ARTICLES

EMPLOYMENT IN NORTH-EAST INDIA: AN INVESTIGATION

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ABSTRACT

This paper attempts to study the process of employment growth in north-eastern region of India. The region is primarily grounded in rural economy, which is most isolated and underdeveloped region of India. The negative growth rate of regular employment indicates poor quality of job availability in the region. The structural transformation has been observed in the secondary sector which is led by the construction industry of the region. The binary logistic regression in our analysis observes a U-shape relationship between education and employment in the region. The ST's and Other's participation in the region is lower than that of SC and OBC community which defies the national pattern of higher workforce participation of the ST community. The Christians and other community are more likely to be in the workforce in the region. Finally, individuals from all other states, except Assam, have higher probability of being in the workforce in the region.

Keywords: North-East India, Workforce, Elasticity, Industry, Determinants

1. Introduction

Employment is a key parameter of development, and the study of employment is an important aspect to understand the growth phenomenon of an economy. Therefore, the analysis of the nature of employment is a widely discussed agenda among the researchers and policymakers. However, the labour market is witnessing a change in its nature of work from 'standard employment' to 'casual employment' in recent times (ILO, 2015). While the developed nations are experiencing a transformation of their workforce from

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standard conventional employment to casual or home-based employment, the developing nations are witnessing a shift of employment from formal to informal sector (ibid, 2015). The Indian labour market can be looked through two scenarios – the pre-liberalisation period and the post-liberalisation period. During the first planning period of the independent India, it was expected that the economic growth would automatically improve the employment situation, but the situation of unemployment worsened in the nation (Papola, 2003). Therefore, the second five-year plan emphasised the production and capital goods industry to improve the status of unemployment and poverty (Hari, 2000). During the period 1983/84 to 1993/94, the employment growth rate surpassed the population growth rate in the nation (Himanshu, 2011). The next period, 1993/94 to 2004/05, observed a positive growth rate of employment but at a sluggish rate than the period 1983/84 to 1993/94 (Unni & Raveendran, 2007). However, with the increasing employment growth rate the nation started witnessing income inequalities in the society (Bhalla, 2008). The Indian labour force increases from 381 million to 485 million during the post-liberalisation period (1993/94–2011/12), i.e. every year almost 5.5 million new people entered the labour market (Mehrotra, Parida & Singh, 2014). A decline in self-employment and a rise in casual employment were observed during the 1990s in the rural labour market. The urban labour market observed a decline in regular employment and a rise in self and casual employment during the same period. Self-employment recorded a rapid increase during the year 2004/05 (Unni & Raveendran, 2007; Himanshu, 2011; Mehrotra, Parida & Singh, 2014). In the latest 2011/12 National Sample Survey (NSS), almost 50 per cent of workers were found in the self-employed category, and only 20 per cent of them were engaged in regular employment, while the rest were in casual employment (Shaw, 2013). The structural transformation of the Indian economy, that is, the transformation of the workers from farm sector to non-farm sector has been found significantly high during the post-liberalisation period (Binswanger-Mkhize, 2013; Hensman, 2001; Sundaram, 2008; Chakravarty & Mitra, 2009; Himanshu, 2011). According to Papola & Sahu (2012), structural transformation gets processed rapidly in an open economy than in a closed economy. The international experience suggested the shift of the workers from the agricultural sector to non-farm sector, specifically due to the "push" of technological change in the agricultural sector and the "pull" of higher wage rate by non-farm sector (Fei & Ranis, 1975). During the post-liberalisation period, the construction sector generated most of the employment opportunities in the non-farm sector, but mostly for the male workers (Bhalla, 2008). The analysis of Lahoti and Swaminathan (2013) observed the increase in casual jobs during 2004/05 to 2009/10 period irrespective of the gender. During the period 2004/05 to 2009/10, the construction sector accounted for almost all the employment opportunities created in the rural non-farm sector (Thomas, 2012). Moreover, the rise in employment in the non-farm sector is characterised by poor income and

working conditions in the organised sector, and casual and contractual employment in the unorganised sector (Papola & Sahu, 2012). The increase in employment in the tertiary sector was marginal during the post-liberalisation period. When all other tertiary sectors observed some degree of rise in employment, the community, social and personal services sector lagged behind (Sundaram, 2008).

While the national level study of employment and unemployment gets considerable attention among the researchers, there is a very limited number of analysis found at regional or state level (Chadha & Sahu, 2002; Rangarajan, Kaul, & Seema, 2007; Abraham, 2009; Binswanger-Mkhize, 2013; Sundaram, 2009). Moreover, among the regional levels, large states get more attention than the smaller ones and a study on the North-Eastern region (NER) is difficult to find.

The NER consists of the eight states namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura.[1] According to a world bank report, "India's NER could be seen as a victim of a low-level equilibrium where poverty and lack of development (as compared with the remainder of India and other South-east Asian nations) lead to civil conflict, lack of belief in political leadership and government, and, therefore, to a politically unstable situation. This, in turn, leads to further barriers to poverty reduction, accelerated development, and growth".[2]

The NER is highly diverse and vibrant with natural resources, despite the fact that the region is underdeveloped as compared to other states of the nation. The overall development is the only solution to bring out the region from its underdeveloped stage (Sharma, 2012). The infrastructural deficiency, insurgency, and market failure are to be blamed for the underdevelopment of the region. In this state of underdevelopment, creation of employment opportunity is a grave concern for the region. Therefore, this study attempts to critically assess the current scenario of employment, the relation between economic growth and employment, and the factors that determine the workforce participation rate (WPR) in the region.

In our analysis, first, we will provide the trend, growth rate and status of employment in the NER and second, we will observe the factors that potentially determine the workforce participation rate in the region. The study is based on the available labour market data sets on Indian labour market, that is, the 50th round (1993/94), 61st round (2004/05) and 68th round (2011/12) of the National Sample Survey.

2. The Trend of Workforce Participation in North-Eastern Region

Table 1 presents the state-wise WPR in the NER and respective growth rates during the post-liberalisation period. In the region, Meghalaya State has the highest WPR (66.3 per cent) in the year 2011/12, and Nagaland State has the lowest (48.8 per cent) WPR. In the NER, the WPR is

52.1 per cent while it is 56.6 per cent at the national level. Overall, the workforce participation rate has been declining at both national level and in the NER. A state level analysis of growth rate represents that only the Tripura and Mizoram States have the positive growth rate in the NER, while the State of Arunachal Pradesh has the highest negative growth rate of employment in the region. The decline in WPR is rapid at the national level than in the NER.

Table 1: Workforce Participation Rate and Respective Growth Rate in the North-Eastern Region

State	Workforce Participation Rate (15-64)			Employment Growth Rate		
	1993-94	2004-05	2011-12	1994-2004	2004-2012	1994-2012
Assam	54.2	59.8	49.9	0.0097	-0.0226	-0.0046
Manipur	58.3	59.2	55.4	0.0016	-0.0084	-0.0028
Meghalaya	79.7	79.2	66.3	-0.0006	-0.0223	-0.0103
Nagaland	49.7	70.6	48.8	0.0351	-0.0461	-0.0010
Tripura	51.5	45.7	54.6	-0.0119	0.0222	0.0032
Arunachal Pradesh	69.1	69.6	55.5	0.0006	-0.0282	-0.0122
Mizoram	63.7	67.8	64.4	0.0062	-0.0066	0.0005
North-East	55.7	60.1	52.1	0.0076	-0.0178	-0.0037
INDIA	65.3	64.5	56.6	-0.0013	-0.0162	-0.0080

Source: 50th, 61st & 68th Rounds of National Sample Survey

In the next decade of liberalisation, the states of NER such as Assam, Manipur, Nagaland, Arunachal Pradesh and Mizoram observed an increase in their WPR but lost the momentum during the period 2004/05 to 2011/12. During the first decade after liberalisation (1993/94 to 2004/05), Tripura had a negative employment growth rate but during 2004/05 to 2011/12, it witnessed a positive growth rate of employment in the region.

Spatial distribution of workforce by gender and place of residence is presented in Table 2. A declining trend in WPR is observed for both the genders in both sectors at the national level. In the NER, male WPR observes a slight increase in the urban areas while it is negative in the rural areas.

