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Book Review

FRBM Act and Fiscal Performance of the Special Category States of India: A Trend Analysis

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Abstract

The Indian states namely Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, and Uttarakhand were given special category status considering their severe developmental constraints and long-term economic backwardness. Microeconomic efficiency and macroeconomic stability remain to be a persistent challenge for these special category states in terms of their revenue augmentation, deficit reduction, and fiscal sustainability. The Fiscal Responsibility and Budget Management (FRBM) Act, 2003 has been a revolutionary step towards raising the fiscal efficacy of the Centre and the States in India, particularly management of their finances. Keeping these in consideration, the present study attempts to examine the impact of fiscal reforms i.e., the FRBM Act on the state finances in India, specifically on the special category states which need additional fiscal attentions. For the purpose, the trend analysis as well as searching of the structural break through Chow test have been conducted for the period from 1990-91 to 2019-20 with respect to various fiscal indicators. It is observed that most of the states from both the special and Non-Special categories are performing well in revenue receipts and deficit management after the implementation of FRBM Act, implying a significant impact of FRBM Act on their fiscal performance. However, the result of the Chow test shows less impact of the FRBM Act on the special category states.

I. Introduction

Binding fiscal policy rules are likely to influence the level and composition of government expenditure and revenue collection as well as induce transparency in the country's budget. India, being a federal structure, the fiscal performance at the sub-national level plays a significant role to maintain the fiscal efficiency in the centre. However, there has been deteriorating fiscal performance at both the Centre and

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State levels in India during the period from 1980-81 to 1999-2000 (Rao, 2000). At the earlier, the Eleventh and Twelfth Finance Commissions recommend fiscal reform incentive schemes intending to maintain fiscal discipline at the state level. Apart from this, Fiscal Responsibility Legislations (FRLs) and various institutional reforms were undertaken at the centre as well as state-level including the rule-based fiscal framework known as Fiscal Responsibility and Budget Management Act (FRBMA, 2003). All these initiatives and regulations are towards the objectives of revenue augmentation, deficit reduction, and fiscal sustainability to have microeconomic efficiency as well as macroeconomic stability at the Centre and State levels (Saikia et al. 2021; Mohanty and Mishra, 2016). Eleven states namely Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir (which was having its statehood till 31st October 2019), Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, and Uttarakhand were known as the Special Category States. Having various disadvantages, these states were highly dependent on central grants. Thus, there is no hard budget for these states. Special category states are considered to be handicapped without the central grants. After Economic Reforms, inter-state disparities in terms of GSDP have increased across the states of India (Ahluwalia, 2000). Whenever the disparity level increases among states, the special category states can be expected to be the worst sufferers. Implementation of target-based fiscal rules is effective in reducing fiscal imbalances at the sub-national level which is a major consequence for the economic growth of the country. All the special category states havestarted implementing FRBM Act between the year 2005 and 2010 to maintain their fiscal stability. So, this is felt necessary to check whether these states are performing well or not after the implementation of the FRBM Act.

The study has been divided into six sub-sections including the present one i.e., introduction. The literature survey has been reported in the second section, where the third section covers the research objectives. The fourth section focuses on data sources and methodological issues, whereas the fifth section analyzes the results and major findings. The last section consists the conclusion part.

II. Review of Literature

Several studies have examined the role of the FRBM Act on fiscal performance of both central and state governments' finances (Sucharita et al., 2011; Badaik, 2017; Rao and Sen, 2010; Sen and Dash, 2013). Majority of the studies are mainly theoretically oriented focusing on the gross picture of all the states or of the major states. For example, Singh et al. (2017) have observed that the Fiscal Responsibility and Budget Management Act (FRBMA), 2003 sets fiscal rules to foster fiscal discipline on the Central Government and achieve a balanced budget with effective revenue management. Sucharita et al. (2011) has analyzed the role of the FRBM Act in restoring fiscal balance in India and also explained the major factors behind the rising fiscal imbalance by using the OLS method over the period from 1980-81 to 2008-09. They find no such significant effect of the FRBM Act on the gross fiscal deficit to GDP ratio. However, the GDP growth rate has exemplified a significant negative effect on the gross fiscal

deficit to GDP ratio. Badaik (2017) has explored the impact of Fiscal Responsibility Legislations (FRLs) on the performance of state finances in India by considering the panel data for 28 states from 2000-01 to 2009-10. Fixed effect and Random effect models are used to get the regression coefficients. The result shows that FRLs have a positive impact on the performance of the states. Singh (2015) has discussed the allocation of funds to the special category states from Central Government through both Finance Commissions and Planning Commission. Dash (2011) tries to evaluate the fiscal performance of Tripura (as a special category state) after implementing the FRBM Act, over the period from 1990-91 to 2009-10. The study finds that the overall fiscal performance of the state is improving after the FRBM Act. Singh & Srinivasan (2006), have been examined the impacts of the intergovernmental transfer system and tax assignment tocentre on the quality of governance and government expenditure, the efficiency of the tax system, the fiscal health of different tiers of govt., economic growth and on regional inequality. Jacob & Chakraborty (2020) tries to analyze the Karnataka state performance in terms of fiscal prudence for the period from 2011-12 to 2017-18. By using CSO, CAG reports, and NIPFP databases the study shows the trends of different fiscal indicators including expenditure, revenue receipts, debt management, etc. By examining the expenditure side, the author found the states have curtailed their capital expenditure and decreased their spending on education, social welfare and nutrition which leads to badly affects the human development outcome. Chakraborty & Dash (2017) try to examine the impacts of the fiscal rule on fiscal balance across the 14 major states of India by covering a dataset from 2000-01 to 2013-14. The findings of the paper show that after the implementation of the fiscal rule, the states were able to reduce the fiscal imbalances. Moreover, they have found that the deficit target set by the fiscal rule, the states have resorted to cuts the development expenditures. Mukherjee (2019) tries to assess the impact of fiscal rules in Indian public finances during 2001-16. Various trends of fiscal indicators such as revenue, expenditure and debt, etc. show that all the states are able to reduce their revenue as well as fiscal deficits in the post FRBM period. Dholakia & Karan (2005) try to estimate debt and fiscal deficit by deriving a theoretically consistent and appropriate definition for the 18 non-special category states and 10 special category states. The study covered a period of 1989-90 to 2003-04. They observed that non-special category states have a significantly greater probability of fiscal sustainability than the special category states. However, rigorous studies on the theoretical issues and practical policy perspectives of the FRBM Act on fiscal indicators are the need of the hour in terms of fiscal performance of the Special Category States (of which majority are North-eastern States of India). The present study is an attempt towards that direction.

III. Objectives of the Study

The main objective of the study is to examine the long termimpact of the FRBM Act on the major fiscal indicators of the special category states in comparison to the general category states of India. Also, tries to analyze the structural break of the series in respect of fiscal indicator i.e. gross fiscal deficit for the special category states of India over time.

IV. Data Sources and Methodology

The present study is based on secondary data collected from the Handbook of Statistics on State Government Finances published by RBI, and Economic and Political Weekly Research Foundation (EPWRF). The study attempts to cover a period of 30 years (1990-91 to 2019-20) subject to data availability and to incorporate all the Special Category States including Jammu & Kashmir. Moreover, the study period is subdivided into two parts i.e., Pre-FRBM (1990-91 to 2002-03) and Post-FRBM (2003-04 to 2019-20).

The effectiveness and suitability of the recent FRBM Act has been found by analyzing provision and rules undertaken by FRBM Act. To study the impact of the FRBM Act on fiscal indicators, the trends of the performance of major fiscal indicators such as Gross Fiscal Deficit (GFD), Revenue Deficit (RD), Primary Deficit (PD), Total Expenditure (TE), Revenue expenditure (RE), capital expenditure (CE), Total Tax Revenue (TTR), State Own Tax Revenue (SOTR), State Own Non-Tax Revenue (SONTR), Internal debt (ID), Interest Payments (IP) and Total Outstanding Liabilities (TOL)have been analyzed before and after the FRBM Act, at the state level. All the mentioned indicators are taken as a ratio of the repectiveGross State Domestic Product (GSDP).

Table 1: Month & Year of Implementation of the FRBM Act at Sub-national Level, Special Category

States	Month & Year of Enactment	Financial Year of Enactment
Arunachal Pradesh	March, 2006	2005-06
Assam	September, 2005	2005-06
Himachal Pradesh	April, 2005	2005-06
Jammu &Kashmir	August, 2006	2006-07
Manipur	August, 2005	2005-06
Meghalaya	March, 2006	2005-06
Mizoram	October, 2006	2006-07
Nagaland	January, 2010	2009-10
Sikkim	September, 2010	2010-11
Tripura	June, 2005	2005-06
Uttarakhand	October, 2005	2005-06

Source: State Finances- A Study of Budgets of 2013-14, RBI

Furthur to check the structural breaks in the series in respect of fiscal performance, Chow test has been used. As in the case of Chow test, the break points have to be decided in a priori to test the impact of certain policies or incidents (here, the respective years of implementing the FRBM Act by the various Special category States during 2005-06 to 2010-11; Table1). CUSUM of squares tests is applied to check the structuralbreak in mean and volatility of growth rates respectively with an unknown

breakpoint for the gross fiscal deficit to GSDP ratio over time. It is a possibleway to treat the breakpoint as unknown and carry out the Chow test for all the possibleyears.

Moreover, in order to examine the effectiveness of the FRBM Act on the fiscal indicators through a quantitative analysis Gross Fiscal Deficit to GSDP ratio has been regressed against the growth rate of GSDP, development revenue expenditure to revenue receipt ratio and FRBM (where dummy is taken as '1' for year in which it was implemented and '0' otherwise).

V. Results and Discussion

Performance of Special Category States

The economic reform process has not ensured equity for regional development in India (Ahluwalia, 2002). There was huge inter-state variation in the performance level among the Indian states during both the pre-reform as well as post-reform periods (Sachs et al., 2002). The reforms process is mostly in the favour of already well-governed states. The backward states have always failed to utilize the opportunity of reforms because of various hindrances they have faced like less attractive social, economic, and political conditions. Especially, in the case of Special Category States, they were handicapped in various ways because of their low resource base, lack of infrastructure, their geographical location with international boundaries. So, they have less capacity for revenue generation, expenditure quality management and debt sustainability.

Trends in State Government Major Deficit Indicators

The trend of major deficit indicators for the special and general category states are evaluated through their state of fiscal deficit, revenue deficit, and primary deficit as a percentage of GSDP before and after the implementation of the Fiscal Responsibility and Budget Management (FRBM) Act. There are three major deficit indicators such as fiscal deficit, revenue deficit and primary deficit. Revenue deficit indicates the extent to which current receipts are not able to cover revenue expenditure in terms of borrowing to finance. Basically, government consumption expenditure requires to be financed through capital receipts. These capital receipts, excluding non-debt capital receipt, consist of net borrowing, which is called fiscal deficit. The primary deficit is equal to fiscal deficit (a net inflow of borrowed funds) minus interest payments, which represent outflow of borrowed funds in the form of transfer payments. From the Table2 it is observed that there has been a positive impact of FRBM inmost of the Special Category States compared to the Non-Special Category States.

Table 2: Trends in State Govt. Major Deficit Indicators as Percentage of GSDP

States	Fiscal Deficit (FD)		Revenue Deficit (RD)		Primary Deficit (PD)	
	PRE-FRBM	POST-FRBM	PRE-FRBM	POST-FRBM	PRE-FRBM	POST-FRBM
Non-Special Category States						
AP	2.27	4.31	0.88	0.81	0.85	1.73
BH	2.47	3.06	1.34	-2.30	0.64	1.18
GA	1.46	2.97	0.37	-0.26	0.49	0.69
GT	1.72	2.23	0.90	-0.01	0.74	0.43
HR	1.20	2.87	0.53	1.10	0.37	1.24
KR	0.99	2.10	0.34	-0.35	0.43	0.95
KL	1.50	3.25	0.97	2.05	0.61	1.29
MP	1.54	3.15	0.72	-1.18	0.52	1.18
MH	1.25	1.78	0.58	0.27	0.60	0.27
OD	2.09	1.42	1.16	-1.71	0.73	-0.21
PN	1.99	3.87	1.29	2.16	0.64	1.06
RJ	1.74	3.40	0.80	0.99	0.65	1.19
TN	1.08	2.37	0.73	0.42	0.43	0.91
UP	1.92	3.29	1.07	-0.83	0.68	0.97
WB	2.19	3.74	1.50	2.42	1.01	0.51
Special Category States						
AR	1.82	2.58	-3.56	-10.99	0.50	0.41
AS	0.82	1.43	0.19	-0.87	0.02	-0.13
HP	3.02	3.86	1.50	0.73	1.46	0.49
JK	1.72	4.76	-0.79	-3.33	-0.01	1.26
MN	2.51	3.84	-0.47	-6.29	1.04	0.37
ML	1.53	2.63	-0.64	-1.70	0.67	1.15
MZ	9.73	5.43	3.66	-3.68	6.12	1.37
NG	5.62	3.27	0.73	-4.97	2.86	-0.20
SK	2.65	2.52	-2.23	-4.90	0.50	0.43
TR	2.87	2.18	-0.54	-5.28	0.98	-0.15
UT	1.31	2.86	0.48	0.18	0.26	1.36

Note: Andhra Pradesh (AP); Bihar (BH); Goa (GA); Gujarat (GT); Haryana (HR); Karnataka (KR); Kerala (KL); Madhya Pradesh (MP); Maharashtra (MH); Odisha (OD); Punjab (PN); Rajasthan (RJ); Tamil Nadu (TN); Uttar Pradesh (UP); West Bengal (WB); Arunachal Pradesh (AR); Assam (AS); Himachal Pradesh (HP); Jammu & Kashmir (JK); Manipur (MN), Meghalaya (ML); Mizoram (MZ); Nagaland (NG); Sikkim (SK); Tripura (TR); Uttarakhand (UT)

Source: Calculated based on Handbook of Statistics on State Government Finances, RBI& EPWRF

While in the case of Non-Special Category States, the impact of the FRBM Act is not marked as only the state of Odisha has shown a decreasing rate of fiscal deficit. However, improvements have been noticed for almost all the special category states during the post-FRBM period in revenue and primary deficits and 4 out of 11 in fiscal deficit. The states, Mizoram, Nagaland, Sikkim and Tripura were able to reduce fiscal deficit after the implementation of the FRBM. After the FRBM Act, most of the Special and Non-Special Category States were able to reduce revenue deficit. The states of Arunachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Sikkim and Tripura had Revenue Surplus before implementation of the FRBM Act. There has been an increase in revenue surplus for all the special category states except Himachal Pradesh and UttarakhandAfter the FRBM. The states of Assam, Mizoram, and Nagaland have a shift from revenue deficit to revenue surplus state after the FRBM. Himachal Pradesh and Uttarakhand have witnessed a reduction in revenue deficit from pre to post FRBM period. In case of primary deficit, the states of Gujarat, Maharashtra, Odisha and West Bengal from the Non-Special Category States have been able to reduce primary deficit in the post-FRBM period. Assam, Nagaland and Tripura have shifted from a primary deficit state to a primary surplus state. There has been a reduction in primary deficit for other special category states except for Jammu & Kashmir, Meghalaya and Uttarakhand over pre to post FRBM period. The reductions are substantial for the states of Mizoram and Nagaland. Thus, most of the Special Category States have a favorable impact of the implementation of FRBM Act.

Trends in State Government Major Expenditure

The trend of the major expenditure indicators for the Special and Non-Special Category States are evaluated through their state of total expenditure, revenue expenditure, and capital expenditure as a percentage of GSDP before and after the implementation of the Fiscal Responsibility and Budget Management (FRBM) Act. Table3 demonstrates that except for Sikkim all the Special and Non-Special Category States were shown an increasing trend in terms of total expenditure, revenue expenditure. Whereas including Sikkim, all the states have shown an increasing trend in case of capital expenditure in the post-FRBM period and the Special Category States deserve special mentioning in this regard. Therefore, it is clear that all the states in general and the Special Category States in particular are utilizing their revenue towards individual developmental needs. The variation in terms of capital expenditure for the Special Category States is huge after the FRBM Act implying larger extent of capital formation for them. So, the central government should appreciate them for their expenditure management with a deficit target.

Table 3: Trends in State Govt. Major Expenditure Indicators as Percentage of GSDP

States	Total Expenditure (TE)		Revenue Expenditure (RE)		Capital Expenditure (CE)	
	PRE-FRBM	POST-FRBM	PRE-FRBM	POST-FRBM	PRE-FRBM	POST-FRBM
Non-Special Category States						
AP	11.29	25.77	8.98	20.10	2.31	61.50
BH	11.47	27.97	9.77	21.45	1.70	78.55
GA	8.95	18.52	7.51	14.62	1.44	40.23
GT	7.36	12.47	5.97	9.29	1.38	37.07
HR	6.73	13.92	5.66	11.15	1.07	29.73
KR	5.19	13.82	4.27	10.72	0.91	44.86
KL	6.00	14.78	5.18	12.73	0.82	37.41
MP	8.83	23.45	7.47	17.54	1.36	77.29
MH	5.66	11.61	4.72	9.39	0.95	25.54
OD	7.65	19.42	6.08	15.14	1.57	60.01
PN	7.35	16.83	6.04	13.53	1.30	31.81
RJ	7.00	18.76	5.54	14.67	1.46	48.09
TN	6.03	14.53	5.27	11.51	0.76	44.45
UP	7.33	23.08	5.57	17.60	1.37	99.31
WB	6.44	17.76	5.38	14.54	1.06	61.11
Special category States						
AR	19.57	58.57	13.78	41.68	5.79	253.42
AS	6.55	20.17	5.31	17.02	1.25	93.99
HP	11.93	25.46	9.24	19.82	2.69	44.61
JK	13.84	36.21	10.62	27.65	3.22	38.08
MN	17.44	46.26	12.11	34.24	5.33	118.98
ML	12.14	31.31	9.37	25.76	2.76	98.88
MZ	39.01	56.19	31.35	44.72	7.65	140.43
NG	29.32	50.42	22.54	39.60	6.77	81.38
SK	51.38	42.24	45.59	33.59	5.79	62.61
TR	20.13	33.89	15.94	25.71	4.19	119.83
UT	8.43	15.96	6.78	12.34	1.65	49.04

Note: Andhra Pradesh (AP); Bihar (BH); Goa (GA); Gujarat (GT); Haryana (HR); Karnataka (KR); Kerala (KL); Madhya Pradesh (MP); Maharashtra (MH); Odisha (OD); Punjab (PN); Rajasthan (RJ); Tamil Nadu (TN); Uttar Pradesh (UP); West Bengal (WB); Arunachal Pradesh (AR); Assam (AS); Himachal Pradesh (HP); Jammu & Kashmir (JK); Manipur (MN), Meghalaya (ML); Mizoram (MZ); Nagaland (NG); Sikkim (SK); Tripura (TR); Uttarakhand (UT)

Source: Calculated based on Handbook of Statistics on State Government Finances, RBI& EPWRF

Trends in State Government Tax Revenue

Table 4: Trends in State Govt. Tax Revenue as Percentage of GSDP

States	Total Tax Revenue (TTR)		State Own Tax Revenue (SOTR)		State Own Non-Tax Revenue (SONTR)	
	PRE-FRBM	POST-FRBM	PRE-FRBM	POST-FRBM	PRE-FRBM	POST-FRBM
Non-Special Category States						
AP	11.29	25.90	4.15	10.25	1.19	2.14
BH	11.20	27.74	2.25	5.53	0.87	0.61
GA	8.85	18.57	2.47	7.02	3.42	4.90
GT	7.40	12.59	3.00	5.99	1.04	1.06
HR	6.98	13.98	2.64	6.62	1.77	1.56
KR	5.21	13.93	2.41	7.02	0.46	0.72
KL	5.98	14.82	2.67	6.66	0.32	1.06
MP	8.86	23.58	2.78	7.59	1.19	1.87
MH	5.68	11.80	2.72	6.35	0.72	0.82
OD	7.62	19.95	1.51	5.58	0.59	2.19
PN	7.53	16.73	2.50	6.63	1.50	1.91
RJ	6.98	18.84	1.96	6.06	0.83	1.85
TN	6.01	14.68	2.96	7.25	0.40	0.84
UP	7.33	23.24	1.97	7.04	0.48	1.70
WB	6.45	17.87	1.92	5.25	0.21	0.43
Special Category States						
AR	19.18	61.11	0.34	3.05	1.53	3.96
AS	6.65	20.54	1.18	4.66	0.53	1.93
HP	11.69	25.27	1.66	5.09	0.76	2.17
JK	13.36	36.24	1.23	5.66	0.61	2.46
MN	17.24	46.28	0.49	2.60	0.61	1.43
ML	12.21	31.30	1.08	4.15	0.70	1.80
MZ	38.56	57.14	0.51	2.32	1.28	2.38
NG	28.45	50.29	0.76	2.39	0.94	1.61
SK	51.88	43.63	1.55	3.76	30.45	12.77
TR	20.07	29.04	1.11	4.02	0.72	0.97
UT	9.94	16.21	2.03	4.79	0.54	1.00

Note: Andhra Pradesh (AP); Bihar (BH); Goa (GA); Gujarat (GT); Haryana (HR); Karnataka (KR); Kerala (KL); Madhya Pradesh (MP); Maharashtra (MH); Odisha (OD); Punjab (PN); Rajasthan (RJ); Tamil Nadu (TN); Uttar Pradesh (UP); West Bengal (WB); Arunachal Pradesh (AR); Assam (AS); Himachal Pradesh (HP); Jammu & Kashmir (JK); Manipur (MN), Meghalaya (ML); Mizoram (MZ); Nagaland (NG); Sikkim (SK); Tripura (TR); Uttarakhand (UT)

Source: Calculated based on Handbook of Statistics on State Government Finances, RBI & EPWRF

The tax revenue is a major component of the taxable capacity of a state. It can be measured in terms of GSDP (as it is considered as a proxy for the tax base of a country). Thus, to analyze the revenue capacity of a particular state, both own tax revenue and own non-tax revenue to GSDP ratio can be considered as the major indicators. From Table 4, it is clear that in case of total tax revenue and state own tax revenue all the Special and Non-Special Category States were shown increasing tax capacity except Sikkim. Moreover, in case of the state's non-tax revenue indicator, the state Sikkim shows a huge reduction in revenue generation. Bihar and Haryana from the general category states also show a decreasing trend in terms of state own non-tax revenue. Thus, there has been huge inter-state variation in terms of various revenue-generating indicators.

