further, there was a wide disparity in the rate of growth, as recorded across the eight states. Some states such as Meghalaya, Mizoram and Tripura could not often keep pace with the overall GDP growth of the country. However, the states, such as Manipur, Assam and Nagaland have witnessed a moderate growth. This differential in economic performance has been reflected in the per capita income of respective states.

**Table 3. Changing pattern of resource allocation over the years in NEHR, 2004-2014**

(in per cent)			
Year	Agriculture & allied sector	Industrial sector	Services sector
2004-05	3.4	13.4	83.2
2005-06	3.1	11.3	85.6
2006-07	3.7	11.3	85.0
2007-08	1.8	18.3	80.0
2008-09	0.9	19.0	80.1
2009-10	3.4	27.2	69.5
2010-11	6.7	19.8	73.5
2011-12	9.6	20.3	70.2
2012-13	10.6	18.6	70.8
2013-14	11.8	25.0	63.3

*Source:* Computed by the author based on Basic Statistics for the North Eastern Regions 2015

**Table 4. Farm income from different sources across North East Region, 2002-03**

State	Contribution of different sources of income (%)				Total income (₹/month/ household)
	Wages & salaries	Crop income	Livestock farming income	Off- farm business income	
Arunachal Pradesh	28.78	27.00	30.90	13.32	4758
Assam	25.03	48.54	3.98	22.45	3940
Manipur	44.65	38.25	2.58	14.52	3365
Meghalaya	14.79	61.32	3.86	20.03	6015
Mizoram	25.76	50.95	23.03	0.27	6198
Nagaland	28.77	39.08	3.22	28.93	4543
Tripura	21.76	35.44	28.50	14.30	3226
Sikkim	28.78	27.00	30.90	13.32	4758

*Source:* The author estimates based on NSSO unit level data (visit-1 & visit-2) on Situation Assessment Survey of Farmers, 2002-03.

The income from agricultural sector as available from the *National Accounts Statistics* has explained how gloomy the situation in NEHR states was. However, the NSSO has studied the different sources of income of farmers based on its nationwide surveys on *Situation Assessment of Farmers* 2003 and 2013. But those two surveys adopted different definitions of farmers/ farm households. So a strict comparison is not possible. But to get an idea about how income changes over the decade, an attempt was made to identify the potential areas for enhancing farm income in the NEHR states.

A perusal of Tables 4 and 5 reveals that monthly percentage contribution of wages and salaries to total income increased in 2013 vis-a-vis 2003 in many of the NEHR states, but in states such as Arunachal Pradesh, Assam and Manipur, the shares declined. It can be noted that the contributions of those states to other sources like crop and livestock increased. In the case of Meghalaya, the monthly contribution of livestock income increased, whereas for Assam, the crop income in 2013 increased even though cropping intensity remained almost unchanged or declined (see Table 1). It clearly indicates that both productivity

**Table 5. Farm income from different sources across North East Region, 2013**

State	Contribution of different sources of income (%)				Total Income (₹/month/ household)
	Wages & salaries	Crop income	Livestock farming income	Off- farm business income	
Arunachal Pradesh	16.09	63.46	12.62	7.82	12902
Assam	17.19	59.62	13.92	9.27	8325
Manipur	31.17	32.02	15.50	21.31	12238
Meghalaya	23.68	46.46	6.31	23.54	15944
Mizoram	35.56	49.10	13.05	2.29	10278
Nagaland	49.10	33.15	15.59	2.16	10984
Tripura	29.04	49.16	6.35	15.46	7524
Sikkim	32.88	19.85	18.59	28.68	9469

*Source:* The author estimates based on NSSO unit level data on Situation Assessment Survey of agricultural Households, 2012-13.

levels as well as the total farm income have jointly affected these two states substantially. Except Arunachal Pradesh and Tripura, most of the NEHR states' contribution to total income from crop declined in 2013 as compared to in 2003, whereas the contributions from the livestock farming increased in most of the states, except Sikkim, Mizoram and Tripura.