In the NER, the female workforce participation rate (FWPR) declined almost 0.05 per cent annually during 2004/05 to 2011/12 in the rural areas. During the same period, the rural FWPR at the national level also declined at a rate of 0.04 per cent. The almost negligent rate of growth of employment indicates the stagnant nature of the labour market in the NER. The restrictive nature of female mobility and the social stigma against females' working outside the home are some of the reasons for low female WPR in both NER and at the national level.

Table 2: WPR and Growth rate by Sex and Place of Residence in the North-Eastern Region

State	Year	Rural		Urban		Growth Rate (CAGR)	Rural		Urban	
		M	F	M	F		M	F	M	F
North-East	1993-94	82.3	28.3	72.6	18.2	1994-2004	0.0035	0.0241	0.0031	0.0216
	2004-05	85.3	36.0	74.9	22.6	2004-2012	-0.0067	-0.0494	-0.0028	-.0260
	2011-12	80.8	24.3	73.2	18.4	1994-2012	-0.0010	-0.0086	0.0004	0.0005
India	1993-94	88.3	50.83	78.9	23.2	1994-2004	-0.0019	0.0000	0.0002	0.0034
	2004-05	86.9	50.82	79.0	23.8	2004-2012	-0.0073	-0.0401	-0.0029	-0.0187
	2011-12	82.0	36.9	77.2	20.5	1994-2012	-0.0041	-0.0178	-0.0012	-0.0068

Note: M = Male, F = Female
Source: 50th, 61st & 68th Rounds of National Sample Survey

The NSS of India classifies work into three categories, namely self-employed,[3] casual employment and regular or wage labourer to define the nature and quality of job available in the labour market. In the recent decades, the Indian economy indicated a jobless growth, and hence, it is expected that there will be an increase in the workers in either self-employed or casual employed category. Table 3 presents the change in the composition of workers and the nature of their work during the post-liberalisation period. In the NER, Arunachal Pradesh has the highest percentage of self-employed and Tripura has the lowest as per the 68th round of NSS. The creation of regular employment in the NER is very miserable – except Mizoram and Nagaland, none of the states have more than 20 per cent of their workers in the regular employment.

Tripura has only 13.3 per cent of its total workers in regular employment, while the State of Nagaland with 25.2 per cent has the highest percentage of wage employed, followed by Mizoram State with 22.5 per cent out of their total workforce. With more than 46 percentage share in casual employment out of their total employment, the State of Tripura shows a critical condition of its labour market as well as employment creation in the region. Nagaland State has the lowest casual employment with only 2 per cent share in its total employment in the region. In comparison to the national average, the NER has the higher percentage of workers in the self-employed category,

Table 3: State-wise Variation in the Nature of Employment in NER

State	Year	Rural			Urban			Total		
		S	R	C	S	R	C	S	R	C
Assam	1993-94	57.1	14.9	28.1	45.6	43.4	11.0	56.1	17.4	26.5
	2004-05	70.6	9.4	20.0	42.1	45.2	12.7	68.2	12.4	19.4
	2011-12	69.5	11.9	18.7	53.4	36.8	9.8	67.8	14.5	17.7
Manipur	1993-94	81.6	12.0	6.3	61.9	34.2	4.0	77.0	17.3	5.8
	2004-05	84.7	9.8	5.5	64.6	30.8	4.6	80.7	14.0	5.3
	2011-12	64.6	12.6	22.8	72.2	22.8	5.0	66.3	14.9	18.7
Meghalaya	1993-94	79.5	6.3	14.2	33.8	55.6	10.7	75.3	10.8	13.9
	2004-05	80.7	5.1	14.2	19.4	71.2	9.4	74.3	12.0	13.7
	2011-12	70.4	10.5	19.0	35.0	50.8	14.2	64.8	16.9	18.3
Nagaland	1993-94	79.3	18.5	2.3	39.2	54.3	6.5	71.0	25.9	3.1
	2004-05	87.7	11.6	0.7	61.7	34.2	4.1	81.3	17.2	1.5
	2011-12	84.9	13.6	1.5	42.4	54.6	3.0	72.9	25.2	2.0
Tripura	1993-94	52.4	12.3	35.2	36.7	48.0	15.4	50.4	16.8	32.7
	2004-05	52.2	10.6	37.2	40.8	45.9	13.3	50.7	15.3	34.1
	2011-12	40.4	8.4	51.3	38.5	45.4	16.1	40.1	13.3	46.6
Arunachal Pradesh	1993-94	89.2	6.2	4.6	21.8	67.3	10.9	80.9	13.7	5.4
	2004-05	82.9	11.1	6.0	41.3	50.1	8.6	79.2	14.6	6.2
	2011-12	81.7	12.1	6.1	35.5	53.3	11.2	74.4	18.7	7.0
Mizoram	1993-94	90.7	7.7	1.6	60.4	33.1	6.5	81.8	15.2	3.1
	2004-05	91.4	6.9	1.7	58.4	34.7	7.0	80.5	16.1	3.4
	2011-12	82.2	9.5	8.3	51.9	40.4	7.8	69.4	22.5	8.1
North-East	1993-94	60.7	13.7	25.6	46.6	43.3	10.1	59.2	17.0	23.9
	2004-05	71.9	9.2	18.9	45.1	44.3	10.6	69.0	13.0	18.0
	2011-12	67.4	11.5	21.1	50.8	39.5	9.8	65.2	15.3	19.6
India	1993-94	56.8	6.8	36.4	41.5	40.3	18.3	53.6	13.8	32.6
	2004-05	59.2	7.4	33.5	44.6	40.3	15.1	55.9	14.8	29.3
	2011-12	55.0	9.1	35.9	41.4	44.0	14.6	51.4	18.5	30.2

Note: S = Self-Employed, R = Regular/Wage Employed, C = Casual Employed

Source: 50th, 61st & 68th Rounds of National Sample Survey

but the percentage of regular and casual employment is lower than the national average. The agrarian nature of the economy promotes self-employment in the region. During the post-liberalisation period, the self-employed workers increased in the region, but wage employment and casual employment declined massively. The lower percentage of wage workers in the region is a growing concern for the economy because it raises questions

on the availability of quality work in the region. Sahu (2012) observed that inadequate wage rate and unavailability of the paid employment in the region forces workers to move towards self-employment or casual employment. The evidence of lower wage rate in casual employment in the NER is presented in Table 4.

Table 4: State-wise Variation in Daily Wage Rate in the North-Eastern Region by Regular and Casual Jobs

State	Nature of Employment	Daily Wage Rate		
		Male	**Female**	**Total**
Assam	Regular	423	250	384
	Casual	144	99	137
Manipur	Regular	620	574	613
	Casual	200	173	194
Meghalaya	Regular	487	397	455
	Casual	199	131	176
Nagaland	Regular	576	436	558
	Casual	171	NA	171
Tripura	Regular	359	253	329
	Casual	168	123	164
Arunachal Pradesh	Regular	679	534	655
	Casual	228	156	211
Mizoram	Regular	806	611	766
	Casual	249	280	252
North-East	Regular	469	308	433
	Casual	154	110	147
India	Regular	413	304	391
	Casual	153	103	142

Source: 68th round of National Sample Survey (author's calculation)

Any industrial development of the NER mostly ignores rural areas, and hence, most of the employment opportunities in rural areas lie either in the agricultural sector or at small and cottage industries. Moreover, in the North-Eastern region, the physical capital development is not enough to create gainful employment in the area. Therefore, the hill economy of the North-Eastern region is highly dependent on the forest covers for subsistence. The access and utilisation of the forest resources determine the livelihood and employment creation process. Therefore, the livelihood of the region is critically dependent on the "environmental entitlement" (Mishra, 2007).

3. Structural Transformations of Employment in the North-Eastern Region

The structural transformation of an economy can be looked through different macroeconomic observations like output, employment, capital investment and consumption. In the analysis presented at Table 5, an attempt has been made to highlight the structural transformation through changing sectoral employment in the NER. The transformation of employment was observed from the primary sector to tertiary sector in the region. During the post-liberalisation period (1993/94 to 2011/12), the share of primary sector employment declined from 69 per cent to 52.2 per cent in the region. The tertiary sector employment increased to 30.6 per cent from 24.4 per cent during the same period, but the employment generation was rapid in the secondary sector in the region. In the NER, Tripura is the only state where primary sector has a lower share of employment than the secondary sector. The states of Arunachal Pradesh, Nagaland, Mizoram, Meghalaya and Assam have more than 50 per cent workers in the primary sector. In the secondary sector, Tripura has the highest (47.3 per cent) and Arunachal Pradesh has the lowest percentage (7 per cent) of workers in the NER. Except for Arunachal Pradesh and Tripura, all the other states of the region have more than 30 per cent of workers in the tertiary sector.