Trends in State Government Debt indicators

The trend of major debt indicators for the Special and Non-Special Category States are evaluated through their state of internal debt, outstanding liabilities and interest payments as a percentage of GSDP before and after the implementation of the Fiscal Responsibility and Budget Management (FRBM) Act (*Table5)*. In case of debt indicators, internal debt and outstanding liabilities have shown a high transition from pre-FRBM to post-FRBM period across the states. In terms of interest payments, most of the states from both the Special and Non-Special Categories have shown a declining trend in the post-FRBM period. However, the FRBMA has less impact on the debt indicators across the states.

Table 5: Trends in State Govt. Debt indicators as Percentage of GSDP

States	Internal Debt (ID)		Outstanding Liabilities (OLs)		Interest Payments (IP)	
	PRE-FRBM	POST-FRBM	PRE-FRBM	POST-FRBM	PRE-FRBM	POST-FRBM
Non-Special Category States						
AP	4.86	25.6	15.62	37.65	16.33	14.63
BH	5.31	21.17	22.62	35.4	21.43	11.54
GA	2.57	17.24	14.21	29.14	13.68	14.11
GT	2.12	15.5	11.36	24	18.31	19.59
HR	1.56	9.9	8.59	22.29	15.92	16.38
KR	2.79	16.67	6.26	17.9	13.76	10.62
KL	2.6	17.09	10.36	28.29	20.09	19.53
MP	1.46	13.26	12.09	28.14	14.72	11.4
MH	4.5	9.6	8.24	19.61	15.02	15.71
OD	3.46	25.99	15.37	23.88	25.92	11.81
PN	3.53	19.03	15.27	36	26.97	24.3
RJ	2.11	14.39	12.02	30.8	21.71	17.92

TN	3.51	21.87	7.54	20.39	13.49	13.75
UP	3.76	32.3	15.06	37.02	24.21	14.68
WB	2.07	17.58	12.7	41.92	28.32	31.31
Special Category States						
AR	2.58	12.59	11.29	38.32	7.17	5.62
AS	5.26	26.43	9.12	19.9	15.03	8.81
HP	4.69	26.8	17.37	40.74	19.2	18.8
JK	5.3	23.18	16.98	46.9	16.21	11.01
MN	3	16.86	16.08	46.62	10.82	7.97
ML	15.64	25.37	9.78	30.34	8.25	7.46
MZ	10.89	36.25	46.4	65.31	8.36	7.56
NG	7	19.01	24.26	51.14	12.07	8.5
SK	6.02	19.56	19.8	30.99	5.86	5.89
TR	1.48	17.1	20.48	37.74	11.31	9.38
UT	4.86	25.6	14.29	23.18	15.4	14.32

Note: Andhra Pradesh (AP); Bihar (BH); Goa (GA); Gujarat (GT); Haryana (HR); Karnataka (KR); Kerala (KL); Madhya Pradesh (MP); Maharashtra (MH); Odisha (OD); Punjab (PN); Rajasthan (RJ); Tamil Nadu (TN); Uttar Pradesh (UP); West Bengal (WB); Arunachal Pradesh (AR); Assam (AS); Himachal Pradesh (HP); Jammu & Kashmir (JK); Manipur (MN), Meghalaya (ML); Mizoram (MZ); Nagaland (NG); Sikkim (SK); Tripura (TR); Uttarakhand (UT)

Source: Calculated based on Handbook of Statistics on State Government Finances, RBI & EPWRF

Structural Breaks

Table 6: Structural Breaks in fiscal deficit to GSDP Ratio: Special Category States

States	Year of Break	F- Statistic	P- value	Remarks
Arunachal Pradesh	2006	72.0087	0.0000	Significant
Assam	2006	65.2712	0.0000	Significant
Himachal Pradesh	2006	80.7822	0.0000	Significant
Jammu & Kashmir	2007	18.2349	0.0001	Significant
Manipur	2006	49.6918	0.0000	Significant
Meghalaya	2006	41.5883	0.0000	Significant
Mizoram	2007	12.4150	0.0005	Significant
Nagaland	2010	33.4611	0.0000	Significant
Sikkim	2011	27.9877	0.0000	Significant
Tripura	2006	74.6025	0.0000	Significant
Uttarakhand	2006	12.3004	0.0000	Significant

Source: Calculated based on Handbook of Statistics on State Government Finances, RBI & EPWRF

A break in fiscal performance is suggested by the evidence of deficit reduction in terms of gross fiscal deficit at the special category states of India (Table 6). In case of all the Special Category States,significant break point has been observed after the implementation of the FRBM Act.

Panel Unit Root Test

Prior to opting for the panel regression approach, we investigated the time-series properties of all the variables, such as Fiscal deficit to GSDP ratio, growth rate of GSDP, Development Revenue Expenditure to the ratio of revenue receipts.Different methods of panel unit root tests viz. ***Levin, Lin, Chu (2002),Im, Pesaran, Shin (2003)*** were applied in our investigation for both Special as well the Non-Special Category States separately (Table 7).Where the earlier one assumes a common unit root across cross-sections, while the latter one assumes individual unit root processes.Here, the null hypothesis signifies the presence of a unit root at level, while the alternative hypothesis ascertains stationarityin the data series.The results of both the tests collectively suggest that all the variables are stationary at 1 percent level of significance and development revenue expenditure to revenue receipts is stationary in the first difference.

Table7: Results of Panel Unit Root Tests: Levin, Lin, Chu (2002),Im, Pesaran, Shin (2003)

Variables	Non-Special Category States		Special Category States	
	Levin, Lin, Chu t-statistics	Im, Pesaran, Shin W-statistics	Levin, Lin, Chu t-statistics	Im, Pesaran, Shin W-statistics
FD/GSDP	-2.161 (0.015*)	-0.696 (0.243***)	-5.845 (0.00*)	-5.313 (0.00*)
GSDPgr	-16.845 (0.000*)	-16.551 (0.000*)	-11.928 (0.00*)	-12.554 (0.00*)
DRE/RR	-1.328 (0.092**)	-0.148 (0.440***)	-1.267 (0.102***)	-0.857 (0.195***)
DRE/RR: I(1)	-15.064 (0.000*)	-15.666 (0.000*)	-11.386 (0.000*)	-14.217 (0.000*)

*Note: I(1) is the 1st difference of the unit root; automatic selection of lags through Schwarz Information Criteria (SIC). All panel unit root tests are defined by Bartlett kernel and Newly West bandwidth. *-**-*** shows 1, 5 &10 per cent level of significance.*

Source: Authors' Calculation

Panel Cointegration Test

Since all the variables were found to be I (0) in case of both Levin, Lin, Chu and Im, Pesaran, Shin except DRE/RR is I(1) in Im, Pesaran, Shin. In the next step, an attempt has been made to test, whether there exists a long-run equilibrium between the variables through the panel cointegration tests.The study has been used the methodology proposed by Pedroni (1999) to test whether a cointegrating relationship exists between the variables in case of Special as well Non-Special Category States.The null hypothesis shows there is no cointegration while the alternative hypothesis shows there is cointegration.This method employs seven statics, four panel statistics and three group panel statistics.In the case of panel statistics, the first-order autoregressive term

AR(1) is assumed to be the same across all the cross sections while in case of group panel statistics, the parameter is allowed to vary over the cross sections (Kaur, 2018). The results of the test for both the panel and group statistics reveal evidence of panel cointegration (Table8).The estimated 'rho' statistics, variance ratio 'V' statistics, fails to reject the null hypothesis which means there is no cointegration among the variables in case of Non-Special Category States. But AugmentedDickey Fuller (ADF) statistics and the Phillips and Perron (PP) statistics reject the null hypothesis of no cointegration at 1% significance level for all the three models.This implies

Table-8: Panel Cointegration Tests: Pedroni Residual Cointegration

Test Statistics	Non-Special Category States		Special Category States	
	Panel Statistics	Group Statistics	Panel Statistics	Group Statistics
Model with no deterministic intercept or trend				
V Statistics	-0.990 (0.839***)		-0.948 (0.828***)	
Rho Statistics	-0.810 (0.208***)	1.405 (0.920***)	-2.474 (0.006*)	-1.463 (0.071**)
PP Statistics	-1.962 (0.024**)	-0.131 (0.447***)	-4.586 (0.000*)	-4.666 (0.000*)
ADF Statistics	-1.988 (0.023**)	-0.069 (0.472***)	-4.623 (0.000*)	-4.732 (0.000*)
Model with individual intercept and no deterministic trend				
V Statistics	-0.946 (0.828***)		-1.290 (0.901***)	
Rho Statistics	-0.630 (0.264***)	2.298 (0.989***)	-2.101 (0.017*)	-0.997 (0.159***)
PP Statistics	-2.390 (0.008*)	1.077 (0.859***)	-5.600 (0.000*)	-5.716 (0.00*)
ADF Statistics	-1.515 (0.04*)	1.775 (0.962***)	-5.806 (0.000*)	-5.605 (0.00*)
Model with individual intercept and trend				
V Statistics	-1.271 (0.898***)		-2.847 (0.997***)	
Rho Statistics	0.902 (0.816***)	2.148 (0.984***)	-0.604 (0.272***)	0.476 (0.683***)
PP Statistics	-6.501 (0.000*)	-5.919 (0.000*)	-9.043 (0.000*)	-15.322 (0.000*)
ADF Statistics	-7.018 (0.000*)	-5.107 (0.000*)	-7.096 (0.000*)	-7.807 (0.000*)

*Note: All reported values are asymptotically distributed as standard normal. Figures in the parentheses indicate the respective p values. Automatic selection of lags through Schwarz Information Criteria (SIC). Newly West bandwidth selection using a Bartlett kernel. *-**-*** shows 1, 5 &10 per cent level of significance.*

Source: Authors' Calculation

that the cointegration results are not affected by differentmodeling assumptions. Moreover, in case of the Special Category states the results are same as the Non-Special Category States but here except 'rho statistics and V statistics, all the panel and group statistics reveal the evidence of panel cointegraton.

The Pedroni(1999) test results are also supported by Kao residual cointegration test, which rejects the null hypothesis and accept the alternative hypothesis of cointegration at 1% level of significance (Table 9). Also, in case of Non-Special Category States the test shows cointegration at 1% level of significance. Thus, the overall findings of the

panel cointegration tests reveal that the FD/GSDP, GSDPgr, DCE/RR and DFRBM are cointegrated, indicating a long-term co-movement between them. Thus, it is clear from the results that there is a long runimpact of the FRBM on the fiscal indicators of the Indian states.

Table-9: Results of Kao Residual Tests

Variable	Non-Special Category States		Special Category States	
	t-statistics	Prob.	t-statistics	Prob.
ADF	-2.074	0.019	-1.643	0.040
Residual variance	1.472		9.820	
HAC variance	0.449		1.487	

*Note: Newly West bandwidth selection using a Bartlett kernel. Automatic selection of lags through Schwarz Information Criteria. *-**-*** shows 1, 5 &10 per cent level of significance.*

Source: Source: Authors' Calculation

After ensuring the stationary properties of the data, the impact of FRBM Act has been examined by using the panel estimation methods. The following equation has been used for hepurpose:

$$F_{it} = \alpha_o + \beta_1 Gr_{(it-1)} + \alpha_1 RE_{it} + \alpha_2 D_{it} + \varepsilon_{it} \quad (1)$$

Here, F stands for fiscal deficit to GSDP ratio; Gr is the growth rate of GSDP; RE is the development revenue expenditure to revenue receipt ratio; D is the FRBM dummy with '0' (if not implemented) and '1' (if implemented) and ε is the error term of the model. For checking the fixed or random effect, Hausman specification test is applied which validates the fixed effect model for the Non-Special Category States and random effects model for the Spcial Category states. The result of Fixed effect model shows that the impact of FRBM Act on the fiscal deficit to GSDP ratio is significant at 1% level for the Non-Special Category States. Whereas, the Random effect model reveals that the implementation of the FRBM Act has significant impact on the fiscal deficit to GSDP ratio for the Special Category states at 5 percent level. So, implementation of FRBM appears to be significant for managing fiscal deficit.

Table10 clearly reveals that the implementation of FRBM has a clear and significant impact on fiscal deficit of the Non-Special Category States. The positive coefficient of the FRBM dummy reveals that the implementation of FRBM leads to an adverse impact on the States' fiscal deficit with an increasing amount of deficit as (α_o+α_2i.e. 16.14 + 6.40 = 22.54) on an average, keeping all other explanatory variables constant. Again for the Non-Special Category States, gross fiscal deficit reduces with increased in GSDP growth rate as well as development revenue expenditure as a proportion to revenue receipt. However, for the Special Category States, the implementation of FRBM Act does not have that much adverse impact on their fiscal deficit as compared to the Non-Special Category States, though there is no model fit for the regression of the Special Category States.

Table-10: Results of the Fixed and Random Effect Models

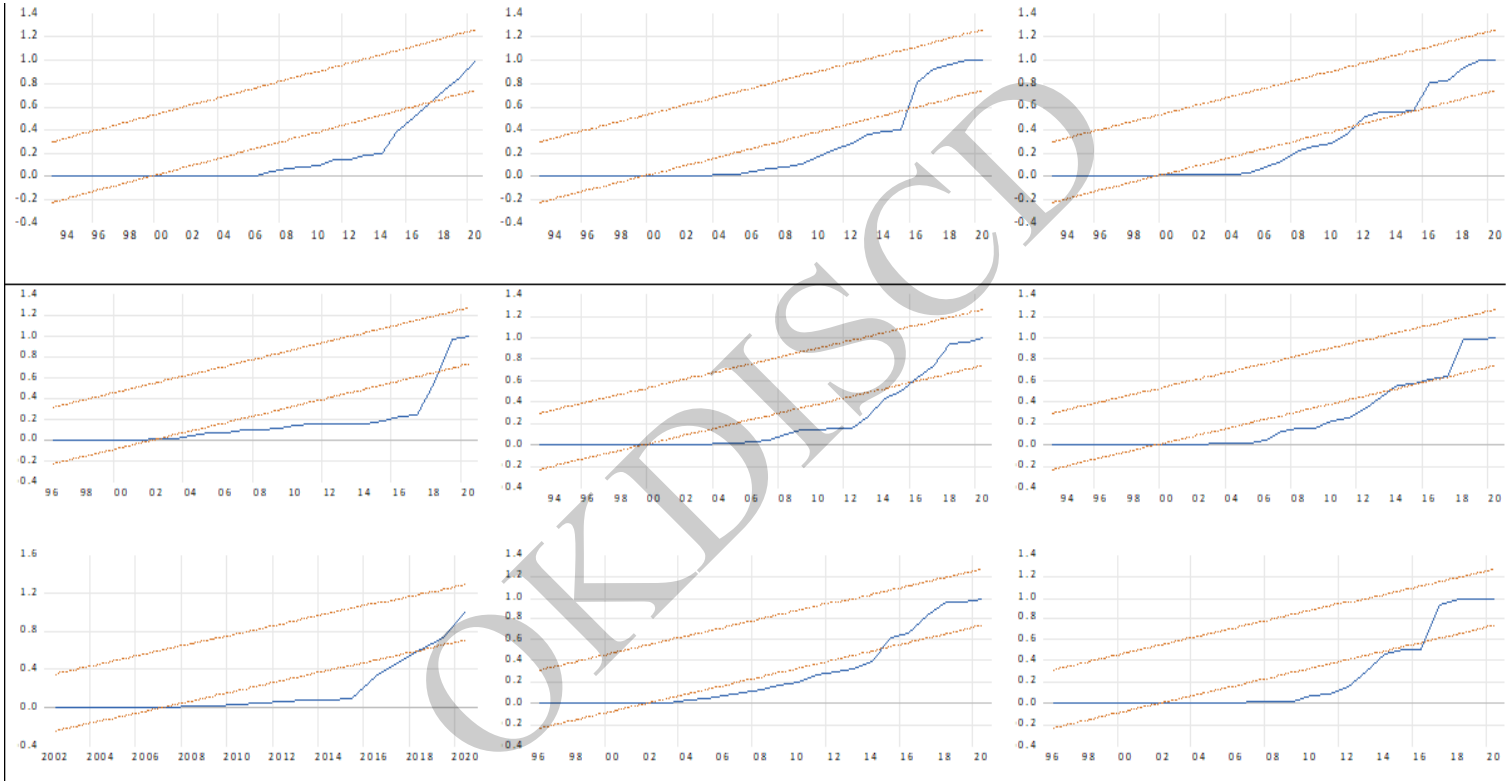
Regressors	Non-Special Category States (FE)	Special Category States (RE)
C	16.135 (0.000*)	7.521 (0.000*)
GSDPgr	-1.485 (0.138***)	0.854 (0.193***)
DRE/RR	-2.137 (0.033**)	-1.560 (0.119***)
FRBM_dummy	6.403 (0.000*)	1.841 (0.066**)
Cross-section FE (dummy variables)		
R-squared	0.273	0.015
Adjusted R-squared	0.244	0.005
F-statistic	9.244 (0.000)	1.526 (0.207)
Akaike info Criterion	3.536	
Durbin-Watson stat	0.848	1.390
Hausman (chi2)	0.000 (1.000)	10.561 (0.014)
No. of observation	435	292

*Note: 1. Figures in p-values; *-**-*** indicate significance levels at 1%, 5% and 10%, respectively.*

Source: Authors' Calculation

It can be observed from Figure 5, that the CUSUM of Square statistics is significant at 5 % level of significance. The figures indicate that the model is stable only for the state of Uttarakhand. Other states have shown instability over the time. Break point is observed for all the states after the implementation of the FRBM Act.

Figure 5: Special Category States: Fiscal Deficit



RBI & EPWRF; Note: fig: (i-xi) contain for the AR, AS, HP, JK, MN, ML, MZ, SK, TR, UT respectively; Source: Calculated based on Handbook of Statistics on State Government Finances

Conclusion

The present study clearly demonstrates that the fiscal performance of the special category states after the implementation of the FRBM Act appears to be better in comparison to the Non-Special Category States. These states have been reducing revenue deficit and also maintain revenue generation after the FRBM Act, but in the context of fiscal deficit and debt sustainability, the performance is not that much satisfactory. The causes may be that most of the special category states have utilized the central resources according to their capacity and performing well over time but some of them were failed to maintain fiscal sustainability and they are highly dependent on central grants. The result of the Chow test has shown structural break in case of all the special category states in the post-FRBM period. There is unexplained variation in fiscal performance across the states. Thus, it is expected to be better if there is a target-based and time-bound framework with proper accountability and monitoring facilities, for both the special and non-special category states. It may be motivated them to grow and become prosperous by reducing their dependency on the Centre.