### **Crop Diversification and Risks**

North-eastern states are predominated by the production of cereal crops and nearly 70 per cent of the agricultural land is covered by foodgrains only. Almost 80 per cent of the cultivated land is under the rice cultivation only. The crop diversification was observed low in Tripura and Manipur, relatively better in Arunachal Pradesh and Meghalaya, but the agricultural performance in these states was found to be poor. Only a moderate crop diversification was observed in Nagaland, Mizoram and Assam (Datta and Mandal, 2011).

The micro-level studies on the farming systems in NEHR indicate the possibility of high level of crop diversification, particularly at the highland regions. This dichotomy prevails in the North-East agriculture. A variety of crop mix consisting of several horticultural crops such as fruits, vegetables and specie. But, those crops were cultivated on a small scale only and the economies of scale were restricted as those farm lands were primarily managed by the family labour and the scope of farm mechanization was limited.

Again, a high level of crop diversification could lead to lowering of crop income, as high risks are involved with such agricultural activities along with the management problems. The supply of quality seeds and other essential inputs and delivery of output at remunerative prices are being other pivotal factors that could lead to restrictions of the crop diversifications particularly at the geographically difficult terrains of the region. Therefore, a careful planning is required to lift the farm income through improvement of present farming systems practised by the farmers.

With increasing incomes and expanding urbanization, there is an increasing demand for branded agricultural products. The successful branding is possible when the brand delivers consistently a clearly defined, appealing product that sets it uniqueness among the competitors (Singh, 2016). Branding the

farm products could increase farmers' income in the NEHR.

### **Employment in Agriculture**

Agricultural and allied activities are the major employment provider in the NEH accounting for 80-90 per cent of the total workforce across its states (see Table 6). But, the contributions of agricultural output are quite low, ranging between 27 and 38 per cent only, which is almost half of the share of labour force, engaged in this sector, implying a low level of labour productivity. The agricultural output can be increased through promotion of possible horizontal and vertical integrations of the agriculture and allied activities. The women also need to be given special attention to increase their efficiency, which in turn will lead to improvement in the overall labour productivity and will increase the share of agricultural output in the net state domestic product (NSDP). This trade-off occurs most often in the female headed households where resource constraints are greatest, thus as a consequence of their restricted range of choices, women tend to retain traditional modes of economic activities (Todaro and Smith, 2004).

In order to assess the number of households engaged in different economic activities as their major source of income, the NSSO 70<sup>th</sup> Round data sets were used and it is clear that more than 90 per cent households in NEHR were engaged in cultivation ( see Table 6). Unlike other parts of the country, where around 56 per cent of rural households are engaged in agriculture, in the NEHR it is an exception as there is no substantial industrial or manufacturing sector. It was also reflected in Table 3 that allocation of funds to agriculture has increased over the years but the size has remained relatively low. The allocation of funds in service sector has clearly shown that all the states have huge potential to serve as the service sector.

### **Value Addition**

Several modified farming systems have potential to improve the farm income substantially. Keeping in view the existing farming condition, a Farming System Research (FSR) approach, was advocated by the ICAR for the region. The aim was to protect the land and water from degradation being caused by the adverse effect of *jhum*/slash and burn/shifting cultivation without proper conservation measures in the hilly

**Table 6. Number of agricultural households engaged in different economic activities in NEHR during 2012-13**

State	Households (percentage) engaged in					
	Cultivation	Livestock	Other agricultural activities	Non-agricultural enterprise	Wages/salaried employment	Others
Arunachal Pradesh	99	46.1	29.0	5.5	23.7	7.7
Assam	95.8	78.5	41.6	19.2	26.7	11.5
Manipur	96.9	36.8	17.8	26.5	77.6	11.8
Meghalaya	99.2	71.5	51.4	17.0	89.3	5.7
Mizoram	98.8	54.1	23.4	4.3	68.0	13.6
Nagaland	100	35.0	24.4	16.9	52.3	12.5
Sikkim	99.9	87.9	11.6	17.6	79.6	20.8
Tripura	98.8	26.7	11.7	7.9	88.5	25.9
All India	92.6	71.9	9.4	14.7	49.5	19.1

*Source:* The Situation Assessment Survey of Agricultural Households in NSS 70th Round; Key Indicators of Situation of Agricultural Households in India, NSS 70th Round, (January – December 2013)

slopes of the region. Some of the programmes being implemented include: soil conservation and land reclamation for permanent agriculture in hills; setting *jhumias* on wet terraced land for growing horticultural crops; engaging shifting cultivators as wage earners in the cash crop plantation and setting them on forest land in small pockets with basic amenities like schools, sales depot, etc. The proposition is to shift hill farmers to sustainable farming practices comprising a bundle of terraced agriculture and horticulture crops. However, so far such research interventions have failed to create any significant result (Chawii, 2001).