**Table 5: Structural Transformation of Employment in the NER**

States	1993-94			2004-05			2011-12		
	P	S	T	P	S	T	P	S	T
Arunachal Pradesh	80.3	5.6	14.1	75.2	6.1	18.7	67.6	7.0	25.4
Nagaland	61.3	5.0	33.7	62.5	6.1	31.4	59.3	7.9	32.7
Manipur	55.9	15.7	28.4	60.5	14.0	25.5	38.1	31.2	30.7
Mizoram	74.7	4.1	21.2	70.2	4.7	25.0	55.0	10.7	34.3
Tripura	43.8	8.2	48.0	37.4	16.4	46.2	26.4	47.3	26.3
Meghalaya	78.2	4.0	17.8	73.1	8.3	18.6	56.0	12.0	32.1
Assam	71.9	6.1	22.0	68.2	7.1	24.7	55.6	13.3	31.1
North-East	69.0	6.6	24.4	65.9	8.2	26.0	52.2	17.2	30.6
India	64.1	14.9	21.0	57.7	18.5	23.9	48.1	24.6	27.3

Note: P = Primary Sector, S = Secondary Sector, and T = Tertiary Sector
Source: 50th, 61st & 68th rounds of National Sample Survey (author's calculation)

Figure 1 shows the structural change in employment by the growth rate of employment across primary, secondary and tertiary sectors in the NER. The growth rate of the respective sectors reveals that all the states of the region have witnessed a negative growth rate of employment in the primary sector. With almost 10 per cent of annual growth rate, the Tripura State has the highest employment growth rate in secondary sector followed by

Mizoram and Meghalaya. Arunachal Pradesh has the lowest secondary sector employment growth rate in the region. In the tertiary sector, Tripura and Nagaland have negative growth rates while all other states have positive growth rates of employment in the region. Meghalaya has the highest growth rate of tertiary sector employment in the NER.

Figure 1: Growth Rate of Employment in the Primary, Secondary and Tertiary Sector
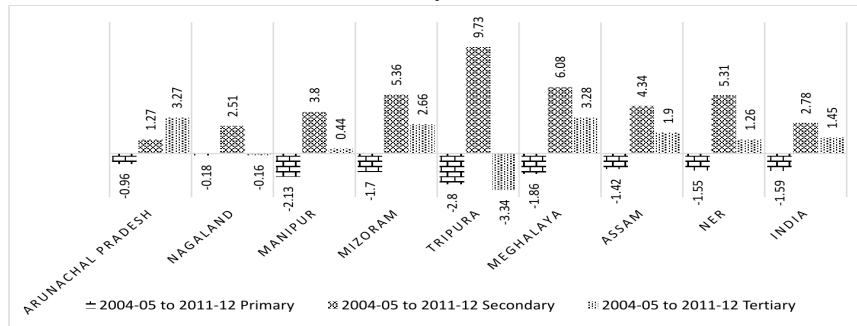
Source: 50th, 61st & 68th Rounds of National Sample Survey

The primary, secondary and tertiary sector can further be classified into nine broad industrial divisions. This classification of industries provides the real picture of employment creation within the primary, secondary and tertiary sectors. Table 6 displays the industrial classification of workers in the NER.

Table 6: Industrial Classification of Workers in the North-Eastern Region

States	Year	1	2	3	4	5	6	7	8	9
Arunachal Pradesh	1993-94	80.91	0.12	2.04	0.58	2.69	1.84	2.04	0.35	9.45
	2004-05	75.65	0.00	0.64	0.83	4.39	4.11	0.78	0.69	12.89
	2011-12	68.07	0.14	1.00	0.29	5.49	7.06	1.16	0.14	16.65
Nagaland	1993-94	61.85	0.87	0.96	0.25	3.18	7.96	1.16	0.35	23.42
	2004-05	63.49	0.00	3.15	0.62	2.12	13.31	2.28	0.41	14.63
	2011-12	60.54	0.12	2.05	1.89	3.57	9.59	2.69	0.00	19.56
Manipur	1993-94	56.18	0.04	13.09	0.46	1.73	6.84	1.90	1.25	18.51
	2004-05	60.99	0.41	9.85	0.01	3.36	9.34	2.45	0.39	13.18
	2011-12	39.69	0.30	10.15	0.25	19.62	11.7	3.73	0.31	14.25
Mizoram	1993-94	74.99	0.07	1.71	0.18	2.19	5.73	0.49	0.13	14.51
	2004-05	70.54	0.03	2.31	0.03	2.37	8.03	1.22	0.5	14.96
	2011-12	55.31	0.26	1.81	0.42	8.08	12.28	2.41	0.10	19.33
Tripura	1993-94	44.06	0.09	6.15	0.22	1.99	12.26	3.78	0.84	30.62
	2004-05	38.19	0.00	5.45	0.06	10.73	13.02	3.80	0.33	28.42
	2011-12	27.12	0.34	6.42	0.04	40.11	10.85	3.11	0.53	11.49

(contd.)

(Table 6 contd.)

States	Year	1	2	3	4	5	6	7	8	9
Megha-laya	1993-94	78.43	0.42	1.1	0.29	2.17	5.77	1.12	0.16	10.53
	2004-05	73.47	1.15	3.93	0.49	2.48	6.49	1.46	0.19	10.34
	2011-12	56.55	2.26	2.44	0.15	6.98	13.67	3.49	0.55	13.92
Assam	1993-94	71.85	0.7	4.12	0.44	0.85	9.05	2.01	0.39	10.59
	2004-05	68.49	0.34	3.67	0.35	2.74	10.54	3.29	0.36	10.22
	2011-12	56.05	0.57	5.9	0.06	6.71	15.01	3.76	0.49	11.45
North-East	1993-94	69.01	0.58	4.46	0.4	1.17	8.84	2.03	0.45	13.05
	2004-05	66.22	0.36	4.06	0.33	3.39	10.19	2.99	0.36	12.1
	2011-12	52.7	0.63	5.56	0.15	10.71	13.82	3.53	0.45	12.45
India	1993-94	64.88	0.72	10.42	0.37	3.14	7.4	2.77	0.93	9.36
	2004-05	58.5	0.57	11.73	0.27	5.57	10.24	3.83	1.55	7.74
	2011-12	48.9	0.54	12.6	0.52	10.6	10.96	4.83	1.10	9.95

Notes: 1.Agriculture, Hunting, Forestry and Fishing 2. Mining and Quarrying 3. Manufacturing 4. Electricity, Gas, and Water (Utility Sector) 5. Construction 6. Wholesale, Retail Trade and Restaurants 7. Transport, Storage and Communication 8. Financing, Insurance, Real Estate and Business 9. Community, Social and Other Services

Source: 50th, 61st and 68th rounds of National Sample Survey (author's calculation)

We observe a decline in the share of agricultural workers from 1993/94 and a shift of workers towards the construction sector within the secondary sector; and wholesale, retail trade and business within the tertiary sector. The share of construction workers increased from 1.17 per cent to 10.71 per cent during the post-liberalisation period. The percentage of wholesale, retail trade and business sector increased to 13.82 per cent in 2011/12 from 8.84 per cent in 1993/94. From Table 6 it is clear that the community, social, personal and other services always remain an employment creation industry in the NER. However, in the last decade, it seemed to have become almost stagnant and observed a slight decline from the year 1993/94.

4. The Elasticity of Employment in the NER

The analysis of employment may not represent the real picture of the employment creation in a nation, if it is not complemented by the growth of an economy. Therefore, the employment intensity or the elasticity of employment is one of the critical measures to identify the effect of economic growth on the creation of employment. The elasticity of employment is a measure of the 1 percentage point change in the employment in response to 1 percentage point change in the economic growth. The elasticity of employment indicates the ability of employment creation by an economy with its development process. In our analysis, the compound growth rate

approach (CAGR) is used to indicate the 'arc elasticity' of employment in the north-eastern region. The formula for calculating arc elasticity is

$$e = \frac{\Delta L / L}{\Delta Y / Y}$$

Where L denotes employment and Y denotes GDP of the economy. The numerator indicates the percentage change in the employment and the denominator refers to the percentage change in economic growth, which is nothing but the economic growth rate of the state. The researchers prefer the CAGR or the 'arc elasticity' method due to unavailability of the panel information of employment growth rate in India.