Note:

Now, there is no such categorization of special and general category states after the recommendations of the Fourteenth Finance Commission and restructuring and reduction of the plan grants and CSS lead these states in a disadvantageous position. But still the eight northeastern states and the two (As Jammu & Kashmir become union territories: 31st October, 2019) Himalayan states were getting some benefits than other states considering their economic backwardness and higher dependency on the Centre.

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Migration Tales from Indian Census

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Abstract

The paper stems with the objective to explore the extent and causes of migration in India based on the Census 2011 data. In India there are two types of migrants- by birth and by place of last residence. The data analysis shows that the extent of migration in India is on the rise. The migrants are mostly females and are concentrated in the rural areas owing to marriage as the most prominent cause of migration. However, economic factors of migration are more important for males. Moreover, it is seen that urbanisation and migration are concomitant India is no different. The agrarian belt of Eastern and Central India witness higher outflow while the western region and certain parts of Northern India are the major destinations. The trend in Census data also gives an indication to the nature of return migration during the current COVID pandemic.

1. Introduction

Migration is an old age phenomena. People moving from one area to another in search of improved livelihoods have been a key feature of human history. The temporary or permanent movement of people from one geographic location to another owing to a variety of reasons ranging from better employment to religious persecution is called migration (Hagen-Zanker, 2008). Again, migration along with fertility and mortality are the three pillars determining the size, composition and distribution of human population (Bhagat, 2005). Literatures, nonetheless, indicate that migration is influenced by social, cultural and economic factors and its outcome has differential manifestations owing to gender, spatial and temporal variations. It may be noted that theoretical expositions on migration generally attempt to focus on two orientations- the origin of the process and the perpetuation of the system. Economic decision making under the neo-classical school of thought had obtained the prime position in explaining the causes of sustenance of migration traditionally over the years; however, the new economics of labour migration (NELM) indicates this process as not just an individual phenomenon but often a family, and at times, a community decision. Further, the use of social, demographic, financial, environmental variables

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along with standard economic variables in the recent years widened the dimension of migration literature and system. There is an argument of considering migration from the aspect of behavioural economics and five types of migrants having- physiological needs, safety needs, social needs, esteem needs and self-actualization needs, are considered (Žičkutė & Kumpikaitė-Valiūnienė, 2015). It is thus obvious that the impact of migration is numerous and scattered. It varies between the source and the destination and has immense cultural linkage. The present study stemmed out in this backdrop to understand and discuss the dimensions of migration in India.

Migration is important and it is said that in certain parts of India, for every four households, at-least three migrants are found and the dynamics of migration on the individuals, households and regions has a strong and significant impact on the national economy and society. The recent pandemic witnessed an unprecedented movement of people returning home amidst severe distress; however, no data is available regarding the extent of such migration. Nonetheless, to generate a fair idea, we undertake the present study with the broad objective of studying the nature and causes of migration in India. The study is exploratory in nature and attempts to - a) *examine the volume of migrants in India including its gender and spatial considerations & b) discuss out the reasons behind such migration.*

The study is based exclusively on secondary data. The D- Series of Census 2011 on Migration in India is used for the study as it was published in late 2019 and extremely exhaustive. The secondary data was tabulated and processed for deriving the desired objectives using standard analytical and statistical tools. Tables and Charts were used for easier comprehension.

For analytical purpose and we have classified the Indian states/ UTs into six zones as has been the practice by several institutions including NITI Aayog. These are – 1) Northern Zone: Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Delhi & Chandigarh; 2) North-Eastern zone: Assam, Arunachal Pradesh, Manipur, Tripura, Mizoram, Meghalaya & Nagaland; 3) Central Zone: Chhattisgarh, Uttarakhand, Uttar Pradesh and Madhya Pradesh: 4) Eastern Zone: Bihar, Jharkhand, Orissa, Sikkim and West Bengal; 5) Western Zone: Goa, Gujarat, Maharashtra, Daman& Diu and Dadra & Nagar Haveli; 6) Southern Zone: Andhra Pradesh, Andaman& Nicobar Islands, Lakshadweep, Karnataka, Kerala, Tamil Nadu and Pondicherry. The inter-regional variations were studied on this specification.

This paper is structured into five sections including the present Introduction. Section 2 provides a brief note on the concepts and terms of migration in India. In Section 3, data analysis is undertaken while the fourth section provides a discussion. Concluding remarks are provided in the final section.

2. Migration in Census: Notes and Concepts

The office of the Registrar General of India publishes migration data based on its inter-decadal enumeration exercise, known as Census. The data is published as the D-Series and records migrants of two forms- by birth and by place of residence. It may be noted that the Census of India has been recording the place of birth, rater the district of birth, right from 1881. Thus it was possible to identify inter-district and inter-state migration. Since 1961, the town and village of birth was recorded, thus, intra-district migration data was also possible. The information on the place of last residence has been collected since 1971 census and from 1981; the reasons of migration based on the place of last residence are being recorded. It may be recalled that movement of population within the boundary of a district is defined as intra-district migration, whereas the movement outside the district but within the state is known as inter-district migration, while the movement beyond the states/ UTs but within the country is termed as inter-state migration.

Migrants by Place of Birth: If a person is enumerated in the village or town where he/ she was born, then he/she is not a migrant. Others are. Enumerators note the birthplace in such situation and the status of the person is determined accordingly. Similar is the case for person born in other state of India or in any foreign country and their respective classification. A person born on the high seas is recorded as 'born at sea'; while for those born in train, boat, bus or aircraft, the administrative and territorial status of the actual place of birth was recorded.

However, for people who moves from his/her place of birth but returns back before the enumeration, such migration cannot be recorded. In other words, the place of birth criterion is unable to capture return migrants.

Migrants Defined by Place of Last Residence: The place of last residence is the most commonly used measure to determine the migrant status of a person. The place of birth can also be the place of last residence if the enumeration is being done at a different place. However, there is no minimum time-duration for ascertaining the status of migrants by last residence. Discretionary decisions, if needed, are made. A government official transferred to a different place over a new posting will be a migrant by last residence in case of stay during enumeration. However, temporary movement like women moving into hospital for delivery or a person moving into a hospital for treatment are not examples of migrants by place of last residence.

In other words, we say that the Census of India considers two types of migrants. The first category is known as the Migrants by place of birth (MPB) and the second category is migrants by place of last residence (MLR). MPB are those who are enumerated at a village/town at the time of census other than their place of birth, whereas, a person is considered as MLR, if the place in which he/she is enumerated during the census is other than his place of immediate last residence

Causes of Migration

Marriage is the most prominent of the reasons accounted by Census owing to the social custom of women migrating to the husband's place on marriage. Employment and business are two separate causes for migration as per Census classification. A person moving out in search of a job or for joining a job is migrant for employment; and that includes the transfer of government servants as well as others of the organised sectors. On the other hand, if a person moves on account of joining a business or setting up or running a business; the cause is business. The distinction between work/ employment and business is based on the nature of payment/ earning. The former receives wages/ salary as remuneration for human labour; while in the latter earning is for risk-taking and entrepreneurship efforts.

Education is a reason of migration under census. A person moving to join a school/ college/ or any other educational institute falls under this category. However, dependent children or young adults being enrolled for education at a different place following the movement of the guardian or earning member is categorised as moved with household. The reason moved after birth caters to the cultural practice of the expecting mothers moving to their parental house for childbirth. The baby born at his maternal place becomes a migrant at his paternal place thereof. This is also applicable to births occurring at hospitals and nursing homes located at a different place.

'Others' as a cause in India acts as an envelope. It includes all those persons who moved due to partition; takes into fold all those who have been internally displaced following developmental interventions like construction of highways, large irrigation projects and industrial establishments; accounts for those unfortunates who are fall out of manmade disasters like riots, social unrest and ethnic disturbances. Last but not the least, people moving out due to environmental impacts and disasters like droughts and floods are also considered under the umbrella of others.

3. Data Analysis

Extent of Migration

The number of MPB in India increased from 30.71 crores in 2001 to 44.73 crores in 2011 as seen in Table 1, which also shows that the number of such migrants in 1991 was 22.98 crores. Majority of these migrants have been of intra-district category suggesting migration within shorter distance. However, the number and share of international migrants by birth have reduced over the years. Interestingly, the number of migrants increased by almost 34% during 1991-2001; on the other hand, the growth in the number of migrants is more than 45% during 2001 to 2011. Table 3.1 also shows that the number of inter-state migrants has increased from 2.72 crores to 5.63 crores but their share has remained in the range of 12-13% over the years. Similarly, the number of inter-district migrants by birth has more than doubled from 5.91 crores to 12.12

crores in the twenty year period from 1991, yet its share remained in the vicinity of 25-26% of the total migrants

Table 1: Type of Migrants by Birth in India (in Crores)

	2011	2001	1991
Total Persons	44.73 [100]	30.71 [100]	22.98 [100]
Intra-district	26.41 [59.04]	18.17 [59.17]	13.62 [59.27]
Inter-district	12.12 [27.10]	7.68 [25.00]	5.91 [25.72]
Inter-state	5.63 [12.59]	4.23 [13.77]	2.72 [11.84]
International	0.536 [1.20]	0.61 [1.99]	0.69 [3.00]
Unclassifiable	0.03 [0.07]	0.02 [0.06]	0.04 [0.17]

Source: Computed from various Census Reports

Note: Figures in parentheses indicate percentage;

The total population of India is 121.08 crores and numbers of MLR are 45.57 crores which amounts to 37.64% of the total. The number of male migrants is 14.61 crores while the majority is female, 30.96 crores. In other words, females constitute 67.94% of the migrant population and the rest 32.06% are male. On the other hand, the number of rural migrants is 27.82 crores, whereas the rest, 17.75 crores stay in urban areas, i.e., majority of the migrants, 61.04% stay in rural areas and the remaining 38.96% resides in urban areas.

From Table 2, it can be observed that the share of migrants in the total population is highest in Goa, 78.21% and least in Jammu & Kashmir, 22.40%. The share of migrants among the population is higher in smaller units like the union territories Chandigarh, Puducherry, etc, whereas among the larger states, Kerala and Maharashtra indicate mark more than 50% of their population as migrants by last residence. As seen earlier, the average of India in terms of share of migrants by last residence is 37.64%, and only one north-eastern state Arunachal Pradesh indicates a higher ratio. Rather, most of the other remaining NER states are in the lower spectrum of the spread with Manipur and Meghalaya being just ahead of Jammu & Kashmir. Large states like Uttar Pradesh, Bihar, Rajasthan and Madhya Pradesh share the commonality of lower proportion of migrants.

Table 2 further indicate that males as migrants are higher in smaller places like- Daman & Diu (66.31%), Lakshadweep (58.32%), Dadra & Nagar Haveli (54.95). Among the states, Meghalaya leads with 53.37% share of males among the migrants followed by Nagaland (51.15%). On the other extreme, the shares of males are less in states like Bihar (14.08%), Uttar Pradesh (19.83%) and Jharkhand (20.71%). Interestingly, the share of males among the total migrants is more than the national average (32.06%) in all the NER states with Assam having the lowest ratio (34.50%).

Table 2: Migrants in India (By Last Residence)

States and UT	Population	Migrant (%)	Male Migrants (%)	Rural Migrants (%)
A & N Islands	380581	56.84	50.96	64.10
Andhra Pradesh	84580777	45.35	38.05	58.99
Arunachal Pradesh	1383727	45.59	47.69	64.45
Assam	31205576	34.11	34.50	79.44
Bihar	104099452	26.17	14.08	85.40
Chandigarh	1055450	64.26	53.42	2.90
Chhattisgarh	25545198	34.79	26.07	67.90
Dadra & Nagar Haveli	343709	54.71	54.90	33.33
Daman & Diu	243247	61.09	66.31	14.70
Delhi	16787941	43.03	51.93	2.42
Goa	1458545	78.21	47.10	38.12
Gujarat	60439692	44.50	37.16	48.70
Haryana	25351462	41.75	30.19	51.90
Himachal Pradesh	6864602	38.56	25.20	84.10
Jammu & Kashmir	12541302	22.40	29.62	65.05
Jharkhand	32988134	29.28	20.71	67.57
Karnataka	61095297	43.31	38.56	56.21
Kerala	33406061	53.47	40.94	55.04
Lakshadweep	64473	31.64	58.32	20.85
Madhya Pradesh	72626809	34.06	25.93	66.10
Maharashtra	112374333	51.06	42.15	51.12
Manipur	2855794	24.05	35.12	64.22
Meghalaya	2966889	25.60	53.37	72.18
Mizoram	1097206	35.31	49.92	34.81
Nagaland	1978502	27.78	51.15	50.00
Odisha	41974218	36.74	27.41	77.41
Puducherry	1247953	57.09	44.87	32.98
Punjab	27743338	49.51	36.99	57.31
Rajasthan	68548437	32.20	20.85	71.75
Sikkim	610577	40.46	44.15	62.85
Tamil Nadu	72147030	43.35	40.88	46.56
Tripura	3673917	35.37	37.27	67.43
Uttar Pradesh	199812341	28.25	19.83	70.97
Uttarakhand	10086292	42.81	34.31	62.64
West Bengal	91276115	36.65	30.62	63.83
Total	1210854977	37.64	32.06	61.04

Source: Census of India 2011

The rural urban divide of the migrants indicate Bihar having 85.4% of its migrant residing in rural areas followed by Himachal Pradesh (84.1%) and Assam (79.44%). The proportion of rural migrants expectedly will be less in urbanised areas and the data attest to it with Delhi and Chandigarh showing an incidence of 2-3%. Among the states, Mizoram has the least rural migrant share, 34.81%. Tamil Nadu and Maharashtra also indicate comparatively lesser share of rural migrants.

Table 3: Descriptive Statistics of Extent of Migrants

Region		TMS	FMS	RMS
North East	Mean	32.54	55.85	61.79
	Std. Deviation	7.43	8.18	14.90
Northern	Mean	41.67	64.54	47.92
	Std. Deviation	13.19	12.76	32.59
Western	Mean	57.91	50.47	37.19
	Std. Deviation	12.84	11.44	14.56
Central	Mean	34.98	73.46	66.90
	Std. Deviation	5.99	5.94	3.48
Southern	Mean	47.29	55.35	47.82
	Std. Deviation	9.18	7.48	14.56
Eastern	Mean	33.86	72.61	71.41
	Std. Deviation	5.91	11.33	9.71

Source: Computed from Census of India 2011

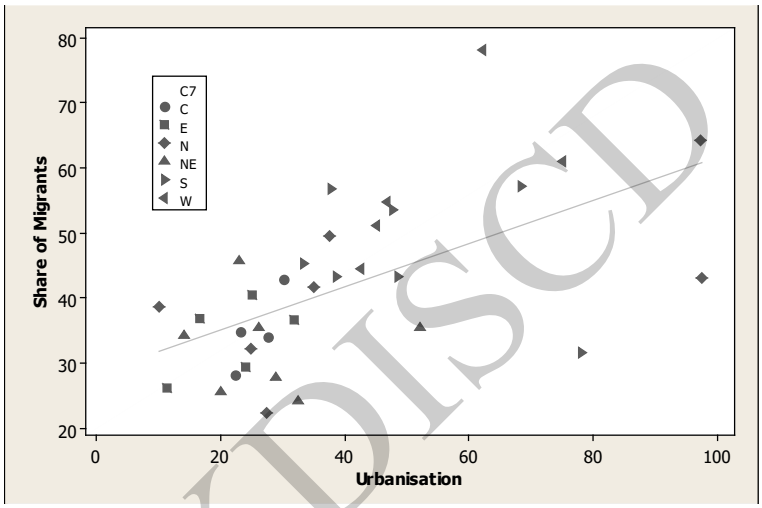
Notes: TMS- Share of Migrants in Total Population; FMS- Share of Females in Total Migrants; RMS- Share of Rural Migrants among Total Migrants

Table 3 indicate that the proportion of migrants in total population is highest in Western region (57.91%) and least in North-eastern region (32.54%); the standard deviation is however maximum for the Northern region (13.19) followed by that of western region (12.84). The spread is low in Eastern (5.91) and Central Region (5.99). We had seen earlier that incidence of migrants are highest in Goa and least in Jammu & Kashmir. In terms of the female share among migrants, it is the Central and the Eastern region at the top with an average of 73.46% and 72.61% respectively., The least average rates, 50.47% are in the Western region while Southern and North-eastern are almost at par with around 55%. The dispersion for this classification is highest for the Northern region (12.76) alike the previous indicator and the least values are seen for the Central region (5.94). It may be noted that the female share in total migrants is maximum in Bihar (85.92%) and minimum in Daman & Diu (33.69%).

The rural: urban divide in the migration domain of the country also provides unique spectrum. Most of the unitary Union Territories of India are almost thoroughly urbanised as a result, the share of rural population in such areas are negligible. Thus,

it is no surprise that we find the lowest share of rural migrants among the 35 considered units is found in Delhi (2.42%) and Chandigarh (2.9%). On the other hand, the shares of rural settlers among the migrants are among the highest in Bihar (85.40%) and Himachal Pradesh (84.10%). Nonetheless, from Table 3, we find that the average is highest for the Eastern region (71.41%) and least for Southern (47.82%) and Northern region (47.9%). The standard deviation is least in the Central Region (3.48) and highest in Northern region (32.59).

Fig 1 Migration and Urbanisation



Source: Computed from Census 2011

In this context, we may note that migration and urbanisation are often considered concomitant to each other. The correlation coefficient between the rate of urbanisation and rate of migration is 0.585 which is statistically significant at 1% level of significance. Fig 1 shows that most of the states and UTs belonging to the central, eastern and north-eastern region flock towards the origin indicating low extent of both urbanisation as well as the rate of migration. A close look at the figure shows that the two extremes at the right vertical axis are Delhi and Chandigarh, both highly urbanised and having a significant proportion of migrant population. The upward slope of the fitted line indicates the positive relationship of these two factors.

Reasons of Migration

Census of India as we know classified seven (7) reasons for migration. Among these work/ employment, business and education can be considered as economic factors while marriage, moved after birth, moved with household are purely social factors influencing migration. Others include factors like natural hazards and various types of issues which causes movement of people from one place to another. Others also include displacement or forced migration which is often an offshoot of development

interventions and inclusive of economic, social and even political causes. Table 4 provides a snapshot on the reasons of migration of Indian people as an aggregate. Considering males and females together as persons, it is observed that marriage is the most prominent reason for migration in India, 46.33%, and it is particularly because of the system of the bride moving to the groom's residence as customary in most of the country. The second most definite cause of migration in India is moved with household indicating the movement of dependent family members along with the head of the household. Among the economic factors, movement for work or employment accounts for 9.09 % of the total.

Business and education factors accounts for 0.79% and 1.20 % of the country's total migration. Others as a reason of migration account for 20.69% of the total migration in the country. The reasons of domestic migration indicate similar trend, save marginal variation, from the country's aggregate. However considering rural migrants we observe that marriage as a factor becomes even more dominant- accounting for 59.89% of the total, while others as a cause has the least share, 10.42% among all the considered levels. Others as a factor are responsible for 10.42% of the migration. The case for urban migration is quite different from the rural scenario. The economic factors become a bit important- work/employment account for 12.58%. Even though the social causes account for almost 64% of the urban migration, the share of marriage is much lower, 26.33%, while moved with household accounts for 23.45% and moved after birth shares 13.35%. For the intra-district and inter-district migration, the social factors dominate undoubtedly, but it is interesting to note that work/employment contribute to more than 12% of the inter-district migration, while for intra-district migration the share is 5.0%. The share of others as a reason also vary between inter-district and intra-district level with the former recording 24.60% share while the later accounts for 14.13% share.