Value addition to agricultural produce is another option to boost farmers' income. Value-added agriculture also refers to the products with increased economic value through a particular production process, e.g., organic product, or regionally branded product that increase consumers appeal and willingness to pay a premium over a similar but undifferentiated product. However, it is important to identify the value addition activities that will support the necessary investment in research, processing and marketing.

### Livestock Sector

The livestock sector draws much attention in the NEHR as evident from Table 6. The percentage of households engaged in the livestock sector in almost all NEHR states is very high and some states such as

Sikkim, Meghalaya and Assam, crossed the all India level. Similarly, percentage of wages and salaried employed households (see Table 6) in some states of NEHR are almost double. In this context the role of agro-business could also play a vital role in training the youths so that they can harness opportunities in the livestock sector by supplying dairy products, such as ice cream, curds, and sweets, instead of selling liquid milk and meat. Livestock sector provides multiple benefits like rise in rural non-farm income and employment via linkages effects. Our past study has shown also that opening up of new avenues of income from different other sources (Datta and Mandal, 2011).

### New Trade Routes

Even though the NEHR is endowed with a huge potential to increase its export volume, the region lacks far behind in this regard. A number of studies have been conducted on the export potential of NE region and its role in facilitating trade with Asian countries (Verghese, 2004; Mukherjee, 2016; Bhattacharjee, 2016; Gupta, 2017). All these studies have stressed on a greater role of the NEHR in India's export to the ASEAN region. Given the ethnic diversity of the North Eastern region, ecological richness and cultural proximity with all the ASEAN partners, the region can play a vital role in the initiative, and increase farmers' income.



## Policy Implications

Farming systems in North-Eastern states are complex and face high degree of risk and uncertainty. At the household level, particularly in upland conditions, the farming systems are highly diverse with multiple crops (mixed cropping) but at aggregate level, the cropping pattern is skewed to paddy only. The region is highly suitable for growing a number of high-value horticultural crops which have great demand in domestic as well as of international markets. Improvement of farming system through selection and promotion of suitable crop mix in compliance with the existing socioeconomic as well as topographical situations would certainly enhance farm income. There is a growing need for prioritization of sub-sectors with potential of short-term as well as long-term growth prospects and framing strategies to sustain these growths through appropriate institutional support and public-private partnership (PPP). The process will reduce economic inequality and enhance social stability where voice of local community will be a guiding force.

Crop diversification through extensive micro-level studies particularly at the upland situations, is essential. The organic farming and biodiversity have a close relationship, particularly with the hill farming system of the region. Management of agro biodiversity through organic agriculture may be a viable option for the region to achieve the twin objectives of biodiversity conservation and promotion or doubling of different (organic) agricultural production.

Establishment of market intelligence system for timely dissemination of information regarding day-to-day prices at various market points is desirable for the North-East region. Private investment may be encouraged and incentives may be provided to establish model agricultural, horticultural, ornamental fisheries and organic food production, including meat at the district level through cluster approach to boost the households' level farm income.

There is a need to develop location based state-specific opportunities like formation of women bamboo association and their skill development along with bank financing to meet their financial needs. Similarly, paddy fields can be converted into mushroom field (Sept to March), low lying paddy field can be used as fish farm along with value added fish products, pineapple and citrus villages can be linked with tourist resorts,

backyard poultry can be converted as organic hubs of meat and eggs. Organic tea gardens could be another option for enhancing income; the cultivation of medicinal plants could also be adopted by the community in the region. The sum-up, we may say that new varieties of agro-products, and the active involvement of local people, might place the NEHR on an altogether new platform from where the myths of doubling of income of the people of the NEHR will turn to be a reality.

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