The economic growth of a state is expected to increase the employment opportunity but not necessarily experienced forever. Therefore, to understand whether the north-eastern region is successful in creating employment opportunity with its development process or not, we have calculated the elasticity of employment of the region.

In the process of economic growth, some sectors might get benefited, while some might lag behind. As mentioned above, the elasticity of employment explains a unit change of employment with respect to the change in the output growth rate of the respective sector(s). However, the employment elasticity calculation is not very simple because of various underlying factors influencing employment creation, e.g., prevailing wage rate, technological enhancement, infrastructural development, demand and supply of the labour force etc.

The motive behind the calculation of employment elasticity in the NER is to track the employment growth rate of the industrial sector and current and future perspectives of the employment creation rate in the respective sectors. Table 7 presents the elasticity of employment in the north-eastern region.

In the North-Eastern region, only utility industry has the negative elasticity of employment that represents the negative employment growth and positive output growth scenario of the industry. The construction sector has the highest elasticity of employment in the region, followed by mining & quarrying and wholesale, retail trade & business industry. All other industries except the utility industry have positive growth rate, but the figures are not very significant. The elasticity of employment is so low in the primary sector that it can be considered a stagnant sector during the post-liberalisation period. During the period 2004/05 to 2011/12, employment growth rate of the region was registered as negative in both utility sector and primary sector of the economy. In the region, the secondary sector has the highest employment elasticity followed by the tertiary sector. The state-level analysis of the elasticity of employment reveals that except Tripura all other states of the region have positive elasticity of employment in the tertiary sector (Also see Tables A1, A2 & A3 in Annexure).

Table 7: The Elasticity of Employment in the North-Eastern Region

Industrial Category and Year	1993-2004		2004-2012		1993-2012		Elasticity of Employment		
	E	O	E	O	E	O	1993-2004	2004-2012	1993-2012
Primary Sector	2.30	1.80	-2.58	3.03	0.15	2.35	1.30	-0.85	0.06
Mining and quarrying	-2.00	2.27	7.27	0.18	2.11	1.34	-0.89	40.39	1.57
Manufacturing	1.80	6.32	4.20	2.66	2.88	4.69	0.29	1.58	0.61
Utilities (Electricity, Gas, and Water)	0.80	8.02	-9.58	0.86	-3.80	4.84	0.10	-11.14	-0.79
Construction	13.40	8.95	14.65	5.70	13.95	7.50	1.50	2.57	1.86
Secondary Sector	1.40	6.14	3.88	3.26	2.50	4.86	0.23	1.19	0.51
Wholesale, Trade and Restaurants	4.20	3.53	4.08	4.45	4.14	3.94	1.18	0.92	1.05
Transport, Storage and Communication	6.60	4.76	2.35	11.15	4.73	7.60	1.39	0.21	0.62
Financing, Insurance, Real Estate and Businesses	0.50	7.11	3.06	7.75	1.65	7.39	0.07	0.39	0.22
Community, Social and Personal Services	2.00	7.11	0.63	6.40	1.39	6.79	0.28	0.10	0.20
Tertiary Sector	3.26	5.80	2.34	6.87	2.85	6.27	0.56	0.34	0.45
Non-Farm sector	3.62	5.92	4.48	5.68	4.00	5.81	0.61	0.79	0.69

Note: E = Employment, O = output

Source: 50th, 61st and 68th rounds of National Sample Survey, (author's calculation) and National Accounts Statistics, CSO, various years

In the secondary sector except for the State of Arunachal Pradesh, all other states of the region have a positive elasticity of employment. However, the estimation could not be done for the State of Manipur due to unavailability of data. In the primary sector, the states of Meghalaya and Tripura have a negative elasticity of employment during the post-liberalisation period.

Some states of the region such as Arunachal Pradesh, Manipur, Mizoram, and Assam have negative elasticity of employment in the primary sector during the period 2004/05 to 2011/2012.

5. The WPR by Socio-Economic Characteristics in the NER (2011-12)

Preceding the discussion of trend, pattern and elasticity of employment in the region, in this section we have discussed the WPR through various socio-economic lenses before proceeding to a statistical analysis of the paper. The analysis of this section is based only on the 68th round of NSSO. The state-specific analysis is not included in this section. Figure 2 presents the workforce participation rate of the region by social category through sectoral and gender dimensions. India is a country where social group (caste) system has a determining impact on wealth distribution in the society. The people belonging to SC and ST category find themselves on the lowest ladder of the society in both social status and income distribution (Zacharias & Vakulabharanam, 2011). The poverty profile estimated by the World Bank reveals that, in India 28 per cent of the nation's population belongs to the SC and ST category, but 43 per cent of their population lives below poverty line.[4]

**Figure 2: WPR by Social Category in the NER**
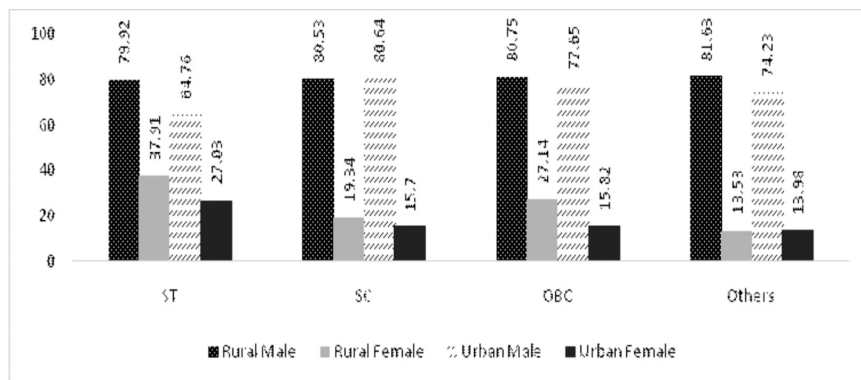
Source: 68th Rounds of National Sample Survey

In the north-eastern region, the male workforce participation does not vary significantly across castes, but there is a significant gap in the FWPR by their social status. In the region, the ST community has the highest female WPR, followed by OBC and SC category; the Other (General) category has the lowest female WPR. As mentioned above, the social stigma against females' working outside the home restricts female participation in the workforce. The social groups like ST and SC experience less restriction on their mobility towards labour market than the Other community of the society. The weak economic status of these two communities leaves them with no option other than participating in the labour market (Srivastava & Srivastava, 2010).

Figure 3 provides a religious classification of the workforce participation rate in the region by gender and sectoral dimension. Just like the social groups, male workforce participation rate is not bounded by the religious customs and norms, but the female workforce participation rate differs among different religious groups. The different social customs and restrictions practised across religious groups are responsible for lower female WPR.

**Figure 3: WPR by Religious Category in the NER**
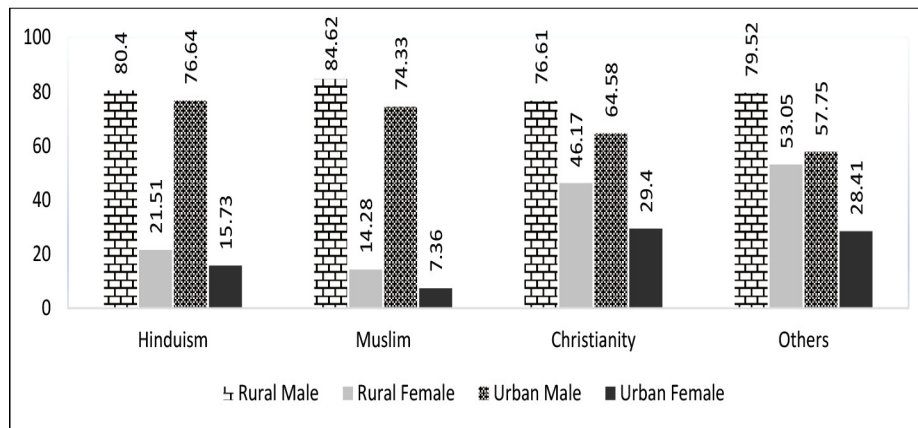
Source: 68th Rounds of National Sample Survey

In the case of NER, it is important to notice that the Other (residual community) religious community has the highest female WPR and Muslim community has the lowest female WPR in the region. The Christian community has also significantly high female WPR in the region in comparison to the Hindu and Muslim community in both rural and urban areas. The higher level of fertility rate among the Muslim females is one among many reasons that cause lower female workforce participation in the labour market (Bhalla & Kaur, 2011). Srivastava & Srivastava (2010) point towards the existence of more social restrictions on the Muslim females in his analysis. Moreover, previous studies observed that females from the Muslim community are less interested in entering the workforce as compared to their counterparts in Other community (Das, 2013). It is pertinent to mention here that Arunachal Pradesh has 16 per cent of Buddhist population, Mizoram has 7 per cent of Buddhist population, and Tripura has 1.11 per cent of Buddhist population in the region, while other states have less than 1 per cent of Buddhist population. The category 'other' constitutes Buddhist population in the working age group.