However, the inter-state migration, suggest a different scenario. The relative importance of economic factors is visible with work/employment emerging as a cause of movement for 23.13% of such migrants. Marriage, on the other hand, accounts for 31.13 % while, moved with household suggest 24.05% occurrence. Further, it is seen that among the migrants from other countries, the reasons are somewhat differently attributed. Moved with household is the most prominent cause followed by others. Marriage is placed at the third position with 22.83% share, whereas, education is less than 1% and moved after birth is less than 3%. Among the unclassifiable migrants, others are the most prominent factor for migration followed by moved with household and marriage.

Table 4 also shows the wide difference in the reasons of migration across the gender dimension. Work/ Employment account for 23.96% of the male migrants in the country while for the females, only 2.07% ascribe work/employment as a cause for movement. Work/Employment as a cause for male migration is least, 13.67%, for the within district classification among those referred here. The rate for the females in the same category is 1.41% which is also the lowest. While work/ employment are the cause

for 47.17% of inter-state male migration, for females it is 4.26%. Marriage, on the other hand, is the predominant reason for migration of females across the country and beyond-either rural or urban; intra- state or inter-state; intra-district or inter-district. Among the rural female migrants, marriage is the reason for 77.65% incidence. However, migration among males for marriage is certainly in practice but with much lesser dimensions. 5.84% of male migrants in rural India have cited marriage as the cause for their enlistment here. Incidence of migration for business and education is higher among males as compared to females. These two reasons do not account for even 1% of the female migration. Social factors of migration like moved after birth and moved with household are also higher for males across various spatial dimensions. Others as a reason account for 44.57% of male migration within the district while it is 17.84% for inter-state male migration. For females, others as a cause for migration are accountable for only 7.26% of the rural incidence.

Among these seven reasons listed for migration, three causes, namely- Work/ Employment, Business and Education are considered as economic factors, while three more, namely Marriage, Moved after Birth and Moved with Household are considered as social factors. The seventh reason *Others* as the name suggest may include both economic and social reasons as well as political, cultural, natural and miscellaneous issues.

4. Discussion

The total number of migrants in the country varies by around 0.85 crores over the two types of measures used by the Census classification. The number of MPB in 2011 was around 44.73 crores, while the count of MLR was 45.58 crores. Interestingly, the composition of MLR in terms of spatial distribution is marginally different than that of MPB. Intra-districts migrants are more for MLR while the incidence of inter-district and inter-state migration is more for MPB. However, considering the situation with 2001, it is observed that during the 10 year period till 2011, the number of migrants increased by around 45% in both counts of MPB and MLR. Further, the increase was highest among the inter-district category, around 58% followed by the intra-district segment, which had a growth of almost 45%. The relative importance of inter-state migration among the total migrants in the country has declined marginally as in 2001, both counts showed a share of around 13% for them, while in 2011, the share for inter-state migrants was 12% following a relatively slower increase of around 32% in the inter-census period. Also, interesting to note is the numerical decline in terms of international MPBs, which is understandable because of age related death of a number of people who have migrant because of India's partition and subsequent independence. Obviously, an issue which emerges here is whether the increased incidence of within state migration can be considered as an indicator of lesser tendency to move towards a few particular regions as well as a possibility of increased opportunities in some of the states which accounted for outflow in the earlier periods.

Table 4: Causes of Migration by last residence (In %)

			Work/ Emp	Business	Education	Marriage	After Birth	Moved with HH	Others
Person	Total	Total	9.09	0.79	1.20	46.33	7.43	14.47	20.69
	Within India	Total	9.07	0.78	1.20	46.64	7.49	14.23	20.58
	Within India	Rural	9.05	0.68	1.16	59.89	6.26	12.55	10.42
	Within India	Urban	12.58	1.35	1.68	26.23	13.35	23.45	21.37
	Within state	Total	7.15	0.67	1.18	48.77	7.88	12.89	21.47
	Within district	Total	5.08	0.53	1.05	49.44	8.21	11.10	24.60
	Other districts	Total	12.01	1.00	1.48	47.20	7.10	17.09	14.13
	Other States	Total	23.13	1.60	1.37	31.13	4.62	24.05	14.09
	Outside India	Total	10.06	1.16	0.89	22.83	2.83	33.09	29.14
	Unclassifiable	Total	11.04	1.32	1.67	22.31	5.94	27.50	30.21
Male	Total	Total	23.96	1.84	2.26	3.66	13.74	20.31	34.24
	Within India	Total	24.06	1.83	2.27	3.70	13.92	20.02	34.20
	Within India	Rural	31.03	2.04	2.83	5.84	15.43	22.78	20.05
	Within India	Urban	24.78	2.36	2.34	1.92	17.68	24.11	26.80
	Within state	Total	19.44	1.60	2.30	4.07	15.47	19.65	37.46
	Within district	Total	13.67	1.24	2.00	4.22	16.34	17.95	44.57
	Other districts	Total	32.50	2.41	2.99	3.73	13.48	23.51	21.37
	Other States	Total	47.17	3.00	2.12	1.83	6.18	21.86	17.84
	Outside India	Total	18.69	2.02	1.29	1.42	3.67	36.28	36.62
Female	Total	Total	2.07	0.29	0.70	66.48	4.45	11.72	14.30
	Within India	Total	2.06	0.29	0.70	66.74	4.47	11.52	14.21
	Within India	Rural	1.83	0.23	0.61	77.65	3.25	9.18	7.26
	Within India	Urban	3.32	0.58	1.17	44.68	10.06	22.94	17.25
	Within state	Total	1.82	0.27	0.69	68.13	4.59	9.96	14.55
	Within district	Total	1.41	0.23	0.64	68.71	4.74	8.18	16.08
	Other districts	Total	2.79	0.37	0.80	66.74	4.22	14.20	10.87
	Other States	Total	4.26	0.50	0.78	54.15	3.40	25.77	11.14
	Outside India	Total	2.78	0.43	0.55	40.90	2.12	30.40	22.81

Source: Census of India 2011

Nonetheless, the gender differential in the accounting of migrants had remained quite similar over the inter-census period with the females having an overwhelming dominance as migrants even though the share of males has increased from 29.68% to 32.06%, particularly for MLR. The incidence of higher migration for the males is visible in the North-eastern, southern and western region while incidence of female centric migration is visible in eastern central and northern regions. On the other

hand, the rural-urban divide has also changed during the period with the share of urban migrants increasing from 33.11% to 38.96% with all the states of Central and Eastern region and larger states of Northern region indicating rural based migration. Such a phenomenon can be considered in the background that these states as primarily agrarian and less urbanised. However, this conjecture needs further analysis yet we cannot deny the fact that the extent of rural incidence of migration in the western and the southern region are less than the national average. Further, we observe a strong negative correlation ($r=-0.742$, $p= 0.000$) between the share of rural migrant and share of male migrants among the different states/UTs of India. The socio-economic character of the region is often manifested in the rates of migration and thus we find differences at the extent of migration over the six regions of the country. The average share of migrants in the population are almost similar in the Central, Eastern and North-eastern regions which are also considered to be economically backward than other parts of the country.

Looking into the reasons of migration, it is observed that the causes have its gender-specific as well as spatial considerations. The relative importance of the economic or social factors vary according to places often, yet it is obvious that in India sociological factors emerge as the most dominant reasons of migration as per Census data. Also to note here is that *others* include factors/reasons which are not listed and may have both social and economic character and at times may have political underpinnings too. Others also include natural causes and forced migration, which are basically displacement. At the total aggregate level, others emerge as the second most prominent cause after marriage, but moves down to fourth place for out-migration to other states as moved with household and work/employment takes the second and third spot respectively. It may be noted that when a household or person migrates for development induced displacement, they generally move to a nearer place which is often provided as rehabilitation or resettlement by the government; as a result, in most cases it is within the boundaries of the same jurisdiction, often within the district or at the most within the state. Further, when the movement is for security or threat perception, moving beyond the state is not a very common phenomenon.

In this context, we may note that based on the data for outmigration across the states of India we find sizeable difference in the average rates for the various reasons on the basis of gender differential. Males out-migrate significantly more for all the economic factors like work/employment, business, and education as well as for moved after birth and others, while females lead for marriage as a reason. Similarly, examining the difference of the reasons based on rural-urban divide, it was seen that the average rates for rural areas and urban areas were significantly different for five of the seven reasons. Others and work/employment have similar rates of incidence across urban and rural areas. People migrate in search of industrial and non-farm work to urban areas, while agricultural labourers are the migrants for work in rural areas. Further, among the remaining five reasons marriage is the only cause with higher rate of incidence in the rural areas.

5. Conclusion

The present paper shows that the extent of migration has been sizeable across the country, though the dimensions have been different. It is also seen that the migration is increasing as the share of migrants in the country's population has increased by around 7% in the inter census period of 2001 to 2011. The data analysis indicates that migration is more a phenomenon for the females as an overwhelming proportion of migrants are females. Further, such female migrants are concentrated more in rural areas as compared to urban areas. Migration due to marriage is also a permanent migration unlike migration for work/employment and education where the possibility of the migrants return to the origin at the end of the purpose of migration is much higher. The large scale migration during the COVID times are by economic migrants, who are back to their origin owing to the emergence of unfavourable environment at the destination.

The preceding sections indicate that larger proportion of migrants in India have moved due to social factors and are females in the rural areas. However, the number of economic migrants have been rising over the years and the pandemic has been a curse to them as the cause behind their movement got adversely effected. Census data indicate outflow of people from the eastern and central parts of the country and inflow of migrants occurring more in the Western part of India and some specific urban areas. Moreover, the relationship between urbanisation and rate of migration also explains the recent experience of flight of labour from the industrial and manufacturing regions. To sum up, we may say that migration has been concomitant with development and intricately embedded with urbanisation. It is a phenomenon which has a two way impact- at the place of origin and at the destination. The Census data indicated the prominent origins and prominent destinations and the return migration during the pandemic is a just reflection of the data.

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Status of Road Network of North Eastern Region of India: An Application of Shortest Path Approach

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Abstract

This paper has attempted to investigate the present status of road transport network of north eastern region of India (NER) which lost its traditional road network connectivity during partition of India in 1947. All the state capital has been considered as different nodes except for Sikkim. For Assam, due to its geographical characteristics, five other important places have been considered as nodes; and after which, the Internal Road Network is extended by incorporating Siliguri which connects the NER with its mainland. In the third stage, the Land Custom Stations of NER are included as nodes. In the fourth stage, the network is recreated to its pre-partition stage through Bangladesh. In the final stage, Mandalay in Myanmar is incorporated as a node to construct the External Road network of NER. Based on the Floyd-Warshall's algorithm, the shortest distance matrices are calculated under different scenarios. Finally, this study concluded that network proposed under last scenario found to be the optimal which can reconnect this region to its traditional road network connectivity available in 1947, in one hand and opening of connection through Mandalay as a part of Act East Policy of Government of India, on the other hand will create a new vista for the NER.

1. Introduction

The North Eastern Region (NER) of India has a geographical advantage for boosting trade relations with countries of East Asia. However, the inadequate transport network within the region has resulted in high transactions cost which is one of the major reasons behind the inadequate exploitation of trade opportunities both internally and

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externally and also underdevelopment of this region. What has led to this inadequacy in the transportation network is the partition of India in 1947. During the British period, the eastern part of India, Nepal, Bhutan, Myanmar and the present Bangladesh were under a common road transportation network which catered the need of this region without any obstacles. However, the demarcation of India has isolated NER not only from the mainland but also from its external neighbours. After partition, NER emerged as a geographically sequester region encompassed with ethnic and bio-geographic location(Barkakati, 1985; Bhattacharyya, 1989). The region was left partially land locked as it is connected only by tenuous *Siliguri Corridor*[1]. As a matter of fact, partition has made NER a partially landlocked region and Sen et al. (2013) has termed this as a pseudo landlocked region since it is not landlocked at least geographically but the actual road distance from the nearest sea port i.e., Kolkata port is more than three and half times the aerial distance from the same on an average may be identified as synonymous to economically landlocked.

Of the many reasons behind the underdevelopment of this region, lack of adequate connectivity with the rest of the country as well as with the neighbouring countries is one of the prime reasons. Furthermore, presence of hilly terrains all over the region is a hindrance to smooth transportation. Accordingly, this study laid emphasis on the underdevelopment of this region from the accessibility and road transportation point of view. The road transport and connectivity can be viewed as networks and could be dragged towards network study for analysis by considering different terminals as network nodes and their connection as edges or arcs.

To assess an integrated road network, a proper evaluation of road network structure is otherwise essential. It is a useful initial process to prioritize sections of the network so that the allocation of limited funds can be optimized to maximize benefits to the region as a whole. Network planning assists in the development of a broad vision of how the road network could be improved to enhance connectivity and accessibility in the future. This also helps to identify relative deficiencies on the road network and justify the assumptions often reached by intuition and dialogue alone. It serves as a means of gaining an understanding of the whole regional road network and how different parts are connected in comparison with each other(Bianco, 1987). Network measures provide a means to comparethe feasibility of a node both spatially and temporally, and can form a basis for developing strategies in the future. An important issue in formulation of transport policy is the trade-off between maximizing the socioeconomic efficiency and developing regional equity (Nijikamp, 1986).

1.1. Related Studies

The NER of India is bestowed with richnatural resources and is at the door-step of

[1] The NER of India is connected with rest of the country with 18 kilometers tenuous chicken neck shaped corridor in the state of West Bengal, popularly known as the Siliguri corridor.

the East Asia. In spite of these advantages, the NER has remained economically laggard which accounts for a mere 2.6 per cent of India's Gross Domestic Product (GDP) in 2019-2020. High transport costs arising out of inadequate transport systems connecting NER both domestically and internationallyentangled with lack of other essential infrastructure have rendered the region economically in underdeveloped state (De, 2008). The sudden isolation of the region due to partition resulted in political and economic crunch. Therefore, integrating the NER with the rest of India and neighbouring countries could help in reducing imbalances in the region (Chaube et al., 1975). The geo-political distancing of the region from its main port of Kolkata coupled with economic isolation has caused immense structural damage to the economy of NER (Ganguli, 1969).

The NER of India occupies a vital location and position both geographically and strategically from the angle of Act East Policy (earlier Look East Policy) adopted by the Government of India. However, a considerable infrastructure development is imperative in order to promote this region with a potential to influence neighbouring economies (Kazi, 2013). Also, in order to effectively execute the Act East Policy and making this region the gateway to South-East Asia, road connectivity within this region and with the neighbouring countries need to be well established (Ziipao, 2018). Furthermore, to aid India's strategy on regional cooperation and also as an alternative access to this pseudo landlocked region, connectivity particularly through road transport with Myanmar and Bangladesh is crucial (Yhome, 2015). However, a sound regional connectivity is not characterized by single mode transportation but by a multi modal transport system (Singh, 1984). In this study, road transportation has been taken into consideration to investigate the issue of accessibility and connectivity under different Scenarios which are presented and discussed later.

Accordingly, the aim of this research is to explore the possibilities of constructing a practical road network that can take action in regard to (a) the demand for proper means of communication by the people of this region, (b) the efficiency of the existing road transport network of this region and (c) the viability of establishing new economically efficient road transport network in and around the region being considered. Accordingly, the specific objective of this study is to investigate the shortest routes from among the different nodes within the region's road transport network.

Choosing an efficient route in real road network is a critical task in transportation network analysis. The existing literature on transportation network is mainly concerned with the identification of shortest path algorithm (Zhan & Noon, 1996) and computation of appropriate shortest path in real road network in terms of distance or cost (Wang & De, 2007). Zhan (1995) compared a set of three shortest path algorithms on real road networks to identify the fastest among them. These three algorithms are the graph growth algorithm, the Dijkstra algorithm implemented with approximate buckets, and the Dijkstra (1959) algorithm implemented with double buckets. However,

in the literature of Transport Economics, the Floyd-Warshall's Algorithm[2] is an improvement over and above the Dijkstra algorithm in the sense that the former is considering the shortest distances between each and every node of a network under study whereas the latter is concentrating on the shortest route between any two nodes of that network(Floyd, 1962). In this sense, Floyd's algorithm may be taken as a generalization of the Dijikstra algorithm (Rardin, 2003). Accordingly, the alternative proposals have been evaluated in terms of a Floyd's shortest path algorithm in the real road network of NER.

2. Theoretical Framework of the Study

It is a fact that after partition of India, the NER is connected with its mainland only through the tenuous Siliguri corridoras mentioned earlier. This study first identified the nodes to be incorporated for analysis on the basis of administrative and strategic importance. The NER comprises of eight states including Sikkim. However, for this study Sikkim has been excluded assuming that it is well connected with West Bengal. Accordingly, the study area covers the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. Other than Assam, all the state capital has been considered as different nodes. For Assam, due to its geographical characteristics, along with its capital city, Guwahati five other important places namely Naogaon, Lumbding, Dibrugarh, Tinsukia and Silchar have been considered as nodes to construct the Internal Road network of NER. After which, the Internal Road Network is extended by incorporating Siliguri as another node since the whole NER is connected with its mainland only through Siliguri. In the third stage, six more nodes are included namely the Dawki, Sutarkandi, Sabroom, Zokwarthar, Moreh and Pangsu pass. These are the Land Custom Stations (LCS) declared by the Government of India through which trade takes place between NER of India with its external counterpart. In the fourth stage, the network is further extended by incorporating the possibility of Port connection for this region namely Kolkata (within India) and Chittagong in Bangladesh with one more node Dhaka in Bangladesh. In the final stage, the Mandalay in Myanmar is incorporated as a node to construct the External Road network of NER. Mandalay is selected because of its strategic location in implementing the Act East Policy of Government of India. Mandalay has been declared by the Government of India as the most important node for connecting the South Asian economies as a part of the Act East Policy.

Accordingly, this study determines the shortest distance matrix among the all nodes using the shortest path algorithm; and on the basis of such derived result the existing route is compared with the proposed route for the different Scenarios mentioned above. Accordingly, this study has identified the five different Scenarios mentioned above, on the basis of which analysis has been carried out. These are as under:

[2] Floyd-Warshall's Algorithm was developed during 1962 independently from each other by Floyd and Warshall.

Table 1: Description of different Scenarios proposed in the Study

Sl No.	Scenarios	Number of Nodes	Description of the Scenario
1	Scenario 1	13 Nodes	Internal Road Network of NER
2	Scenario 2	14 Nodes	Internal Road Network of NER with domestically connecting node at Siliguri
3	Scenario 3	20 Nodes	Scenario 2 with 6 LCS as different node
4	Scenario 4	23 Nodes	Scenario 3 with Port connectivity with Kolkata and Chittagong, Bangladesh via Dhaka
5	Scenario 5	24 Nodes	Scenario 4 with Mandalay since it is the most important node through which connectivity under Act East Policy is declared by the Government of India.

Source: Prepared by the authors

The details of the selected nodes are presented below as Table 2.

Table 2: Description of the selected Nodes in the study

Nodes	Nodes Names	Location of Selected Nodes	Nodes	Nodes Names	Location of Selected Nodes
N1	Guwahati	Guwahati,Assam, India	N13	Tinsukia	Tinsukia, Assam, India
N2	Shillong	Shillong, Meghalaya, India	N14	Siliguri	Siliguri, West Bengal, India
N3	Silchar	Silchar, Assam, India	N15	Dawki	Dawki, Meghalaya, India
N4	Agartala	Agartala, Tripura, India	N16	Sutarkandi	Sutarkandi, Assam, India
N5	Aizawl	Aizawl,Mizoram, India	N17	Sabroom	Sabroom, Tripura, India
N6	Imphal	Imphal, Manipur, India	N18	Zokhawthar	Zokhawthar,Mizoram, India
N7	Kohima	Kohima, Nagaland, India	N19	Moreh	Moreh, Manipur, India
N8	Dimapur	Dimapur,Nagaland, India	N20	Pangsu Pass	Pangsu Pass, Arunachal Pradesh, India
N9	Lumbding	Lumbding,Assam, India	N21	Kolkata	Kolkata, West Bengal, India
N10	Naogaon	Naogaon, Assam, India	N22	Dhaka	Dhaka, Bangladesh
N11	Itanagar	Itanagar, Arunachal Pradesh, India	N23	Chittagong	Chittagong, Bangladesh
N12	Dibrugarh	Dibrugarh,Assam, India	N24	Mandalay	Mandalay, Myanmar

Source: Prepared by the authors

As mentioned above, the first thirteen Nodes (N1 – N13) are considered under Scenario 1. Scenario 2 consists of fourteen Nodes (N1-N14) i.e., first thirteen nodes from Scenario 1 with Siliguri (N14) as another node. Scenario 3 consists of twenty nodes (N1- N20) i.e.,Scenario 2 plus six LCS (N15 – N20) available in this region. Under Scenario 4, the issue of Port connectivity is considered. Hence, two ports namely Kolkata (N21) in India along with Chittagong (N23) via Dhaka (N22) in Bangladesh

is considered along with twenty nodes already considered under Scenario 3. Finally, under Scenario 5, one new node namely Mandalay (N24) is considered.

This studyattempts to evaluate the economic viability of internally efficient road connectivity in NER in terms of an appropriate shortest path algorithm available in the existing literature. Accordingly, this study deals with the following research questions that need to be answered. These are as following:

1. How the region suffered in the disruption of its road transportation network after partition of India during 1947?
2. What is the nature of the internal road transportation network of NER?
3. Whether the internal road transportation network of NER is cost effectively connected with the rest of the country through the Siliguri corridor?
4. Whether the opening of different LCS within the NER really improves the existing road transportation network of the region?
5. Whether the opening of Bangladesh route can significantly improve the efficiency of the internal road transportation network of NER?
6. What is the best possible solution to connect the NER externally in the light of Act East Policy initiated by the Government of India?

This study attempts to answer these research question raised here in the following subsections one after another.

3. Data & Methods

3.1. Data

This proposed study is basicallyempirical research and the data has been collected from secondary sources for investigating the present land-way network system of India's NER after Partition of 1947; and for calculation of shortest path from the different nodes of the NER's transport network using Floyd's algorithm; the different nodes on the region's transport network are selected on the basis of economic and administrative importance. The secondary data in identifying the actual distance matrix were collected from the Bing map portal, from where again; the shortest route distance matrix was determined by using the Floyd's algorithm.

3.2. Methods

Network can be represented as a graph g= {N, E} where N represents the set of nodes or vertices and E represents the set of Edges or links. The broad objective is to find the best possible route considering the alternative proposals in the real road network of NER. To find the best possible alternative in real road network, it is necessary to considering the economic efficiency of such routes. The technical efficiency in

route choice is related to determination of shortest path through applying appropriate shortest path algorithm. If heedlessly applied, this shortest path algorithm may result a situation where the best alternative may satisfy the technical efficiency in the real road network but the economic importance of nodes in the real road network may be compromised. These are discussed in detail in the following.

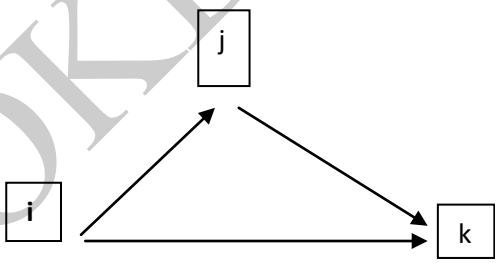
3.2.1. Floyd's Algorithm

This study applied Floyd's algorithm to find the shortest path within the road transportation network of NER under five different Scenarios.Suppose G = (N, A) be the road transportation network consisting of a set of 'N' number of nodes and a set 'A' of arcs with associated numerical values. In this study, associated numerical values are nothing but the actual road distances (in km). The Floyd's algorithm works on n-node network as a square matrix with 'n' rows and 'n' columns. Entry (i, j) of the matrix, denoted by dij, gives the distance between the source node 'i' to destination node 'j', which is finite if node 'i' is directly connected to node 'j', and infinite otherwise.

The logic of Floyd's algorithm is very simple, Consider the following figure where we consider three nodes i, j and k with the weights (distance) shown on the three arcs. It is always shorter route to reach k from i passing through j if

$$d_{ij} + d_{jk} < d_{ik}$$

This is presented as following:



Assuming, d_{ij}, the actual road distance between i^{th} sources to j^{th} destination', and d_{ij}*, the Shortest Road distance in the same route following Floyd's Algorithm, this study defines, $(d_{ij} - d_{ij}^{*})$ as the net reduction in road distance if the existing traffic flow is routed through the shortest path network. To find the technical efficiency of available routes in the existing network,this study has applied the Floyd's algorithm to find the shortest path for the whole network. The net reduction in road distance when the existing traffic flow is routed through the alternative routes is compared to find the technical efficiency through shortest path methods.

After finding the technical efficiency of each route through appropriate shortest path methods (this study utilizes Floyd's algorithm to find the shortest path in real road network of Tripura), a close look towards the economic efficiency of such alternative route is necessary. To correct this bias, this study modified the results related to technical efficiency of the existing road network by considering the economic weights of each node in terms movement of vehicle. When the vehicles are actually routed through the shortest paths, the reduced distance matrix will show a positive value.

It may be noted that the concept of technical efficiency and economic efficiency of choice of route in the real road network is not substitute in nature. Rather, technical efficiency of such route is calculated independently of economic efficiency of routes. But economic efficiency of route is derived by modifying the concept of technical efficiency of routes through shortest path method. Hence, it may be argued that technical efficiency is necessary but may not sufficient to achieve the economic efficiency of choice of appropriate route in the real road network. The result of technical efficiency is modified as below to identify the economic efficiency of choice of appropriate route.Following Sen et al. (2013), the actual distance matrix and the shortest distance matrix in real road network may be defined as:

$$D = ((d_{ij})) = \begin{pmatrix} d_{11} & \cdots & d_{1n} \\ \vdots & \ddots & \vdots \\ d_{n1} & \cdots & d_{nn} \end{pmatrix} \text{ and } D^* = ((d_{ij}^*)) = \begin{pmatrix} d^*_{11} & \cdots & d^*_{1n} \\ \vdots & \ddots & \vdots \\ d^*_{n1} & \cdots & d^*_{nn} \end{pmatrix}$$

Where again,

$$d_{ij} = d_{ji} \text{ for all i,j= 1, 2, ...n}$$
$$\text{and } d_{ij} = 0 \text{ for all i=j}$$

Hence, both the matrices are square symmetric matrices.

Accordingly,
$$\Omega = (D - D^*) = \begin{pmatrix} d_{11} - d^*_{11} & \cdots & d_{1n} - d^*_{1n} \\ \vdots & \ddots & \vdots \\ d_{n1} - d^*_{n1} & \cdots & d_{nn} - d^*_{nn} \end{pmatrix}$$

This may be taken as an indicator of level of economic efficiency of alternative routes. Note in this context that, Floyd's algorithm does not take traffic density into account. This study deals with the accessibility issue and hence, distance is more important than that of traffic density in the existing road.Accordingly, a lager value of such indicator clearly implies higher economic efficiency.

Results & Discussions

As mentioned above, the analysis has been carried out with five different Scenarios. Scenario 1 represents a 13 by 13 sub-matrix representing the internal road network of NER. Scenario 2 represents a 14 by 14 sub-matrix representing the internal road network of NER and connection of NER with the rest of the country through Siliguri (N14) corridor. Scenario 3 is the extension of Scenario 2 with inclusion of six more LCS (N15-N20). Scenario 3 is represented by the sub-matrix of order 20 by 20. Scenario 4 is the next extension of Scenario 3 with the option of port connectivity either through Kolkata (N21) or through Chittagong (N23) via Dhaka (N22), Bangladesh. It may be recalled that Scenario 4 is synonymous to traditional connectivity of NER before partition in 1947 mentioned above. Scenario 3 is represented by the sub-matrix of order 23 by 23. Finally, Scenario 5 is formed by extending Scenario 4 with one more node Mandalay (N24) to analyses the impact of Act East Policy on the efficiency of road transportation network of NER. Scenario 5 is represented by the matrix of order 24 by 24. This is presented below in Table 3.In the matrix, the initial direct distance between any two nodes isgiven. The 'na' signifies that there is no direct link between the nodes. After which, this study applied the R Package "sna" to determine the shortest distance matrix under different Scenarios mentioned above.

Table 3: Combined Initial Distance Matrix of Selected Nodes under different Scenarios

Names	Nodes	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22	N23	N24
Guwahati	N1	0	100	na	na	na	na	na	na	na	123	na	na	na	436	na	na	na	na	na	na	na	na	na	na
Shillong	N2	100	0	208	na	na	na	na	na	275	na	na	na	na	na	81	na	na	na	na	na	na	na	na	na
Silchar	N3	na	208	0	284	176	267	na	na	273	na	na	na	na	na	na	66	na	na	na	na	na	na	na	na
Agartala	N4	na	na	284	0	345	na	na	na	na	na	na	na	na	na	na	na	129	na	na	na	na	135	na	na
Aizawl	N5	na	na	176	345	0	414	na	na	na	na	na	na	na	na	na	na	na	216	na	na	na	na	na	na
Imphal	N6	na	na	267	na	414	0	137	na	na	na	na	na	na	na	na	na	na	na	108	na	na	na	na	na
Kohima	N7	na	na	na	na	na	137	0	138	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Dimapur	N8	na	na	na	na	na	na	138	0	92	165	na	271	na	na	na	na	na	na	na	na	na	na	na	na
Lumbding	N9	na	275	273	na	na	na	na	92	0	98	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Naogaon	N10	123	na	na	na	na	na	na	165	98	0	197	320	na	na	na	na	na	na	na	na	na	na	na	na
Itanagar	N11	na	na	na	na	na	na	na	na	na	197	0	188	na	na	na	na	na	na	na	na	na	na	na	na
Dibrugarh	N12	na	na	na	na	na	na	na	271	na	320	188	0	48	na	na	na	na	na	na	na	na	na	na	na
Tinsukia	N13	na	na	na	na	na	na	na	na	na	na	na	48	0	na	na	na	na	na	na	121	na	na	na	na
Siliguri	N14	436	na	na	na	na	na	na	na	na	na	na	na	na	0	na	na	na	na	na	na	588	492	na	na
Dawki	N15	na	81	na	na	na	na	na	na	na	na	na	na	na	na	0	na	na	na	na	na	na	297	na	na
Sutarkandi	N16	na	na	66	na	na	na	na	na	na	na	na	na	na	na	na	0	na	na	na	na	na	276	na	na
Sabroom	N17	na	na	na	129	na	na	na	na	na	na	na	na	na	na	na	na	0	na	na	na	na	na	168	na
Zokhawthar	N18	na	na	na	na	216	na	na	na	na	na	na	na	na	na	na	na	na	0	na	na	na	na	na	480
Moreh	N19	na	na	na	na	na	108	na	na	na	na	na	na	na	na	na	na	na	na	0	na	na	na	na	474
Pangsu Pass	N20	na	na	na	na	na	na	na	na	na	na	na	na	121	na	na	na	na	na	na	0	na	na	na	781
Kolkata	N21	na	na	na	na	na	na	na	na	na	na	na	na	na	588	na	na	na	na	na	na	0	314	na	na
Dhaka	N22	na	na	na	135	na	na	na	na	na	na	na	na	na	492	297	276	na	na	na	na	314	0	248	na
Chittagong	N23	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	168	na	na	na	na	248	0	na
Mandalay	N24	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	480	474	781	na	na	na	0

Source: Estimated by the author

Results & Discussions

Shortest Distance Analysis under Scenario 1

The Shortest Distance matrix under Scenario 1 is determined and presented as Table 4 below.

Table 4: Shortest Distance Matrix under Scenario 1

Names	Node	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13
Guwahati	N1	0	100	308	592	484	563	426	288	221	123	320	443	491
Shillong	N2	100	0	208	492	384	475	505	367	275	223	420	543	591
Silchar	N3	308	208	0	284	176	267	404	365	273	371	568	636	684
Agartala	N4	592	492	284	0	345	551	688	649	557	655	852	920	968
Aizawl	N5	484	384	176	345	0	414	551	541	449	547	744	812	860
Imphal	N6	563	475	267	551	414	0	137	275	367	440	637	546	594
Kohima	N7	426	505	404	688	551	137	0	138	230	303	500	409	457
Dimapur	N8	288	367	365	649	541	275	138	0	92	165	362	271	319
Lumbding	N9	221	275	273	557	449	367	230	92	0	98	295	363	411
Naogaon	N10	123	223	371	655	547	440	303	165	98	0	197	320	368
Itanagar	N11	320	420	568	852	744	637	500	362	295	197	0	188	236
Dibrugarh	N12	443	543	636	920	812	546	409	271	363	320	188	0	48
Tinsukia	N13	491	591	684	968	860	594	457	319	411	368	236	48	0

Source: Estimated by the author

From the Table 4, it is clear that distance between any two nodes varies in between 48 km to 968 km within the internal road network of NER. Maximal distance varies in between 557 km to 968 km. The interesting fact that both the lower and upper end of maximal distance is between Agartala (N4) to Lumbding(N9) and Agartala(N4) and Tinsukia(N13). The minimal distance within the road transportation of NER varies in between 48 km to 280 km. The least distance is identified as Dibrugarh (N12) to Tinsukia (N13) whereas upper most value is 284 km between Agartala (N4) to Silchar (N3) within the internal road network of NER. Guwahati (N1) is considered as the gateway of NER. The average distance of the different nodes from Guwahati (N1) is around 363 km with a spread in between 100 km to 592 km. Shillong (N2) is nearest node to Guwahati (N1) whereas Agartala (N4) via Silchar (N3) is the furthest node from Guwahati (N1).

Shortest Distance Analysis under Scenario 2

The Shortest Distance matrix under Scenario 2 is determined and presented as Table 5 below. From the below Table, with the inclusion of Siliguri (N14) as another node along with the internal road network of NER, it is found that distance between any two nodes varies in between 48 km to 108 km.

Table 5: Shortest Distance Matrix under Scenario 2

Names	Node	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14
Guwahati	N1	0	100	308	592	484	563	426	288	221	123	320	443	491	436
Shillong	N2	100	0	208	492	384	475	505	367	275	223	420	543	591	536
Silchar	N3	308	208	0	284	176	267	404	365	273	371	568	636	684	744
Agartala	N4	592	492	284	0	345	551	688	649	557	655	852	920	968	1028
Aizawl	N5	484	384	176	345	0	414	551	541	449	547	744	812	860	920
Imphal	N6	563	475	267	551	414	0	137	275	367	440	637	546	594	999
Kohima	N7	426	505	404	688	551	137	0	138	230	303	500	409	457	862
Dimapur	N8	288	367	365	649	541	275	138	0	92	165	362	271	319	724
Lumbding	N9	221	275	273	557	449	367	230	92	0	98	295	363	411	657
Naogaon	N10	123	223	371	655	547	440	303	165	98	0	197	320	368	559
Itanagar	N11	320	420	568	852	744	637	500	362	295	197	0	188	236	756
Dibrugarh	N12	443	543	636	920	812	546	409	271	363	320	188	0	48	879
Tinsukia	N13	491	591	684	968	860	594	457	319	411	368	236	48	0	927
Siliguri	N14	436	536	744	1028	920	999	862	724	657	559	756	879	927	0

Source: Estimated by the author

The maximal distance between any two nodes spread in between 591 km to 1028 km. The lower end of maximal spread is between Shillong (N2) and Siliguri (N14) whereas upper end of maximal distance is between Agartala (N4) and Siliguri (N14). The minimal spread between any two nodes under consolation 2 varies in between 48 km to 436 km. The lower end of minimal spread is between Dibrugarh (N12) to Tinsukia (N13); and the upper end of minimal distance between any two nodes is between Guwahati (N1) to Siliguri (N14). The average path length in between any two nodes under Scenario 2 lies in between 330 km to 771 km. The lower and upper end of average path length is for Lumbding (N9) and Siliguri (N14), respectively. In comparison to Scenario 1, under Scenario 2 the lower and upper end values increase due to the inclusion of Siliguri (N14) since this act as a dead-end node in the road transportation network graph. Siliguri (N14) is connected to Guwahati (N1) at a distance of 436 km which is the major reasons behind staggering transport cost described under Scenario1. Disconnection of traditional connectivity of the NER after partition in 1947 partially transforms this region to an economically backward region.

Shortest Distance Analysis under Scenario 3

The Shortest Distance matrix under Scenario 3 is determined and presented as Table 6 below. From the Table 6, with the inclusion six more nodes along with the nodes under Scenario 2, it is found that distance between any two nodes varies in between 48 km to 1218 km. The maximal distance between any two nodes spread in between 686 km to1218 km. The lower end of maximal spread is between Lumbding (N9) and Sabroom (N17) whereas upper end of maximal distance is between Sabroom (N17) between Pangsu-pass (N20). The minimal spread between any two nodes under consolation 3 varies in between 48 km to 436 km. The lower end of minimal spread is between Dibrugarh (N12) to Tinsukia (N13); and the upper end of minimal distance between any two nodes is between Guwahati (N1) to Siliguri (N14).

The average path length in between any two nodes under Scenario 3 lies in between 386 km to 836 km. The lower and upper end of average path length is for Lumbding (N9) and Siliguri (N14), respectively. In comparison to Scenario 2, under Scenario 3 the lower and upper end values increase due to the inclusion of six more LCS (N15-N20) available which are also Act as the dead-end node in the road transportation network graph. Moreover, as compared to Scenario 1 six more LCS namely Dawki (N15), Sutarkandi (N16), Sabroom (N17), Zokhawthar (N18), Moreh (N19) and Pangsu-pass (N20) as well as Siliguri (N14) which are all dead-end nodes which ultimately leads to increase in the spread of lower and upper end distances in a every situation. Hence, when compared to Scenario 2, Scenario 3 also hardly improved the connectivity issues in terms of lower end average path link. Another interesting fact is that the immediate neighbouring nodes namely Shillong (N2), Silchar (N3), Agartala (N4), Aizawl (N5), Imphal (N6), and Tinsukia (N13), respectively lies at a distance of 81 km, 66 km, 129 km, 216 km, 108 km, and 121 km, respectively. This is presented in Table 7 below.

Table 6: Shortest Distance Matrix under Scenario 3

Names	Nodes	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20
Guwahati	N1	0	100	308	592	484	563	426	288	221	123	320	443	491	436	181	374	721	700	671	612
Shillong	N2	100	0	208	492	384	475	505	367	275	223	420	543	591	536	81	274	621	600	583	712
Silchar	N3	308	208	0	284	176	267	404	365	273	371	568	636	684	744	289	66	413	392	375	805
Agartala	N4	592	492	284	0	345	551	688	649	557	655	852	920	968	1028	573	350	129	561	659	1089
Aizawl	N5	484	384	176	345	0	414	551	541	449	547	744	812	860	920	465	242	474	216	522	981
Imphal	N6	563	475	267	551	414	0	137	275	367	440	637	546	594	999	556	333	680	630	108	715
Kohima	N7	426	505	404	688	551	137	0	138	230	303	500	409	457	862	586	470	817	767	245	578
Dimapur	N8	288	367	365	649	541	275	138	0	92	165	362	271	319	724	448	431	778	757	383	440
Lumbding	N9	221	275	273	557	449	367	230	92	0	98	295	363	411	657	356	339	686	665	475	532
Naogaon	N10	123	223	371	655	547	440	303	165	98	0	197	320	368	559	304	437	784	763	548	489
Itanagar	N11	320	420	568	852	744	637	500	362	295	197	0	188	236	756	501	634	981	960	745	357
Dibrugarh	N12	443	543	636	920	812	546	409	271	363	320	188	0	48	879	624	702	1049	1028	654	169
Tinsukia	N13	491	591	684	968	860	594	457	319	411	368	236	48	0	927	672	750	1097	1076	702	121
Silliguri	N14	436	536	744	1028	920	999	862	724	657	559	756	879	927	0	617	810	1157	1136	1107	1048
Dawki	N15	181	81	289	573	465	556	586	448	356	304	501	624	672	617	0	355	702	681	664	793
Sutarkandi	N16	374	274	66	350	242	333	470	431	339	437	634	702	750	810	355	0	479	458	441	871
Sabroom	N17	721	621	413	129	474	680	817	778	686	784	981	1049	1097	1157	702	479	0	690	788	1218
Zokhawthar	N18	700	600	392	561	216	630	767	757	665	763	960	1028	1076	1136	681	458	690	0	738	1197
Moreh	N19	671	583	375	659	522	108	245	383	475	548	745	654	702	1107	664	441	788	738	0	823
Pangsu Pass	N20	612	712	805	1089	981	715	578	440	532	489	357	169	121	1048	793	871	1218	1197	823	0

Source: Estimated by the author

Table 7: Neighbourhood LCS Connection of NER under Scenario 3

Names	Guwahati	Shillong	Silchar	Agartala	Aizawl	Imphal	Kohima	Dimapur	Lumbding	Naogaon	Itanagar	Dibrugarh	Tinsukia
Nodes	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13
Existing Route	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri	Siliguri
Existing Distance	436	536	744	627	920	999	862	724	657	559	756	879	927
Min Distance	181	81	66	129	216	108	245	383	339	304	357	169	121
Difference	255	455	678	498	704	891	617	341	318	255	399	710	806
Optimal Route	Dawki	Dawki	Sutarkandi	Sabroom	Zokhawthar	Moreh	Moreh	Moreh	Sutarkandi	Dawki	Pangsu Pass	Pangsu Pass	Pangsu Pass

Source: Estimated by the author

Shortest Distance Analysis under Scenario 4

Under Scenario 4 (Table 8), with the inclusion of three more nodes along with the nodes under Scenario 3, it is found that distance between any two nodes varies in between 48 km to 1404 km. The maximal distance between any two nodes spread in between 712 km to 1404 km. The lower end of maximal spread is between Silchar (N2) and Kolkata (N14) via Dhaka (N22), Bangladesh whereas upper end of maximal distance is between Pangsu-Pass (N20) and Kolkata (N21). The lower end of minimal spread is between Dibrugarh (N12) to Tinsukia (N13) similar as that of previous two Scenarios and the upper end of minimum distance is between Guwahati (N1) to Siliguri (N14) similar to that of Scenario 1, 2 and 3.