Better educational attainment is a gateway to better employment opportunity in the labour market (Becker, 1975). However, the educational attainment is also a reason behind low workforce participation of the individuals in the younger age groups. Figure 4 presents the gender and

sectoral dimension of the workforce participation rate by educational attainment in the north-eastern region. The workforce participation rate is assumed to have a U-shape relationship with the educational attainment. This indicates a higher workforce participation rate among the illiterates and those having at least graduation level of education.

Figure 4: Workforce Participation Rate by Educational Attainment in the NER
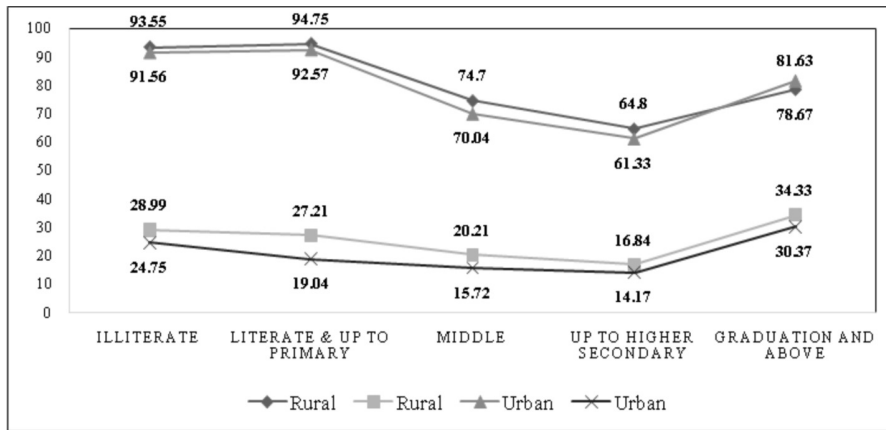
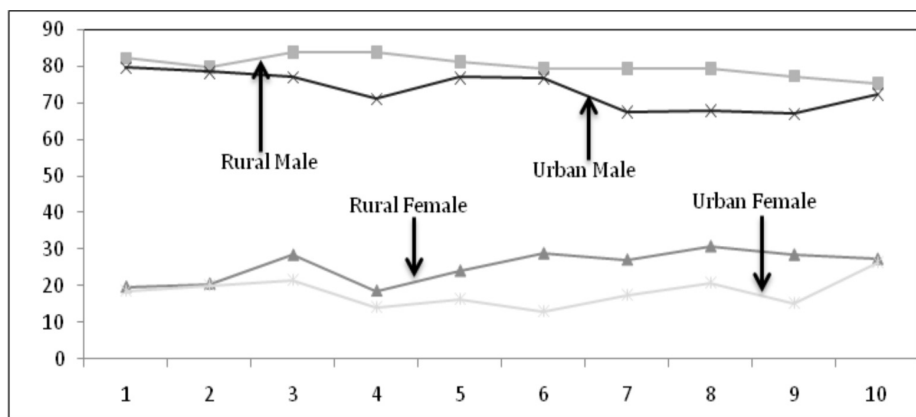Source: 68th Round of National Sample Survey

In the NER, a similar U-pattern relationship between education and employment is observed. Despite having better education level, female participation in the workforce is lower than male participation which indicates the restriction put on females' working outside the home in the region. Moreover, previous literature argues that gender discrimination at the household level is the reason behind the low female literacy rate and finally low workforce participation rate. Early marriage of females, keeping girls inside the home to care for their kin etc., are some other reasons behind the low level of female literacy rate in India (Rao & Gupta, 2006). Also, the rising household income may be a reason for the withdrawal of females from the labour force. The highest female WPR by graduation and above level of education indicates the breaking of attitudes towards work with higher level of education (Klasen & Pieters, 2015).

The National Sample Survey (NSS) uses only monthly per capita expenditure (MPCE) as an economic variable to analyse the workforce participation of the population. Figure 5 presents the gender and sectoral dimension of workforce participation rate by monthly per capita expenditure in the North-Eastern region. Like education and workforce participation relation, female workforce participation and income also have a U-shape relationship.

Figure 5 indicates that the female workforce participation rate is comparatively higher at the very low-income strata and at the very high-

income strata. In between these two income levels, the workforce participation rate falls as income increases (Srivastava & Srivastava, 2010). In the North-Eastern region, a smooth U-shape relationship between female WPR and MPCE is not observed. In the urban areas, the pattern of workforce participation is most inconsistent across the MPCE deciles. In the rural areas, the WPR is higher than the urban areas across all the income strata, but the pattern of inconsistency prevails in the case of female workforce participation in the region.

Figure 5: Workforce Participation Rate by MPCE deciles in the NER

Source: 68th Rounds of National Sample Survey

6. Descriptive Statistics

We used data from the employment and unemployment survey which is a part of the 68th round (2011-2012) of the survey conducted by the NSSO. To consider the working age population in our study, we restricted our data set to the age group 15-64 years. The NER is the only area of observation in our analysis. Hence, our sample comprises data on 41,141 individuals from the region.

In the study of the workforce participation, the decision of an individual would only have two possibilities, either to participate in the workforce or not, hence, WPR is a yes or no decision. Therefore, the response variable or the regressand can take only two values, 1, if the individual is in the workforce and 0 if he or she is not. In other words, we need a regressand that is binary or dichotomous variable. Therefore, we used the binary logistic regression to analyse the determinants of WFP in the NER. The definition of all variables used in our regression analysis is presented in Annexure A-4.

Table 8 represents the mean and standard deviation for all the variables used in our analysis. Some of the key features of the samples are: 85 per cent of the sample is from the rural areas, and almost 48 per

cent of individuals are females. In the NER, 57 per cent of the sample belongs to Hindu religion, almost 24 per cent belongs to Muslim religion, and 15 per cent belongs to Christian religion. Among the sample, only 3 per cent has graduation and above level of education and almost 19 per

Table 8: Descriptive Statistics

Variables	Mean	SD	Min	Max
Age	34.127	12.847	15	64
Household Size	5.232	2.014	1	18
Illiterates	0.100	0.300	0	1
Literate & Up to Primary	0.216	0.412	0	1
Middle	0.253	0.435	0	1
Secondary, HS & Diploma	0.321	0.467	0	1
Graduation & above	0.109	0.312	0	1
Hindu	0.444	0.497	0	1
Muslim	0.097	0.296	0	1
Christian	0.373	0.484	0	1
Others	0.086	0.280	0	1
ST	0.509	0.500	0	1
SC	0.069	0.253	0	1
OBC	0.197	0.398	0	1
Others	0.225	0.417	0	1
Male	0.506	0.500	0	1
Female	0.494	0.500	0	1
Unmarried	0.325	0.468	0	1
Currently Married	0.637	0.481	0	1
Widow/Divorce/Separated	0.039	0.193	0	1
Rural	0.655	0.475	0	1
Urban	0.345	0.475	0	1
Arunachal Pradesh	0.121	0.326	0	1
Nagaland	0.085	0.279	0	1
Manipur	0.199	0.399	0	1
Mizoram	0.113	0.317	0	1
Tripura	0.121	0.326	0	1
Meghalaya	0.098	0.297	0	1
Assam	0.263	0.440	0	1

Source: NSSO 68th round – Schedule 10, Employment and Unemployment, 2011-12 (author's calculation)

cent sample belongs to the illiterate category. 28 per cent of the sample is from the ST community and 38 per cent from the other residual category, that is, non-ST/SC/OBC category. Due to limited sample size in the divorced and separated category, we recoded the marital status into three categories, that is, unmarried, currently married, and widow, separated or divorced.