The Average path length in between any two nodes under Scenario 4 lies in between 419 km to 843 km. The lower end of minimal spread is between Dibrugarh (N12) to Tinsukia (N13); and the upper end of minimal distance between any two nodes is between Silchar (N3) to Kolkata (N21), respectively.

In comparison to Scenario 3, under Scenario 4 the lower and upper end values increase due to the inclusion of three more nodes. It is a fact that as compared to Scenario 1, 2 and 3 under Scenario 4, lower and upper end distances increase slightly under Scenario 4. Previously under Scenario 1, 2 and 3 Siliguri (N14) was the only available gateway for the NER. But under Scenario 4 comparing the differences between the minimum distance from the six LCS to the corresponding the neighbouring nodes with the existing distance from Siliguri (N14) the optimal routs for the nodes under

Scenario 1 i.e., the internal road network of NER is presented above as Table 9.The optimal routs for the all 13 nodes under Scenario 1 proved to be economically efficient as compared to the existing gateway i.e., Siliguri (N14). This study further finds that, the geographical position of the six LCS (N15-N20) pave the way for connectivity of the internal network to its nearest port. This possibility of connecting the internal road network of NER under Scenario 1 is widening up gradually from Scenario 1, 2, 3 to Scenario 4.

Table 8: Shortest Distance Matrix under Scenario 4

Names	Nodes	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22	N23
Guwahati	N1	0	100	308	592	484	563	426	288	221	123	320	443	491	436	181	374	721	700	671	612	792	478	726
Shillong	N2	100	0	208	492	384	475	505	367	275	223	420	543	591	536	81	274	621	600	583	712	692	378	626
Silchar	N3	308	208	0	284	176	267	404	365	273	371	568	636	684	744	289	66	413	392	375	805	656	342	581
Agartala	N4	592	492	284	0	345	551	688	649	557	655	852	920	968	627	432	350	129	561	659	1089	449	135	297
Aizawl	N5	484	384	176	345	0	414	551	541	449	547	744	812	860	920	465	242	474	216	522	981	794	480	642
Imphal	N6	563	475	267	551	414	0	137	275	367	440	637	546	594	999	556	333	680	630	108	715	923	609	848
Kohima	N7	426	505	404	688	551	137	0	138	230	303	500	409	457	862	586	470	817	767	245	578	1060	746	985
Dimapur	N8	288	367	365	649	541	275	138	0	92	165	362	271	319	724	448	431	778	757	383	440	1021	707	946
Lumbding	N9	221	275	273	557	449	367	230	92	0	98	295	363	411	657	356	339	686	665	475	532	929	615	854
Naogaon	N10	123	223	371	655	547	440	303	165	98	0	197	320	368	559	304	437	784	763	548	489	915	601	849
Itanagar	N11	320	420	568	852	744	637	500	362	295	197	0	188	236	756	501	634	981	960	745	357	1112	798	1046
Dibrugarh	N12	443	543	636	920	812	546	409	271	363	320	188	0	48	879	624	702	1049	1028	654	169	1235	921	1169
Tinsukia	N13	491	591	684	968	860	594	457	319	411	368	236	48	0	927	672	750	1097	1076	702	121	1283	969	1217
Silliguri	N14	436	536	744	627	920	999	862	724	657	559	756	879	927	0	617	768	756	1136	1107	1048	588	492	740
Dawki	N15	181	81	289	432	465	556	586	448	356	304	501	624	672	617	0	355	561	681	664	793	611	297	545
Sutarkandi	N16	374	274	66	350	242	333	470	431	339	437	634	702	750	768	355	0	479	458	441	871	590	276	524
Sabroom	N17	721	621	413	129	474	680	817	778	686	784	981	1049	1097	756	561	479	0	690	788	1218	578	264	168
Zokhawthar	N18	700	600	392	561	216	630	767	757	665	763	960	1028	1076	1136	681	458	690	0	738	1197	1010	696	858

Moreh	N19	671	583	375	659	522	108	245	383	475	548	745	654	702	1107	664	441	788	738	0	823	1031	717	956
Pangsu Pass	N20	612	712	805	1089	981	715	578	440	532	489	357	169	121	1048	793	871	1218	1197	823	0	1404	1090	1338
Kolkata	N21	792	692	656	449	794	923	1060	1021	929	915	1112	1235	1283	588	611	590	578	1010	1031	1404	0	314	562
Dhaka	N22	478	378	342	135	480	609	746	707	615	601	798	921	969	492	297	276	264	696	717	1090	314	0	248
Chittagong	N23	726	626	581	297	642	848	985	946	854	849	1046	1169	1217	740	545	524	168	858	956	1338	562	248	0

Source: Estimated by the author

Table 9: Neighbourhood Port Connection of NER under Scenario 4

Names	Guwahati	Shillong	Silchar	Agartala	Aizawl	Imphal	Kohima	Dimapur	Lumbding	Naogaon	Itanagar	Dibrugarh	Tinsukia
Nodes	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13
Existing Port	Kolkata												
Existing Distance	792	692	656	449	794	923	1060	1021	929	915	1112	1235	1283
Min Distance	726	626	581	297	642	848	985	946	854	849	1046	1169	1217
Difference	66	66	75	152	152	75	75	75	75	66	66	66	66
Nearest Port	Chittagong												

Source: Estimated by the author

Shortest Distance Analysis under Scenario 5

Under Scenario 5 (Table 10), with the inclusion of one more node i.e., Mandalay (N24) along with the nodes under Scenario 4, it is found that distance between any two nodes varies between 48 km to 1581 km. The maximal distance between any two nodes spread in between 849-km to1581 km.

The lower end of maximal spread is between Silchar (N3) to Mandalay (N24) whereas upper end of maximal distance is between Siliguri (N14) to Mandalay (N24). The lower end of minimal spread is between Dibrugarh (N12) to Tinsukia (N13) similar as that of previous four Scenarios. The Average path length in between any two nodes under Scenario 5 lies in between 437 km to 976 km. The lower end of average path length is for Silchar (N3) to Mandalay (N24), respectively. In comparison to Scenario 4, under Scenario 5 the lower and upper end values increases slightly under

Scenario 5. As mentioned above previously under Scenario 1, 2, and 3 Siliguri (N14) was the only available gateway for the NER whereas under Scenario 4 the geographical position of 6 LCS (N15-N20) along with their port connectivity to Kolkata (N21) and Chittagong (N23) via Dhaka (N22), Bangladesh paves the way for connectivity in the internal network of NER to its nearest port either through domestically or neighboring country Bangladesh, respectively. This is presented as Table 11below.

Table 10: Shortest Distance Matrix under Scenario 5

Names	Nodes	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22	N23	N24
Guwahati	N1	0	100	308	592	484	563	426	288	221	123	320	443	491	436	181	374	721	700	671	612	792	478	726	1145
Shillong	N2	100	0	208	492	384	475	505	367	275	223	420	543	591	536	81	274	621	600	583	712	692	378	626	1057
Silchar	N3	308	208	0	284	176	267	404	365	273	371	568	636	684	744	289	66	413	392	375	805	656	342	581	849
Agartala	N4	592	492	284	0	345	551	688	649	557	655	852	920	968	627	432	350	129	561	659	1089	449	135	297	1041
Aizawl	N5	484	384	176	345	0	414	551	541	449	547	744	812	860	920	465	242	474	216	522	981	794	480	642	696
Imphal	N6	563	475	267	551	414	0	137	275	367	440	637	546	594	999	556	333	680	630	108	715	923	609	848	582
Kohima	N7	426	505	404	688	551	137	0	138	230	303	500	409	457	862	586	470	817	767	245	578	1060	746	985	719
Dimapur	N8	288	367	365	649	541	275	138	0	92	165	362	271	319	724	448	431	778	757	383	440	1021	707	946	857
Lumbding	N9	221	275	273	557	449	367	230	92	0	98	295	363	411	657	356	339	686	665	475	532	929	615	854	949
Naogaon	N10	123	223	371	655	547	440	303	165	98	0	197	320	368	559	304	437	784	763	548	489	915	601	849	1022
Itanagar	N11	320	420	568	852	744	637	500	362	295	197	0	188	236	756	501	634	981	960	745	357	1112	798	1046	1138
Dibrugarh	N12	443	543	636	920	812	546	409	271	363	320	188	0	48	879	624	702	1049	1028	654	169	1235	921	1169	950
Tinsukia	N13	491	591	684	968	860	594	457	319	411	368	236	48	0	927	672	750	1097	1076	702	121	1283	969	1217	902
Silliguri	N14	436	536	744	627	920	999	862	724	657	559	756	879	927	0	617	768	756	1136	1107	1048	588	492	740	1581
Dawki	N15	181	81	289	432	465	556	586	448	356	304	501	624	672	617	0	355	561	681	664	793	611	297	545	1138
Sutarkandi	N16	374	274	66	350	242	333	470	431	339	437	634	702	750	768	355	0	479	458	441	871	590	276	524	915
Sabroom	N17	721	621	413	129	474	680	817	778	686	784	981	1049	1097	756	561	479	0	690	788	1218	578	264	168	1170

Zokhawthar	N18	700	600	392	561	216	630	767	757	665	763	960	1028	1076	1136	681	458	690	0	738	1197	1010	696	858	480
Moreh	N19	671	583	375	659	522	108	245	383	475	548	745	654	702	1107	664	441	788	738	0	823	1031	717	956	474
Pangsu Pass	N20	612	712	805	1089	981	715	578	440	532	489	357	169	121	1048	793	871	1218	1197	823	0	1404	1090	1338	781
Kolkata	N21	792	692	656	449	794	923	1060	1021	929	915	1112	1235	1283	588	611	590	578	1010	1031	1404	0	314	562	1490
Dhaka	N22	478	378	342	135	480	609	746	707	615	601	798	921	969	492	297	276	264	696	717	1090	314	0	248	1176
Chittagong	N23	726	626	581	297	642	848	985	946	854	849	1046	1169	1217	740	545	524	168	858	956	1338	562	248	0	1338
Mandalay	N24	1145	1057	849	1041	696	582	719	857	949	1022	1138	950	902	1581	1138	915	1170	480	474	781	1490	1176	1338	0

Source: Estimated by the author

Table 11: Neighbourhood External Connection of NER under Scenario 5

Names	Guwahati	Shillong	Silchar	Agartala	Aizawl	Imphal	Kohima	Dimapur	Lumbding	Naogaon	Itanagar	Dibrugarh	Tinsukia
Nodes	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	Nodes
Existing Route	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata	Kolkata
Existing Distance	792	692	656	449	794	923	1060	1021	929	915	1112	1235	1283
Min Distance	726	626	581	297	642	582	719	857	854	849	1046	950	902
Difference	66	66	75	152	152	341	341	164	75	66	66	285	381
Optimal Route	Chittagong	Chittagong	Chittagong	Chittagong	Chittagong	Mandalay	Mandalay	Mandalay	Chittagong	Chittagong	Chittagong	Mandalay	Mandalay

Source: Estimated by the author

Conclusion

Up to Scenario 3 Kolkata (N21) was the only available port connectivity for NER which every node under internal transportation network of NER was bound to bore heavy transaction cost as the feasible distance from Kolkata (N21) to any of the nodes described on the Scenario 1. There may be several regions behind under development of NER, the partition in 1947 disrupted it is traditional connection which were economically more viable. Based on the shortest distance matrix under Scenario 5 the difference between distance travel through existing route of Kolkata (N21) port

via Siliguri (N14) and the optimal route to the nearest port i.e. Chittagong (N23) either through Dhaka (N22), Bangladesh or through Sabroom (N17) or through Mandalay (N24) through Moreh (N19) open are the possibility of connecting the geographically sequester regions NER an opportunity to connect the internal network of NER with rest of the world economy. If the road transport network of NER is given the opportunity to connect with the rest of the world as mentioned here under Scenario 5, the policy Act East policy proposed by the Government of India to connect the South Asian Countries through NER will get new dimensions. To reap the benefit of Act East policy in full swing, the economically feasible external transportation network which will connect the internal road network of NER is the most important infrastructure need of the time. This study finds that external transportation network as proposed under Scenario 5 is the best possible solution out of available alternatives which can reconnect this region with the transport network which were available before partition in one hand as well as opening of another connection through Mandalay (N24) as a part of Act East Policy proposed by the Government of India, on the other hand will create a new vista for the NER.

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Connecting India and ASEAN Through the North East: The Energy Perspective

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Abstract

India and Southeast Asia are likely to be the basins of growth in the years to come. In this context, the demand for energy will also certainly increase. However, the backdrop for this situation is, on one hand, the unequal availability of energy resources, with some countries being better endowed in some forms of energy and others less so. On the other hand, many countries, especially in South Asia face a continual shortage of energy, which adversely affects households and businesses.

The best way of overcoming the unequal distribution of energy and the rising demand for energy is by engaging in energy trading. Two initiatives have to be undertaken to make energy trade possible. First, by developing Myanmar and the North East of India or the North East Region (NER) as the two nodes that will be the gateways respectively for Southeast Asia and South Asia. Second, by improving connectivity (physical and energy) between both sub-regions.

I. Introduction

India and Southeast Asia are likely to be the basins of growth in the years to come. In this context, the demand for energy will also certainly increase. However, the backdrop for this situation is, on one hand, the unequal availability of energy resources, with some countries being better endowed in some forms of energy and others less so. On the other hand, many countries, especially in South Asia face a continual shortage of energy, which adversely affects households and businesses. As both regions seek to grow the shortage of energy will have to be addressed. It is a problem that can be overcome since there are other countries within the two regions that do have excess supply of energy resources and a redistribution of energy is possible.

The best way of overcoming the unequal distribution of energy and the rising demand for energy is by engaging in energy trading. Two initiatives have to be undertaken to make energy trade possible. First, by developing Myanmar and the North East of

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India or the North East Region (NER) as the two nodes that will be the gateways respectively for Southeast Asia and South Asia. Second, by improving connectivity (physical and energy) between both sub-regions.

The paper is organised as follows. The second section discusses the need for economic cooperation between India and ASEAN. It argues that in order to sustain high levels of growth, it is necessary to improve economic cooperation trade agreements. The third section is concerned with establishing the rationale for connectivity and regional initiatives. This is followed by a discussion of the existing arrangements for energy cooperation. The fifth section argues that the North East Region can act as a pivotal point for India in forging a link with Southeast Asia. Finally, a conclusion and some recommendations are offered.

II. India and ASEAN: Growth, Trade and Economic Cooperation

South Asia, in general, and India, in particularhas seen rapid growth in the last decade. The same is the case with the Southeast Asian economies that have been growing rapidly despite rather soft global economic growth. Both India and ASEAN have been growing inspite of the risks and uncertainties that have faced the world, and this includes tensions in the Middle East and US-China trade tensions. ASEAN has been expanding tremendously, integrating itself more actively in the regional and global economy, therefore,it has seen the enlargement of regional production networks and witnessed greater connectivity.

Many Southeast Asian economies have been more welcoming to foreign direct investment (FDI) and in order to attract more FDI has relaxed trade and investment barriers. In. both South and Southeast Asia there is a growing middle class that is also a great source of demand for consumer goods.As a consequence of burgeoning growth in Bangladesh, economic reforms in India and the end to the civil war in Sri Lanka, South Asia has been performing very well. For different reasons Southeast Asian economies have been witnessing increasing growth. While Singapore and Malaysia have already taken giant strides in their respective economic development trajectories, Vietnam, the Philippines and Indonesia are now the new basins of growth in the region.

It is undeniable that economic interaction between South and Southeast Asia has increased tremendously, but there is still space for further growth that has not been adequately explored (ADBI, 2015).Trade between South Asia and Southeast Asia has increasedwas valued atUS$4 billion in 1990. It increased to $90 billion in 2013. But this is inadequate becauseSoutheast Asia's share of South Asian trade did not increase significantly, rising from a mere 6% to only 10% over the same period. This clearly indicates that there is more room for improvement.Investment between South and Southeast Asia also suffers from the lack of sufficient initiatives being undertaken to increasing cross-regional investment. South Asia was the destination for only 9% of Southeast Asian FDI. However,South Asia regarded Southeast Asia more favourably,

with 15% of total South Asian FDI being directed to ASEAN member states during the period 2009-2013.

The fact that trade and investment between ASEAN and South Asia is not at its optimum is reflected in the limited trade and investment between South Asia and ASEAN. Generally, portfolio investments between the two regions is limited. It is only Singapore that accounts for a relatively greater flow of portfolio investment between the two regions due to the status of Singapore being a financial hub and also due to the fact that Singapore has taken a more forward-looking view about investment in India. In order to increase the flow of portfolio investmentsbetween India and ASEAN it would be necessary to encourage and increase trade and investment between the two regions.

The full potential in trade and investment leaves much to be desired. This can be captured if there is more progress in developing infrastructure, financial markets and increasing regional cooperation. In this context, India's "Look East" and "Act East" policies are worthy of mention.This is not to say that there is no progress in trade and investment between South and Southeast Asia but only to emphasise there are many constraints. These include inadequate attention being paid to trade facilitation, non-tariff barriers and ease of doing business. Also connectivity between South and Southeast Asia has to be improved, and of special impact is the energy connectivity between both regions.

There are many opportunities for trade and investment growth between Southeast Asia and South Asia and India's new economic diplomacy approach is a worthwhile effort in that direction. Look East and Act East policies that have been promoted by India should also take into account the interest of ASEAN countries in seeing more trade and investment in their own countries. Thus, a two-way cross-investment strategy has to be worked out. This will help to increase trade between both regions. Because of the slow rate at which domestic reforms are being undertaken in India, it has yet to become a production hub as countries in ASEAN already have. Therefore, the liberalisation programme in India has to be jump-started.

One area that India can work on is to develop its industrial activities and attempt to be a part of global production networks. This will function very well within the overall landscape of increasing liberalisation and the investment attractiveness of the country. Being a part of the supply chain networks will help India be a part of the supply chains that should connect it with Southeast Asia, which already is an active participant in global supply chain networks. FDI-driven networks will create a further impetus for trade and investment expansion as well as connecting India with ASEAN.

A pre-requisite for the creation of supply chain networks is connectivity. This is an important variable that India has to develop both in terms of its hard and soft infrastructure. In a sense, much of the rationale for China's Belt and Road Initiative

lies in creating the connectivity between countries, be it by land or sea. In a similar manner, India has to develop the required connectivity so as to drawASEAN closer to it. This will make available for India a greater market, effectively increasing its access to the Southeast Asian market which it can then penetrate more effectively.

In this respect, connectivity must be considered broadly to include not just transport, but also institutional connectivity, cultural connectivity and people-to-people connectivity, one of the factors of connectivity that ASEAN has been a strong proponent of. To support the development of these connectivities, India must support financing arrangements and markets, standards and mutual recognition of qualifications. Naturally, the mutual understanding of rules and regulatory frameworks as well as transparency will, therefore, have to be addressed more systematically. One of the most important aspects of connectivity that has not been sufficiently explored is energy connectivity.