7. Determinates of Workforce Participation in the North-Eastern Region

In this section, an attempt has been made to identify the determinants of workforce participation among the population of the NER. The binary logistic regression is used to identify the probable factors that may determine the workforce participation in the NER. In our model, the dependent variable Workforce Participation is a dummy variable. It indicates that the dummy takes a value of '1' if the individual is a worker and '0' otherwise. Table 9 presents the odds ratio of workforce participation in the NER. The independent variables in our analysis are various socio-economic characteristics found in the previous literature. These include age, household size, caste, religion, marital status, educational attainment and MPCE.

We have also incorporated the state dummies to control the state level heterogeneity in the NER. In our analysis, age and household size are continuous variables; gender dummies have been created, 0 for males and 1 for females; and sector dummies represent 0 for rural areas and 1 for urban areas. In the marital status category, we created three dummies for unmarried, currently married and widows, divorced and separated. In the caste category, three caste dummies for ST, SC and OBC have been created, and other category or the residual category has been used as the comparison category. Moreover, five education dummies have been created, representing literate & up to primary education, middle, secondary, higher secondary & diploma, and graduation & above category, with illiterates as a comparison category. Similarly, the Muslim, Christian and Other religion dummies have been created keeping Hindu religion in the comparison category. The state control of the NER is done keeping the State of Assam in the comparison category.

From the logistic regression analysis, we have identified the factors that are positively related, negatively related and insignificant factors of our analysis. Table 10 indicates the positively associated, negatively associated, and insignificant variables of the logistic regression analysis.

As shown in tables 9 and 10, the results tend to indicate that, those who have educational level up to primary, and graduation & above are more likely to participate in the workforce than the illiterates in the NER. However, the Middle educational attendees and those having secondary, higher secondary and any diploma are less likely to participate in the workforce than the

illiterates of the region. Similarly, Christians and the people belonging to other (residual) religious groups are more likely to participate in the workforce than the people belonging to Hindu religion.

Table 9: Logistic Regression – Determinants of WPR in the North-Eastern Region

Regressor	Odds Ratio	Z values
Age	1.034***	23.12
Household Size	0.971***	-4.51
Literate & Up to Primary	1.264***	4.94
Middle	0.909**	-1.96
Secondary, HS & Diploma	0.711***	-7.09
Graduation & above	1.300***	4.41
Muslim	1.069	1.38
Christian	1.358***	5.52
Others	1.591***	7.3
SC	1.334***	4.65
OBC	1.190***	3.45
Others	0.998	-0.04
Female	0.065***	-87.84
Currently Married	5.102***	40.08
Widow/Divorce/Separated	7.355***	25.63
Rural	0.602***	-17.39
Arunachal Pradesh	1.344***	5.26
Nagaland	1.131*	1.87
Manipur	1.497***	9.5
Mizoram	2.542***	14.72
Tripura	1.180***	3.75
Meghalaya	2.713***	16.55
_cons	0.399	-10.99

Notes: Log likelihood = -19556.894, LR chi2 (22) = 17799.77, Pseudo R2 = 0.3128, Number of observation = 41142
All the z values are at 99 per cent of the confidence interval and highly significant in most of the cases. The '***' indicate the significant at the 99 per cent level of confidence interval and '**' and '*" indicates the significant at 95 and 90 per cent level of confidence interval respectively.

Source: NSSO 68th round – Schedule 10, Employment and Unemployment, 2011-12 (author's calculation)

In the Indian context, SC, ST and the OBC categories are considered as the marginalised social groups in the society. Moreover, the ST and SC community are assumed to be more deprived socially and economically. However, in the NER, except the State of Assam, most of the community belongs to the ST

community. In the region, Nagaland (96.98 per cent) has the highest share of ST population followed by Mizoram (95.38 per cent), Meghalaya (90.74 per cent) and Arunachal Pradesh (71.12 per cent). Therefore, the arguments of economic deprivation of the ST population of NER needs further research to identify the real picture of the economic status of ST population. In the regression analysis, we observed that in comparison to the ST population, the SC and OBC community are more likely to participate in the workforce while Others (residual) are less likely to participate in the workforce than the ST community.

In the marital status category, the widows, divorced and separated are most likely to participate in the workforce, followed by the currently married individuals than the unmarried individuals in the region. Among the states, individuals from the State of Meghalaya are most likely to be in the workforce than the other states of the region. However, in comparison to Assam State, individuals from all other states are more likely to be in the workforce. Females and individuals from the urban areas are less likely to be in the workforce in the NER.

Table 10: Nature of the Regressors after Logistic Regression Analysis

Independent Variables	Nature	Independent Variables	Nature
Age	+	Manipur	+
Literate & Up to Primary	+	Mizoram	+
Graduation & above	+	Tripura	+
Christian	+	Meghalaya	+
Others	+	Household Size	-
SC	+	Middle	-
OBC	+	Secondary, HS & Diploma	-
Currently Married	+	Female	-
Widows/Divorced/Separated	+	Urban	-
Arunachal Pradesh	+	Others (Social Group)	insignificant
Nagaland	+	Muslim	insignificant

Source: NSSO 68th round – Schedule 10, Employment and Unemployment, 2011-12 (author's calculation)

8. Conclusion and Discussion

The economic nature and characteristics of the North-Eastern region is widely different from the rest of India. The economic development of the region is determined by the various factors such as density of forest, land availability for cultivation etc. In this paper, we observe that the workforce participation rate in the region is lower than the national average. However, Meghalaya State has shown consistently high workforce participation rate in the region in the last three decades. The states of

Nagaland and Tripura are lagging behind in employment creation as compared to other states of the region. However, in the region, except Tripura and Mizoram all other states experience a negative growth rate of employment during the period of our analysis, that is, 1993/94 to 2011/12. Tripura state witnessed a significant rise in female workforce participation rate whereas male workforce participation registered a negative growth. The State of Arunachal Pradesh witnessed the highest decline in its workforce in the region followed by the states of Meghalaya and Manipur. The estimation of elasticity of employment in the region reveals that the growth rate of the region responds positively towards the employment creation except for the utility sector.

The microeconomic analysis of data reveals that except construction, mining and quarrying and wholesale, retail trade and business industry, employment creation in other industries is not significant enough to consider sustainable growth. The statistical analysis reveals a broad similarity with the analysis of national level. The socio-cultural practices still keep the females away from the labour market in the region.

Even though the region is lagging behind in the creation of employment opportunity and economic development than the other parts of the nation, the available existing resources of the region have potentials to expand both farm and non-farm sector employment in the region. The NER has the weather and land that is suitable for agriculture as compared to the other parts of the nation. Moreover, the region is known for using less chemical outputs. Hence, NER has the potential to promote the organic products that have a fast-rising demand in the national and international level. The international trading opportunity under "Look East Policy' cannot be denied.

The promotion of micro, small and cottage industry would be a better substitute to the big industries in the region. The region has a huge potential to promote the agro-based and food processing industries. The promotion of the handloom industry could be a better employment-generating industry in the region.

The Public Private Partnership (PPP) model could be decisive for the development of the region. However, as we know, the region is very diverse in nature, and rituals, culture and emotions of the people also differ from the rest of the country. Therefore, the PPP along with the distribution of power to the local government could be a better option for promoting development and the employment opportunity in the region. The PPP model could help attract private investment, foreign direct investment to the region. The Special Economic Zone (SEZ) is a viable option to utilise the untapped economic opportunity of the region especially for coffee, aromatic and medicinal plants, and horticulture products.

There are certain institutional problems associated in the region such as the expansion of the banking sector. Assam State has nearly 65 per cent of banks out of the total available banks in the North-Eastern region. Hence, the credit delivery system needs to be improved in the region. The rural institutes need to be revitalised as mentioned above.

The agriculture sector can be enhanced with the help of contract farming and by use of high yield varieties. The Panchayati Raj system needs to be strengthened to play a significant role in the process of development in the NER because local people can easily identify the nature of their problems and needs than the people from outside.

The role of the Development of North Eastern Region (DONER) Ministry in the NER needs to be enhanced with the North Eastern Development Finance Corporation Ltd. (NEDFi), because the DONER Ministry recognises the required strategies to develop the region. The North-Eastern Vision Documents, 2020 published by the DONER Ministry considered some inter-dependent strategic components to promote inclusive growth in the region. The document includes self-governance, promotion of farm and non-farm sector, utilising the potentials of power generation, promotion of agro-based industries, sericulture, skill development of youth, augmenting the transportation system by all means and finally, ensuring public investment in the infrastructure either independently or by the PPP mode. Moreover, the NEDFi is undertaking the core business activities and development activities in the region. The core business activity includes lending activities like project finance, microfinance and finance to micro and small enterprises. The first generation entrepreneurs' capacity building and skill up-gradation programmes for entrepreneurs, farmers, artisans, etc. have been carried out under the development and other activities by NEDFi and DONER ministry. The activities targeted by the NEDFi and DONER ministry have a high potential to enhance the development and the employment opportunity in the NER.

Annexures

Table A1: State-wise Growth Rate of Employment in the North-Eastern Region (UPSS)

State	Year	1	2	3	4	5	6	7	8	9	10	11	12
Arunachal Pradesh	1993/94 - 2004/05	0.02	-	-0.09	0.06	0.07	-3.63	0.11	-0.07	0.09	0.06	5.93	5.01
	2004/05 - 2011/12	-1.59	-	5.31	-13.41	2.52	-0.61	6.49	4.69	-20.21	2.93	3.33	2.5
	1993/94 - 2011/12	0.36	2.18	-2.64	-2.53	5.28	-2.29	8.79	-1.81	-3.77	4.47	4.78	4.17
Nagaland	1993/94 - 2004/05	2.88	-	14.5	11.7	-1.44	3.75	7.76	9.37	4.2	-2.09	1.9	2.18
	2004/05 - 2011/12	4.1	-	-0.68	18.63	11.21	7.93	0.6	6.76	-	8.32	5.18	5.67
	1993/94 - 2011/12	3.42	-7.47	7.75	14.78	4.18	5.61	4.57	8.21	-	2.54	3.36	3.73
Manipur	1993/94 - 2004/05	3.78	26.23	0.12	-35.32	9.6	1.79	6.08	5.5	-8.69	-0.43	1.79	1.79
	2004/05 - 2011/12	-3.48	-2.02	2.26	42.12	23.94	11.88	4.7	7.14	-0.98	2.86	3.19	5.87
	1993/94 - 2011/12	0.55	13.68	1.07	-0.9	15.97	6.28	5.47	6.23	-5.26	1.03	2.77	4.26
Mizoram	1993/94 - 2004/05	3.22	-4.64	6.84	-14.09	4.62	5.16	7.2	12.95	17.3	4.13	5.52	5.46
	2004/05 - 2011/12	-2.18	27.86	-2.19	33.85	16.19	10.89	6.17	9.37	-19.25	4.07	4.9	6.08

(contd.)

(Table A1 contd.)

State	Period	1	2	3	4	5	6	7	8	9	10	11	12
	1993/94 - 2011/12	0.82	9.8	2.83	7.22	9.76	7.7	6.75	11.36	1.05	4.1	5.24	5.74
Tripura	1993/94 - 2004/05	-0.15	-	0.07	-11.71	18.13	7.81	1.88	1.33	-8.06	0.53	0.87	2.28
	2004/05 - 2011/12	-8.52	-	-2.19	-9.31	12.24	9.02	-6.52	-6.75	1.68	-15.56	-11.26	-2.18
	1993/94 - 2011/12	-3.87	6.21	-0.93	-10.64	15.51	8.35	-1.85	-2.26	-3.73	-6.62	-4.53	0.3
Meghalaya	1993/94 - 2004/05	1.74	12.47	15.13	7.64	3.73	9.44	3.57	5.04	4.11	2.21	2.89	4.47
	2004/05 - 2011/12	-3.03	8.68	-5.72	-14.56	13.17	5.05	9.55	11.13	13.53	3.96	6.96	6.41
	1993/94 - 2011/12	-0.38	10.78	5.86	-2.23	7.93	7.49	6.23	7.75	8.3	2.99	4.7	5.33
Assam	1993/94 - 2004/05	2.5	-4.24	1.83	0.69	14.69	4.48	4.51	7.91	2.18	2.63	4	4.11
	2004/05 - 2011/12	-2.69	6.27	5.75	-22.23	11.01	7.61	4.23	1.48	3.67	1.24	2.69	3.98
	1993/94 - 2011/12	0.2	0.43	3.57	-9.49	13.05	5.87	4.39	5.05	2.84	2.01	3.42	4.05

Notes: **Primary Sector** (Agriculture, Hunting, Forestry and Fishing) 2: Mining and Quarrying 3: Manufacturing 4: Electricity, Gas, and Water (Utilities) 5: Construction 6: **Secondary Sector** (2+3+4+5) 7: Wholesale, Retail Trade and Restaurants 8: Transport Storage and Communication 9: Financing, Insurance, Real Estate and Business 10: Community, Social and Other Services 11: **Tertiary Sector** (7+8+9+10) 12: Non-farm Sector (2+3+4+5+7+8+9+10)

Source: 50th, 61st and 68th rounds of National Sample Survey (author's own calculation)

Table A 2: State-wise Growth Rate of GDP in North-Eastern Region (at a Constant Price 2004-05)

State	Year	1	2	3	4	5	6	7	8	9	10	11	12
Arunachal Pradesh	1993/94 - 2004/05	0.26	9.77	4.3	NE	11.1	17.78	0.85	-0.83	6	7.19	5.29	9.51
	2004/05 - 2011/12	3.74	4.46	4.36	1.91	7.01	6.06	3.82	10.53	6.75	5.7	6.16	6.11
	1993/94 - 2011/12	1.81	7.41	4.32	NE	9.28	12.57	2.17	4.22	6.33	6.53	5.68	8
Nagaland	1993/94 - 2004/05	11.53	NE	-7.56	-19.36	11.01	0.95	6.18	4.45	7.75	5.25	6.05	4.84
	2004/05 - 2011/12	2.35	8.97	5.28	-14.45	10.16	9.01	7.21	5.25	6	6.29	6.06	6.69
	1993/94 - 2011/12	7.45	NE	-1.85	-17.18	10.63	4.53	6.64	4.81	6.97	5.71	6.05	5.66
Manipur	1993/94 - 2004/05	4.44	NE	12.4	NE	13.05	NE	7.83	8.17	5.95	7.78	7.55	NE
	2004/05 - 2011/12	4.34	NE	4.28	3.08	4.49	4.36	1.79	16.08	5.97	5.75	5.75	5.13
	1993/94 - 2011/12	4.4	NE	8.79	NE	9.24	NE	5.15	11.69	5.96	6.88	6.75	NE
Mizoram	1993/94 - 2004/05	10.95	17.24	5.9	8.47	18.38	13.48	9.11	14.9	16.77	15.21	14.29	14.11
	2004/05 - 2011/12	5.92	9.35	8.05	3.46	9.2	7.9	6.04	7.55	8.29	8.09	7.82	7.83
	1993/94 - 2011/12	8.72	13.73	6.85	6.24	14.3	11	7.75	11.63	13	12.05	11.41	11.32
Tripura	1993/94 - 2004/05	3.91	12.07	3.25	NE	21.02	28.62	5.21	9.84	11.92	8.88	8.17	11.27
	2004/05 - 2011/12	5.39	6.16	-3.6	21.53	9.65	8.61	5.5	13.6	9.2	7.47	7.69	7.98
	1993/94 - 2011/12	4.57	9.45	0.2	NE	15.97	19.72	5.34	11.51	10.71	8.25	7.96	9.81
Meghalaya	1993/94 - 2004/05	5.34	12.74	3.93	15.58	9.65	9.28	8.98	10.42	4.04	6.7	6.7	7.46
	2004/05 - 2011/12	3.74	1.87	9.13	-2.81	13.91	9.05	7.13	9.53	3.7	8.26	7.1	7.75
	1993/94 - 2011/12	4.63	7.91	6.24	7.41	11.55	9.18	8.16	10.03	3.89	7.39	6.88	7.59
Assam	1993/94 - 2004/05	0.7	0.97	0.86	23.63	7.83	3.47	6.33	15.39	4.68	6.44	6.95	5.69
	2004/05 - 2011/12	2.95	1.43	1.62	4.74	5.92	3.49	7.69	10.97	9.13	6.91	8.02	6.73
	1993/94 - 2011/12	1.7	1.18	1.2	15.23	6.98	3.48	6.93	13.43	6.66	6.65	7.43	6.15

Notes:1: **Primary Sector** (Agriculture, Hunting, Forestry and Fishing) 2: Mining and Quarrying 3: Manufacturing 4: Electricity, Gas, and Water (Utilities) 5: Construction 6: **Secondary Sector** (2+3+4+5) 7: Wholesale, Retail Trade and Restaurants 8: Transport Storage and Communication 9: Financing, Insurance, Real Estate and Business 10: Community, Social and Other Services 11: **Tertiary Sector** (7+8+9+10) 12: Non-farm Sector (2+3+4+5+7+8+9+10)
NE: Not-Estimated due to the absorbed figures and results.
Source: 50th, 61st and 68th rounds of National Sample Survey (author's own calculation)

Table A 3: Employment Elasticity with respect to GPD during Post-Liberalisation Period

State	Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Arunachal Pradesh	1993/94 - 2004/05	0.08	-	-0.02	-	0.01	-0.20	0.13	0.08	0.02	0.01	1.12	0.53
	2004/05 - 2011/12	-0.43	-	1.22	-7.02	0.36	-0.10	1.7	0.45	-2.99	0.51	0.54	0.41
	1993/94 - 2011/12	0.2	0.29	-0.61	-	0.57	-0.18	4.05	-0.43	-0.6	0.68	0.84	0.52
Nagaland	1993/94 - 2004/05	0.25	-	-1.92	-0.6	-0.13	3.95	1.26	2.11	0.54	-0.4	0.31	0.45
	2004/05 - 2011/12	1.74	-	-0.13	-1.29	1.1	0.88	0.08	1.29	-	1.32	0.85	0.85
	1993/94 - 2011/12	0.46	-	-4.19	-0.86	0.39	1.24	0.69	1.71	-	0.44	0.56	0.66
Manipur	1993/94 - 2004/05	0.85	-	0.01	-	0.74	-	0.78	0.67	-1.46	-0.06	0.24	-
	2004/05 - 2011/12	-0.8	-	0.53	13.68	5.33	2.72	2.63	0.44	-0.16	0.5	0.55	1.14
	1993/94 - 2011/12	0.13	-	0.12	-	1.73	-	1.06	0.53	-0.88	0.15	0.41	-
Mizoram	1993/94 - 2004/05	0.29	-0.27	1.16	-1.66	0.25	0.38	0.79	0.87	1.03	0.27	0.39	0.39
	2004/05 - 2011/12	-0.37	2.98	-0.27	9.78	1.76	1.38	1.02	1.24	-2.32	0.5	0.63	0.78
	1993/94 - 2011/12	0.09	0.71	0.41	1.16	0.68	0.70	0.87	0.98	0.08	0.34	0.46	0.51
Tripura	1993/94 - 2004/05	-0.04	-	0.02	-	0.86	0.27	0.36	0.14	-0.68	0.06	0.11	0.20
	2004/05 - 2011/12	-1.58	-	0.61	-0.43	1.27	1.05	-1.19	-0.5	0.18	-2.08	-1.46	-0.27
	1993/94 - 2011/12	-0.85	0.66	-4.65	-	0.97	0.42	-0.35	-0.2	-0.35	-0.8	-0.57	0.03
Meghalaya	1993/94 - 2004/05	0.33	0.98	3.85	0.49	0.39	1.02	0.4	0.48	1.02	0.33	0.43	0.60
	2004/05 - 2011/12	-0.81	4.64	-0.63	5.18	0.95	0.56	1.34	1.17	3.66	0.48	0.98	0.83
	1993/94 - 2011/12	-0.08	1.36	0.94	-0.3	0.69	0.82	0.76	0.77	2.13	0.4	0.68	0.70
Assam	1993/94 - 2004/05	3.57	-4.37	2.13	0.03	1.88	1.29	0.71	0.51	0.47	0.41	0.58	0.72
	2004/05 - 2011/12	-0.91	4.38	3.55	-4.69	1.86	2.18	0.55	0.13	0.4	0.18	0.34	0.59
	1993/94 - 2011/12	0.12	0.36	2.98	-0.62	1.87	1.69	0.63	0.38	0.43	0.3	0.46	0.66

Notes: I: **Primary Sector** (Agriculture, Hunting, Forestry and Fishing) II: Mining and Quarrying III: Manufacturing IV: Electricity, Gas, and Water (Utilities) V: Construction VI: **Secondary Sector** (2+3+4+5) VII: Wholesale, Retail Trade and Restaurants VIII: Transport Storage and Communication IX: Financing, Insurance, Real Estate and Business X: Community, Social and Other Services XI: **Tertiary Sector** (7+8+9+10) XII: Non-farm Sector (2+3+4+5+7+8+9+10)

Source: Own estimates based on National Accounts Statistics, CSO, various years

Table A.4: Definition and Variable used in the Analysis

Variable	Description
Age	Continuous variable. Age of the individual, (number of years)
Household	Continuous variable: Size of the household, (total members of the size household)
Female	Binary variable: 1, if the sex of the individual is female, 0 otherwise
Urban	Binary variable: 1, if a sector of the individual is urban, 0 otherwise
Currently	Binary variable: 1, if Unmarried, 0 otherwisemarried
Widow/ Separated/ Divorced	Binary variable: 1, if Widows/Separated/Divorced, 0 otherwise
Other	Binary variable: 1, if Currently married, 0 otherwise
ST	Binary variable: 1, if the individual belongs to Schedule Tribe, 0 otherwise
SC	Binary variable: 1, if the individual belongs to Schedule Caste, 0 otherwise
OBC	Binary variable: 1, if the individual belongs to Other Backward Class, 0 otherwise
Others	Binary variable: 1, if the individual belongs to a residual group, 0 otherwise
Hindu	Binary variable: 1, if the individual belongs to Hindu religion, 0 otherwise
Muslim	Binary variable: 1, if the individual belongs to the Muslim religion, 0 otherwise
Christian	Binary variable: 1, if the individual belongs to Christian, 0 otherwise
Others	Binary variable: 1, if the individual belongs to a residual group, 0 otherwise
Illiterates	Binary variable: 1, if the individual is illiterate, 0 otherwise
Literate & Up to Primary	Binary variable: 1, if the individual has at least primary level of education, 0 otherwise
Middle	Binary variable: 1, if an individual has a middle level of educational attainment, 0 otherwise
Secondary, HS & Diploma	Binary variable: 1, if an individual has secondary and HS level of education and diploma,0 otherwise
Graduation & above	Binary variable: 1, if the individual has the graduation and above degree, 0 otherwise
Arunachal Pradesh	Binary Variable: 1, if the state is Arunachal Pradesh, 0 Otherwise

(contd.)

Table A.4 (contd.)

Nagaland	Binary Variable: 1, if the state is Nagaland, 0 Otherwise
Manipur	Binary Variable: 1, if the state is Manipur, 0 Otherwise
Mizoram	Binary Variable: 1, if the state is Mizoram, 0 Otherwise
Tripura	Binary Variable: 1, if the state is Tripura, 0 Otherwise
Meghalaya	Binary Variable: 1, if the state is Meghalaya, 0 Otherwise
Assam	Binary Variable: 1, if the state is Assam, 0 Otherwise

Notes

1. In terms of geographical size, the region constitutes about 8% of the total area of the country. The region comprises 262,230 square km. and the population density is 148 per square km. Guwahati, Jorhat, Agartala, Dimapur, Shillong, Aizawl and Imphal are the largest cities in the region. Hinduism, Muslim, Buddhism, and Christianity are main religions in the area. The region shares more than the 4,500 kilometers of international border with China in the north, Myanmar in the east, Bangladesh in the southwest and Bhutan to the northwest.

2. Development and Growth in North East India: The Natural Resources, Water, and Environment Nexus, Strategy Report, June, 2007, South Asia Region Sustainable Development Department, Environment & Water Resource Management Unit, The International Bank for Reconstruction and Development, The World Bank

3. The self-employed category includes three types of working categories: (a) Workers who works in the household enterprises as the own account workers. (b) Workers who work in the household enterprises as the employers and (c) The workers who works in the household enterprises as the helper. The third category of self-employed is a worker who works as a helper in the household enterprises and is considered as the unpaid workers within the self-employed category.

4. http://www.worldbank.org/en/news/infographic/2016/05/27/india-s-poverty-profile

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