It is in respect of these issues that the Regional Comprehensive Economic Partnership (RCEP) is a significant agreement. It provides the possibility for further trade and investment liberalization between the Association of Southeast Asian Nations (ASEAN) member states and its trading partners (ADBI, 2015: 26). However, India has indicated that it is not participating in RCEP for the time being, and that may slow down India's deeper integration with the region until its outstanding issues are resolved. There is no doubt that RCEP adds substance in the context of India's Look East policy.

The Regional Comprehensive Economic Partnership (RCEP), which was initiated in 2013 provides an arrangementfor trade and investment liberalization between ASEAN member states and its trading partners. Among other things, this offers an important opportunity for India to further its economic integration with ASEAN.In theory, RCEP is timely and could possibly add substance to India's Look East policy and it comes at a time when ASEAN countries are planning to engage in second-generation economic reforms. In the context of ASEAN centrality, ASEAN countries wish to step up their economic growth and increase cross-regional integration so that they are a regional grouping that is the hub for investment. It is envisaged that this will make ASEAN a grouping that can compete with the likes of NAFTA and EU while at the same time driving up growth for member countries.

The ASEAN–India free trade agreement (FTA), which acts as a step towards the RCEP, has laid the foundation for cross-regional trade and investment liberalization. But there are various issues that need to be resolved. Some of the problems that need to be resolved include cross-border infrastructure links, poor trade facilitation measures, inadequate infrastructure financing, the prevalence of non-tariff barriers (NTBs) and barriers to FDI (ADBI:222). These measures have to be attended to as they will support transportation and energy connectivity.

The pre-existing ASEAN–India free trade agreement (AIFTA) offers a platform for cooperation between ASEAN and India. However, RCEP can be expected to go beyond

AIFTA, although the latter does address the issue of trade and investment liberalisation. Until such time as India is able to join RCEP, India should use the instruments available to via AIFTA in developing cross-regional integration with Southeast Asia.

As part of the Act East policy, connectivity between India and Southeast Asia. has to be deepened. There are three aspects to this question. First, the overall , framework of integration has to be addressed. This implies using the instrument of the AIFTA, for the moment, with the possibility of RCEP in the future. Second, the development of Myanmar as a land bridge between India and ASEAN. Political developments in Myanmar as well as the ongoing economic reform process make this possible.The opening up of Myanmar makes it suitable as a link forease of transportation through highways and railroads as well as the development of energy infrastructure. Needless to say, Myanmar has acomparative advantage in energy since it has rich natural resources in petroleumand natural gas It also has potential in hydropower, not to mention an abundant supply of low-cost labour.

Economic relations between India and ASEAN are in the early stages and there is ample scope for a deepening in cooperation and exchange. The notion of closer economic integration is well-known and it is recognised that it brings about an expansion in the market for goods and services and increase the scope for economies of scale. Also, with more integration one can expect greater specialisation, leading to more competitive industries and, thereby, improving regional competitiveness. The increased competitiveness of the firms in the region could lead to two outcomes: one, prices both in the region as well as those of products out of the region could come down and, two, both Indian and ASEAN could, collectively, be in a better position to compete with other regional groupings such as the EU, NAFTA and so forth. Further, it can be expected that if imports into the India-ASEAN region come in at a lower price, this will improve the terms of trade. Thus, these factors will lead to a more vibrant corridor of activity stretching from India to ASEAN.

The deeper integration of markets and the increased competitiveness will attract more production networks into India and ASEAN. India has lagged behind in the participation of production networks and not all countries in ASEAN are actively participating in these networks. Even those that are involved in the production networks are not necessarily engaged in high value-added economic activities. Therefore, this presents an opportunity for interested firms either to participate in the production process or to upgrade their participation to high value-added production.

Evidence indicates that developing countries that lowered their trade barriers had per capita real income growths that were more than those of other developing countries. It has been shown that in the 1990s, developing countries that lowered trade barriers enjoyed 5% growth as against those in the latter category only enjoyed 1.4% per year (OECD 2010). The removal of trade barriers and other measures that improved efficiency, led to a reallocation of resources to activities that had higher return and

that were in line with a country's comparative advantage. This, of course, must be supported with better public infrastructure and other policies that remove trade barriers, such as customs procedures, transparency, and the implementation of single window. Although most countries in ASEAN have been quick to remove barriers to trade and enhance public infrastructure, this has not been specially undertaken to improve trade and connectivity between India and ASEAN.

Consequently, deeper integration between India and ASEAN will attract more investment along the corridors of economic activity and this investment will both be foreign direct investment as well as domestic investment. With the inflow of more FDI the benefits of technology transfer and export-oriented manufacturing will accrue to producers from ASEAN and India. There will also be more involvement in supply chain networks.

Although an FTA like RCEP will promote more linkages, trade and investment between India and ASEAN, it is not the end of the road for more economic cooperation between the two. It is possible to device flexible rules of origin and discuss mutually acceptable standards so as to reduce trade costs, even in the absence of an overarching FTA like the RCEP.

III. Rationale for Connectivity and Regional Initiatives

The rationale for energy trading arises due to factors such as differences in energy resource endowments and variations in timing of peak loads. In this case, obviously a country that is less privileged in energy can tap upon the resources of one that is better endowed, subject to there being no excess demand in the second country. Similarly, if there is a difference in timing of peak load, at times when one has lower requirements it can supply to another country that has higher demand at that time.

Another factor that can work to the advantage of a country that has the advantage of good location. Suitable geographical position, as in the case of hydropower, can be taken advantage of and a country can fully develop it, enjoy economies of scale, and supply the unused surplus to another country that has excess demand that it cannot meet. Since energy projects are investment intensiveit would make economic sense for them to be allowed to develop economies of scale. It would not be necessary to replicate similar resources at large cost if trading is possible and the distance involved is not a constraint. It, thus, stands to reason that regional power plants be built, and electric power grids be linked.

There are various advantages to be gained from regional energy systems. First, regional specialisation is possible and geographical advantage can be harnessed, particularly in the case of hydropower. Second, countries can depend on a variety of countries for their energy supply. This will mean lower costs as well as the dependability of supply. Third, environmental costs can be minimised since energy facilities need not be built

if there are alternative facilities in the vicinity, even if they arein another country. The presumption is that cross-border connectivity is possible and efficient.

Many states in India face frequent energy shortages. This has negative consequences for industrialisation, businesses and for the well-being of people.This is a situation that need not exist since manyASEAN member states have surplus energy that can be exported. This is a clear example of why energy cooperation and trading would be of mutual value to India and ASEAN. For the development of both groups it is obvious that regional energy integration is a matter of prime importance for economic development. Trading of energy will help to stabilise prices and make demand more elastic. Integrating energy systems could help to stabilize prices and make demand more elastic (ADBI, 2015).

There is a strong demand for energy in South Asia, and India, in particular. India can also be the hub for the import of energy into South Asia, aside from importing energy for its own use. There is, therefore, a need to match supply with demand. Since India has excess demand which it cannot meet with locally generated energy, there is a strong case for cooperation in energy and trading in energy. This is where the argument for turning to energy resources in neighbouring countries comes into the fore. Unless, this option is given due attention, the shortage of energy will simply mean that growth in India and South Asia will be impeded. For an illustration of the extent of loss that will be incurred, it is worth mentioning a study by the United States Agency for International Development which estimated that planned outages in Sri Lanka and Bangladesh cost their economies a loss of about half a percentage point of GDP(USAID 2004). It has been pointed out that regional cooperation on energy in the Greater Mekong Subregion (GMS) could reduce energy costs by nearly 20% (ADBI, 2015). This translates into a savings of $200 billion over the period 2005–2025. The integration of energy markets in South Asia has efficiency benefits and it can yield increased revenue.It has been estimated that the potential revenue from energy trade arising from the integration of energy markets can result in revenueamounting to between $12 billion–$15 billion annually (World Bank 2010). The costs of ignoring energy integration and cooperation have not been calculated, but they are surely huge.

Aside from matching energy deficient economies with energy surplus economies, it is useful to cooperate in the provision of energy generation. Energy cooperation is a useful strategy for several reasons. First, it creates a way of spreading the costs of energy generation, locating them across neighbouring countries. This will reduce the burden of costs as compared to a situation where each country has to bear the full costs of locating plants and other facilities within their own borders. Thus, those countries that can bear the investment costs of energy generation will carry the burden of building these facilities in their own countries and recuperate the costs by engaging in energy trade. Not only are the costs spread, but also the risks, too, are spread, thereby encouraging comparative advantage in energy generation.Cross-border investment in energy infrastructure will also give economies with lower levels of income the

privilege of concentrating their expenditure on other programmes that are necessary for their development and to further the welfare of their economies. This will enable less developed economies to benefit from the energy resources in neighbouring economies and allow them to concentrate on poverty alleviation programmes(Sheng and Shi 2011).This will give an opportunity for the poorer countries to focus on catching up on economic development. It will be possible to achieve economic convergence through investment in integrated energy markets, thereby reducing inter-country income disparities(Sheng and Shi 2011).

This leads us to the question of energy market integration which has many advantages. As we have mentioned, it allows specialisation and reduces the cost burden on poorer countries. It also helps countries to focus on income disparities and poverty issues. As far as the countries investing on production of energy, it helps them concentrate on technology acquisition and infrastructure building.In fact, throughintegrated energy markets it can be expected that there will be an increase in output and foreign direct investment. The increase in FDI can only be facilitated through tariff cuts, subsidy reductions, and by committing to greater infrastructure investment. The availability of energy will thus be expanded and its distribution to those under energy deficit conditions will have access to more and better energy.

The existing regional institutions such as the Greater Mekong Subregion (GMS), the South Asia Subregional Economic Cooperation (SASEC) group, and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) group offer opportunities for regional cooperation and a basis for expanding upon connectivity. It is this connectivity that will be the platform for energy trading, based as it will be on cross-border infrastructure projects. India's participation in BIMSTEC and SASEC anchor it to South Asia, while its proximity to Myanmar give it the link to Southeast Asia over land. Thus, India is uniquely positioned to reach out to ASEAN and provide opportunities for regional trade in energy between India, South Asia and Southeast Asia. Notwithstanding the presence of trade within these regions in energy, the above-mentioned regional institutions offer more opportunities for trade in hydropower, connection through gas pipelines and interconnection of electricity power grids. In fact, to take an example, linking the electric power grids of the GMS and SASEC will contribute to the power pooling and deeper interconnection.

It is in this context that Myanmar has a substantial role to play in energy tradinggiven its substantial reserves of hydropower capacity and natural gas. Due to its proximity to India on one hand and the rest of ASEAN on the other hand, it possesses a vantage point for the location of gas pipelines. its position as a gas pipeline location. Given Myanmar's low electrification ratio (about 26%), the immediate focus will be in increasing domestic supply, leaving the goal of cross-border trading as a medium-term objective.Indeed, for cross-border trading to take place, it is necessary that the physical and institutional infrastructure connecting Myanmar with the rest of Southeast Asia, and India should be developed.

Myanmar can benefit substantially from opening-up and becoming a bridge between South Asia and Southeast Asia (ADBI, 2015:19 and Florento and Corpuz, 2014). As far as energy connectivity is concerned there are severalprojects that would link Myanmar with Bangladesh and India, including the Myanmar–Bangladesh–India gas pipeline project and the Tamanti hydropower project to supply electricity from Myanmar to India. But for the proper linking of Myanmar with India, the barriers to connectivity would have to be overcome.

Myanmarhas excess resources in natural gas and hydropower. The surplus hydropower that Myanmar possess can be exported to India and Bangladesh for the purpose of electricity production for export toIndia and Bangladesh. This requires investment in infrastructural facilities. Thus, investment in direct grid connection is required for electricity transmission and, on the other hand, specialised facilities are necessary to carry out natural gas liquefaction and regasification.

Myanmar is exploring the possibility of becoming such energy bridge for inter-regional power connectivity. In the GMS, Myanmar hasconnected to Yunnan Province (China) via export-oriented hydropower dams. The country has also planned several other hydropower dams to export electricity to Thailand and India. Myanmar is looking at improving its energy connectivity with China. Myanmar faces power shortages particularly during its dry months. In this regard, at least two projects are being discussed, and they includea China-Myanmar-Bangladesh interconnection and an interconnection between Lao PDR and Myanmar. These are in addition to the currently existing 50MW interconnection between Moreh (India) and Tamu (Myanmar)which has effectively promoted border electrification in Myanmar.

However, the barriers that hinder energy connectivity and trading in energy would include those that are technical, infrastructural, financial, institutional, and political in nature. It should be noted that there are differences in norms and codes. This makes grid synchronization difficult. Further, convergence in grid codes to electric power is not always available, and finally there are differences in natural gas pipeline technology. An interconnection between India and Southeast Asia would necessarily run through Myanmar, which national electricity grid still does not cover the entire nation and would require reinforcements to increase its capacity.

The failure of India to participate in RCEP is, for the present time at least, a constraint that could have implications on deeper energy integration and trade between India and ASEAN. FTAs are the overarching framework for institutional standards, processes and agreement which do have an impact on energy cooperation. At a less aggregative level the resolution of regulatory barriers is important to support energy trading, which is further restricted through distorted energy pricing and the prevalence of subsidies.

Other issues that impede the flow of energy include political issues, such as security and considerations regarding the sphere of influence that countries choose to align

themselves with. These issues go beyond technical and economic frameworks but are nonetheless present and have to be overcome. It is, indeed, possible to overcome these issues if ASEAN centrality is promoted with India as a partner in this process. Two other issues that have to be addressed include financing for infrastructure and energy projects and environmental assessments. The latter arises because environmental objections hamper the development of energy projects, although the need for environmental impact assessments cannot the denied.

In order to encourage energy trading to take place between South Asia and Southeast Asia is would be necessary, aside from improving financial support, it would be imperative to develop both the physical and institutional infrastructure. As a step towards this it would be essential to increase power pooling and energy interconnection between the two regions.Towards this end the electric power grids of the GMS and SASEC should be linked.The GMS is a good arrangement to achieve progress in energy and power trading. But it requires more institutional support in order to achieve the goals that are envisaged. Primarily, it meansconnecting the energy sectors in India and ASEAN, supported by subregional and international agencies.

Aside from connecting the energy sectors in India and ASEAN, it is also necessary that commercially viable energy projects be identified, as was done in the ASEAN Interconnection Master Plan Study (ASEAN Secretariat 2011). In spite of the long gestation periods that would be involved, and the risks associated with the projects, there must be the political will to see the long-term advantages of inter-regional energy initiatives weighing over short term problems.

IV. Energy Cooperation in South and Southeast Asia

South Asia

The need for energy cooperation was present in South Asia going back as far as the late 1950s. There were attempts at coming out with policies to deal with the energy supply since back then. The issue is more pressing now with supply shortfalls and the high value of electrical outages since they are obviously factors that do not contribute to economic growth. These issues present an opportunity for the creation of a power system that stretches across the AsiaPacific region.

Although SAARC had wider objectives that were in the nature of economic and political cooperation within the South Asian regional framework, cooperation within the scope of SAARC was also considered. SAARC was formed in 1985. The Technical Committee on Energy was established in 2000 and a specialized Working Group on Energy in 2004. In 2014, the SAARC Intergovernmental Framework Agreement on Energy Cooperation was concluded.

India has the capability to be a hub for power in South Asia. It has cross-border interactions with South Asian countries such as Bangladesh, Bhutan, Myanmar and Nepal. The usual modus operandi for cross-border electricity trade is usually through government-initiated agreements rather than the integration of electricity grids. Nevertheless, this provides electricity for economic activities near the borders. Some of the cross-border electricity interconnections are as follows (Anbumozhi et al, 2019: 49):

- Bangladesh is currently connected to India through two 500 MW HVDC links of 400 kV transmission lines from Bahrampur (India) to Bheramara (Bangladesh),
- connection with north-eastern India from 400 kV Tripura (India) to Comilla (Bangladesh).
- Nepal shares about 21 interconnections for electricity exchange with India (mostly through the Indian State of Bihar) through 11 kV and 33 kV distribution lines, and 132 kV and 400 kV transmission lines with a total capacity of up to 500 MW
- an 11-kV distribution link from Manipur was established in India to export up to 3MW power to Myanmar

Other interconnectionsare being explored and they include possible proposals that are being examined by the India-Bangladesh Joint Technical Committees. Bangladesh has been active and it signed an MOU with Bhutan and Nepal to facilitate power trading between Bangladesh, Bhutan and Nepal. Another agreement on power trading between Bangladesh, India and Bhutan is also on the table.

A masterplan for the transmission of power from hydropower projects in Arunachal Pradesh in the north-east salient region to other parts of India foresees the construction of a number of HVAC and HVDC lines. This line will be made to run through Bangladesh, with Bangladesh importing up to 2,000 MW. Connect India and Sri Lanka through the towns of Madurai and Anuradhapura . this will be through a 400 kV HVDC submarine cable with a capacity of up to 1,000 MW. There are also plans to link India to Pakistan from Amritsar in India to Lahore in Pakistan.

With agreements between more countries in South Asia, often involving India, there will be more integration of participating grids. This is a necessary development since it is estimated that South Asia will require 43.2 GW additional cross-border capacity by 2036, which can be fulfilled by a more interconnected and market-oriented system.

Southeast Asia

The Southeast Asian energy market is fast changing since the demand for energy consumption is increasing and there is an increasing tendency to find substitutes for fossil fuels. The growth rates of countries like the Philippines, Indonesia and Vietnam

is increasing and that will require more energy to sustain these growth rates. Forecasts indicate that ASEAN's dependency on oil will increase from 44 per cent in 2011 to 75 per cent in 2035. With the exception of Brunei and Indonesia, the other ASEAN countries will be oil importers in the years to come. Therefore, there attempts will be made to shift away from oil in the interests of energy security. Although presently the price of oil is low, this cannot be taken for granted given the volatile situation in the Middle East and the external forces affecting the oil market.

A mixture of policy responses can be anticipated in Southeast Asia. These include moving away from dependence on oil and a shift to renewable energy and environment-friendly sources of energy since ASEAN countries will want to reduce CO2 emission levels. Two processes can be anticipated in dealing with this situation. First, ASEAN will visit the issue of energy cooperation and connectivity more seriously. Second, ASEAN will plan for energy generation on the basis of non-fossil fuel resources. ASEAN is well – suited to low-carbon energy resources such as geothermal resources, solar and biomass energy. More cost-effective hydropower is another route that some ASEAN countries can take.

ASEAN has the necessary framework to evolve a robust energy connectivity programme because of the regional integration architecture that has been proposed in the ASEAN Economic Community (AEC) in 2015 and further put forward in the AEC Blueprint 2025. AEC 2015 had already mentioned the need for an integrated region that addresses growth challenges as well as energy security.The AEC Blueprint 2025 consists of the following five pillars (ASEAN Secretariat, 2015):

- A highly-integrated and cohesive economy;
- A competitive, innovative, and dynamic ASEAN;
- Enhanced connectivity and sectoral cooperation;
- A resilient, inclusive, people-oriented and people-centred ASEAN; and
- A global ASEAN.

Connectivity is explicitly mentioned as one of the goals that ASEAN aspires to achieve, and it includes energy connectivity since, without it, it would not be possible to achieve "a competitive, innovate, and dynamic ASEAN" neither would it be possible to achieve ASEAN centrality such that ASEAN can fully integrate in the global economy. The AEC Blueprint 2025 explicitly mentions the ASEAN Power Grid (APG) and the Trans-ASEAN Gas Pipeline as part of the agenda for regional energy connectivity. The APG is an attempt to achieve energy interconnection of all ASEAN member states. Aside for interconnections that will link all the member states, the ASEAN Power Grid seeks to extend energy connectivity to neighbouring countries such as Australia and China.China is connected via the Greater Mekong Subregion (GMS) power framework. In 2017, ASEAN exchanged about 51.7 TWh with Yunnan and Guangxi provinces. This was done through cross-border transmission lines passing

through Myanmar, the Lao People's Democratic Republic and Vietnam. Australia, for its part, is examining the possibility of exporting solar electricity to Singapore using submarine cable technology. The prospects of ASEAN emerging as a hub for power connectivity emerges in view of South Asia's interest in exploring the possible of energy cooperation using the Bay of Bengal Initiativefor Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) as an instrument to encourage energy connectivity.

The ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 prioritises the following three projects although there are others in the pipeline (ASEAN Centre for Energy, 2015):

- System A (North System), located in the Cambodia, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam.
- System B (South System), located in Thailand, Indonesia (Sumatra, Batam), Malaysia (Peninsular), and Singapore; and
- System C (East System), located in Brunei Darussalam, Malaysia (Sabah, Sarawak), Indonesia (west and north Kalimantan) and the Philippines.

The Association of Southeast Asian Nations (ASEAN) has developed the ASEAN Plan of Action for Energy Cooperation (APAEC) 2010–2015. The APAEC is a plan thataddresses the energy issues that are related to the ASEAN Economic Community (AEC) Blueprint 2015. The AEC, through APAEC, seeks to ensure a secure and reliable energy supply for ASEAN, aside from other means, through the ASEAN Power Grid and Trans-ASEAN Gas Pipeline (TAGP). APAEC also seeks to promote cleaner coal use, energy efficiency and conservation. It also emphasises the need to turn to renewable energy which includes biofuels and nuclear energy as alternative sources of energy to drive economic activities and industrialisation(Irawan, 2017).

The ASEAN Interconnection Master Plan Study (AIMS), which was completed in two phases, first in 2003 and then in 2010,had a proposal to set up a regional transmission network that links ASEAN power systems. This was supposed to be undertaken in three stages, first on cross-border bilateral terms, subsequently on a sub-regional basis and, finally, expanding to an all-ASEAN basis that reaches out to an integrated Southeast Asian system. One outcome of this process of integration would be an ASEAN power grid system. Another proposal is electricity connection between Myanmar and Thailand (Ibrahim 2014).

Yet another initiative undertaken on a regional basis is the Trans-ASEAN Gas Pipelinewhich is seen as a regional gas grid that links all the existing and planned pipeline networks of by linking the existing and planned gas pipelines that belong to ASEAN members. This was a component of the ASEAN Council on Petroleum (ASCOPE)-TAGP Master Plan 2000. It involves the construction of 4,500 kilometers (km) of pipeline, worth an estimated US$7billion,that is largely supposed to be beneath the sea. The gas pipeline infrastructure had grown from 815 km in 2000 to 2,300 km

of cross-border gas pipelines in 2008. This project is made up of eight bilateral gas pipeline interconnection projects. These pipelines form part of the TAGP, but all are bilateral in nature (Suryadi 2011).

Transboundary power trade is quite common between countries in ASEAN. In 2016 the power trade capacity reached 5.5 GW; this is about 2 per cent of the installed generation capacity. (APAEC, 2015). TheASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 is a regional initiative that attempts to go beyond bilateral arrangements for the trade in power and achieve multilateral connection frameworks.

One of the early projects of this nature is that linking Lao People's Democratic Republic, Thailand, Malaysia, Singapore Power Integration Project (LTMS-PIP). LTMS-PIPuses Thailand's transmission grid and allow Malaysia to purchase up to 100 MW of electricity power from the Lao PDR. With the launch of this project it will be possible to extend the network beyond the initial countries involved, thereby creating a network for multilateral electricity trade.This will extend the APG beyond neighbouring borders (ASEAN Centre for Energy, 2017b).

In 2017 the Lao People's Democratic Republic, Thailand and Malaysia signed a cross-border power and transmission agreement, with electricity trading beginning the following year. Lao PDR began electricity trading with Malaysia using Thailand as a component in the network by sharing the transmission network.

While Cambodia, the Lao PDR and Myanmar have good hydropower resources, there is excess demand for power in Thailand, Malaysia, Singapore and Vietnam, creating an ideal situation for trade in power. There is, therefore, potential for a vibrant energy market in ASEAN to meet intra-regional energy needs. This, of course, implies that the appropriate domestic infrastructure be built along with the necessary cross-border interconnections.

V. North East India as India's Energy Pivot

The NER has an enviable geographical location that positions it suitably within India,and also in close proximity to some of the South Asian states such as Bangladesh and Bhutan. At the same time the NER is also in close proximity to Southeast Asia, since it is close to Myanmar. Thus, the NER can act as a connecting corridor between South and Southeast Asia, enabling energy trade along cross-border lines. The importance of the NER arises from the potential that Bhutan and Bangladesh have in increasing their energy generation potential. The latter has great potential for hydropower generation and Bangladesh for thermal power capacity. The NER itself has the capability to increase its power generation capabilities and it should, if it is to meet increasing demand for electricity within its areas and also in the surrounding region. Not only will the North East be a centre for the generation of power, which can then be traded, but it will also be a link for cross-border energy trade.

With Modi's Look East and Act East policies, the NER can both transform itself and the surrounding region. However, this can be done only if there is energy sector cooperation and the supporting infrastructure and institutional frameworks are improved and strengthened. To achieve this, several steps have to be taken, and this involves, increasing the energy generation in North East India, improving infrastructure investment, connectivity, and people-to-people connectivity.

This is not to deny the challenges required to be overcome in establishing the NER as a hub for energy exchange. The primary challenge are the borders that have to be crossed in those regions for energy connectivity to be established and this brings into question a realignment in thinking on security issues, state-centre relationships, technological hurdles and cross-border institutional liberalisation. The other related issue concerns the natural resources, environment and settlements along those regions, particularly where energy generation is to be established and pipelines or grids constructed. Cross-border energy trading requires, as a first step, proper planning along socio-political lines in order to create the right framework for its implementation. Only then is energy integration possible.

One good reason why the capacity of NERshould be fully exploited is because with such an effort India can gradually scale down its use of coal-fired power plants, but so long as coal is used as a source of energy, there has to be a mechanism for sharing the cost of emissions in the regions. This could be based on the extent of reliance of energy from exporting countries, the logic being that emissions are increasing not only for the good of the exporting country but also for the good of the importing countries, which therefore would need to bear some portion of the costs. However, there is no doubt that there has to be a shift from fossil fuels. Bangladesh can do this by importing electricity, rather than using thermal power plants fired by coal. Nepal, Bhutan, and Myanmar are known to suffer from seasonal downturns in hydropower which can be sourced from the NER if it succeeds in generating sufficient energy.

The NER is in a critical position that enables it to integrate the Bangladesh, Bhutan and Nepal (BBIN) subregion (Anbumozhi, 2019). This sub-regional arrangement is expected to work well because in the coming years Bangladesh and Nepal will become net importers of energy in view of their inability to meet their own energy needs. In that case, the NER could become the source of energy supply. But until the NER becomes a source of energy it has to import energy from Bhutan. Thus, one observes an increasing interaction between these countries in energy trade interactions.

There are various initiatives to further integrate the region. Many regional organisations such as SAARC, BBIN, BIMSTEC and the proposed Bangladesh–China–India–Myanmar Forum for Regional Cooperation initiative see the potential that can be realised by connecting the NER with the rest of the region. In view of this possibility several infrastructure projects have been proposed (Anbumozhi, 2019: 80). Some of the infrastructure initiatives include the following:

A. Asian Highway Link,
B. Trilateral Highways,
C. Asian Railway Network, and
D. a natural gas pipeline grid.

Various models are available for the emergence of interlinkages with Southeast Asian countries. One model is through bilateral exchanges between India and Bhutan and Bangladesh and Nepal. In this model, Bhutan, which has the highest per capita consumption of energy seeks to generate 10,000 MW and export to other South Asian countries as well as Myanmar. Another model is through integration along subregional lines, particularly in the context of arrangements between BBIN and GMS. A third model is through the creation of a regional power pool that is located in the NER- Myanmar junction. The notion of a regional energy pool has gained currency in the Nordic region and in Africa (South African Power Pool) (Anbumozhi, 2019: 3). Fourthly, it is possible to form interconnections between generators and loadcentres, such as between Palatana (Tripura) and Comilla (Bangladesh). This project has started exporting power to NER and Bangladesh. Finally,energy grids could be built in the form of a 'virtual energy grid' like that implemented by India between eastern and western Bhutan and the NER and connecting it with Bangladesh and Southeast Asia.

As we can see, some of the models are consistent with the Act East policy and put cooperation between India and Southeast Asia at the centre of their initiatives. This is particularly so in the case of arrangements between BBIN and GMS, which are carried out in the spirit of India-ASEAN cooperation. Creating a power pool will also connect NER and Myanmar. The model based on virtual energy grids is yet another way to implementing India-ASEAN energy linkages. Arrangements based on bilateral linkages are a less suitable way to build the energy linkages that can be strengthened by the requisite institutional platform.

The integration of Bangladesh, Bhutan, India and Nepal (BBIN) as a subregion is crucial as a mechanism to facilitate cross-border energy trading (CBET). In the context of BBIN, the NER is set to play a prominent role because of its geographical position and also because of its status as an energy-surplus centre. The NER is calculated to have a potential of about 58,900 megawatts (MW). NER can supply as much as 40 per cent of national needs. Since Bangladesh and Nepal as well as the surrounding states in India are likely to be energy deficit, the NER can export energy to these areas. However, for that to happen the NER infrastructure has to be upgraded and transmission networks have to be built within the NER. This will be the first step to be followed by networkslinking NER to other states within India, before then proceeding to connect with neighbouring countries.

The NER can be the core of the BBIN subregion and it can connect with Bhutan, Nepal on the South Asia side and even extend to Lao PDR by linking through Myanmar.

Thus, a corridor can be created by creating power-generating hubs and transmission lines. Several pre-requisites have to be met for this strategy to materialise. First it is necessary to create the right security framework as well as develop the supporting vision from an international relations perspective. An atmosphere of mutual suspicion will damage energy cooperation. India will have to take the lead in determining the right foreign policy approach. Second, the unharnessed hydropower potential has to be tapped. Third, there should be a willingness to shift to green, renewable energy rather than depend on fossil fuels.

It should be noted that there are many regional and sub-regional arrangements that can make a BBIN-NER-Southeast Asia corridor work. Among the frameworks that can help in this regard are the following:

a. ASEAN–India Free Trade Area,
b. Mekong–Ganga Cooperation,
c. Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation,
d. Bangladesh– China–India–Myanmar Forum for Regional Cooperation,
e. South Asian Association for Regional Cooperation, and at some point
f. Regional Comprehensive Economic Partnership

Other initiatives such as the Central Asia–South Asia Project, the China-led growth quadrangle in the Greater Mekong Subregion, the China–Pakistan Economic Corridor, and One Belt One Road initiatives in Asia have implications for trade and could significantly change the scope of energy trading in this region. For example, the $60 billion+ China–Pakistan Economic Corridor project, which is based on a strategy of 'one corridor multiple passages', consists of 51 planned and undertaken projects; of these, 24 are energy-related, with an installed capacity of 17,608 MW. At least seven projects are now at the completion stage under itsearly harvest category (China–Pakistan Economic Corridor).

Initiatives taken by the Government of Bangladesh in engaging with their counterparts in Bhutan and Nepal indicate a strong possibility and acceptance on the part of India to permit the use of its grids for multiple trans-border energy flows and exchanges. In fact, this essentially bilateral framework could be a stepping stone to trilateral and multilateral frameworks for use in the BBIN subregion, and extended to other neighbouring countries in South East Asia and beyond.

VI. Conclusion

South Asian and Southeast Asia are set to grow in the years to come; they are the new growth centres of the global economy, aside from China. This increases the need for regional cooperation and integration, which can be done through the architecture

of multilateral trade agreements. More specifically, within the framework of such institutional arrangements, other initiatives are necessary. Initiatives with respect to building energy cooperation and regional initiatives are specifically necessary in order to drive growth.

There are traditional opportunities for trade in energy resources between South Asia and ASEAN; this is mainly in coal and petroleum products. But there is a shift from fossil fuels to other forms of energy, and these lie in hydropower and natural gas. It is in these areas that India and ASEAN should concentrate moving forward.

More investment is necessary in LNG liquefaction capacity and new exploration. It is also necessary to lay more natural gas pipelines, build power grids and extend hydropower facilities. For this purpose, credit availability and financing have to be extended and the credit constraint has to be relaxed. The electricity sector is another area in need of investment.

From a policy perspective, the pivotal role of the North East Region is the most significant point. NER forms the bridge between India and ASEAN, and while there is more potential for the development of energy connectivity between India and ASEAN there is also an increased role that the North East can play in this respect. To take advantage of its geographical vantage point, the NER should be developed and fully equipped with the necessary infrastructural facilities. These considerations should be kept in mind in the development planning of the NER.

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The Plantation Labour, Planter's Raj and Gandhi Maharaj: Exodus of "Madrasee" Coolies from Tea Gardens of Assam (1924-25)

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Abstract

In 1924-25, large number of plantation labour from tea gardens of Assam, recruited from Madras Presidency collectively withdrew and proceeded on a long march with the objective to go back to their homes and after many hardships, delays and vicissitudes ultimately reached their destination some 3000 kms away.

Faced with a determined combination of coolies who took recourse to a broad spectrum of evasive modes of resistance, to thwart any attempt to send them back to the plantation, the colonial authorities were compelled to repatriate many of the coolies much against the wishes of the planters, leading to prolonged negotiation and acrimonious debate between the officials of Government of Assam and planters. The discourse between the two provides useful insights about conflict of interest and often contradictory interplay between various stakeholders that informed the colonial policy and thus suggests that reducing colonial rule in Assam to planter's Raj, is to overlook this complexity. It also shows emergence of collective withdrawal as a mature and effective mode of non-confrontationist protest wherein by adopting wide -ranging forms of action,which minimized direct conflict with the colonial rule, including invoking the authority of Mahatama Gandhi, plantation labour achieved their objective.

I. Introduction

In 1924-25 large number of plantation labour collectively withdrew from the tea gardens of Assam in batches and proceeded on a long march with a resolve to go back to their home districts. Recruited from the ceded districts - Bellary, Ananthpur, Cuddapah and Kurnool- of Madras presidency the previous year (1923), some 2500

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of them left gardens located in Lakhimpur and Sibsagar districts of Assam Valley,[2] and after many delays, hardships and vicissitudes, ultimately reached their homes more than 3000 km away. The same story was repeated in tea gardens of Cachar district of Surma Valley which also witnessed exodus of plantation labour between December 1924 and January 1925 recruited from ceded districts.[3]

The official report on large scale withdrawal of plantationtitled as "Exodus and repatriation of Madrasee coolies from the garden of Assam[4] despite its statist overtone provides a rare instance in which dissent of the participants was not only recorded by the Government officials but they were also given the opportunity to explain their version of event. While fraudulent and hasty recruitment, undueinfluence and misrepresentation in recruitment, appalling working conditions in the tea gardens and mistrust for colonial bureaucracy etc. are all highlighted in theiraccounts(about which much has already been written), what is unique is emergence of exodus as an effective and mature form of evasive and non-confrontationist form of resistance.

Faced with a serious situation the colonial government was forced to repatriate many of the coolies, not out of any benevolence but sheer expediency, generating an acrimonious debate between the tea industry of Assam represented by Indian Tea Association (ITA) and their associate Tea District Labour Association (TDLA) on the one hand and the Government officials of Assam on the other. Though the Tea Industry alluding to its adverse impact on labour supply opposed repatriation, officials defended it on the grounds of adverse public opinion, maintenance of law and order and even rule of law, suggesting that reducing colonial rule in Assam to planter's raj is to overlook the complex and often contradictory interplay between various stake-holders including negotiation, antagonism of interests and differences of stand points which actually informed colonial policy. Also it was evident that despite centrality of tea interest and as much as the planters desired, the colonial bureaucracy resisted any attempt to put state power at the disposal of tea industry,not out of any concern for the coolies put to salvage its legitimacy.

An interesting aspect of exodus wasthat though repatriation of coolies was done by Government officials, many of the repatriated coolies during an enquiry conducted by Government of Madras stated that they were sent home by Mahatma Gandhi or Sarkar Gandhi Maharaj- an indication of emergence of Gandhi as a counter to the powerful colonial state- a protector and saviour.

[2] Ceded districts are the name of area in the Deccan India that was 'Ceded' to the British East India Company by the Nizam of Hyderabad in 1800. It was used widely even though it had no official relevance for legal or administrative purpose

[3] Tea was commercially cultivated in two valleys of Assam - Assam valley and Surma or Barak valley. Both the valleys are divided by long lines of hills and mountain and were detached from each other. The river Brahamputra flows though Assam valley, while river Surma with its tributaries flows through Surma valleys. Major part of Surma valley now falls in Bangladesh.

[4] There are three such reports of Finance Department, Immigration Branch, Assam Secretariat

II. The Exodus

The exodus took place from a number of gardens of two upper Assam Valley districts of Lakhimpur, Sibsagar and Surma Valley district of Cachar. 'Trouble'originated in Assam Valley with the exodus of 129 'Madrasee' coolies of the Tipuk Tea Estate into Dibrugarh on 7th July, 1924, who refused to return to the tea gardens. Before the Deputy Commissioner (administrative head of the district)they statedthat they have been frightened by the scare of head hunters, disliked both climate and work and wished to return to their homes. It was decided to repatriate themas the coolies could not be allowed to remain indefinitely in the Dibrugarh bazaar. The Tipuk coolies had in the meantime been joined by 70 coolies from the nearby Ethel wood tea estate. Though some of them were persuaded to return to their gardens, the majority refused to do so and most of the coolies left Dibrugarh by road to Sibsagar with the intention of marching home by road. The Deputy Commissioner sent men after them and they were overtaken and repatriated from nearest railway station. Subsequently, small batches of coolies from these two gardens also came into Dibrugarh and some of them were repatriated by the local district authorities[5].

The next scene of "drama" opened with exodus of 1000 'Madrasee' coolies from Lukwatea garden who reached Jorhat on 29thAugust and were joined subsequently by 400 coolies from Meleng tea garden. A certain number of these coolies were persuaded to return to their garden but the main body refused to do so. In their case too the complaint was that they disliked the climate and desired to return home. Failing to get any assurance of repatriation, the coolies left Jorhat and proceeded on their march by road, eventually reaching Nagaon district. From the time they left Jorhat there had been at least 11 deaths and 4 births. One newly born child had been thrown into the jungle and two orphan children had been abandoned on the march. In addition there had been sick in the place of halt, and on the march many of them had been left behind on the road. Given their extreme physical condition authorities repatriated them.

The news of repatriation traveled fast and within a few days the remaining 'Madrasee' coolies from Lakwa walked off; as also did 200 from Meleng and a batch of 85 from Ethel wood and Tipuk, including small batches from a number of tea gardens[6].

After a lull, just when it was thought that the exodus crisis was over and administration should not be further troubled about 'wandering gangs of coolies still left as gleanings from the harvest that is over', 350 Santhali coolies under Assam Railway and Trading Co. at Tipongpani left on 12 September 1924 by road[7].

[5]Letter from Chairman, Indian Tea Association to the Second Secretary to the Government of Assam, 1st October, 1924,No. 1281, Finance Department, Immigration Branch B, Assam Secretariat

[6]Letter from Chairman, Indian Tea Association to the Second Secretary to the Government of Assam, 1stOctober, 1924,No.1281Finance Department, Immigration Branch B, Assam Secretariat

[7]Letter from A. Phillipson, Deputy Commissioner, Lakhimpur to the Commissioner, Assam Valley Division, Gauhati 14thSeptember, 1924, No. 76,Finance Department, Immigration Branch B, Assam Secretariat

In the meanwhile the remaining non-patriated "Madrasee" coolies marched towards Nagaon and hired lorries making own arrangement for food and shelter. Prior to this on 15thOctober they had approached the District authority for the authorities remained indifferent.Their main grievance was unsuitable climate and low wages. In the same month many coolies of Barbari and Rajagour left tea gardens and arrived Sibsagar requesting Deputy Commissioner, Lakhimpur for repatriation. Upon his refusal, many of them proceeded by train for home[8].

The exodus continued following year and on 5th March, 1925 about 120 Bellary coolies from Amguri Tea Estate left by road towards Sibsagar complaining about high causality, with the intention of returning home[9].

This was followed by desertion of about 290 coolies of Kutchujan Tea estate in April[10]. Besides these gardens of Lakhimpur and Sibsagar districts of Assam Valley, a parallel exodus in the meanwhile was taking place from tea gardens in Cachar district of Surma valley though at a low scale, a number of collies leaving Kukichera and Kumbhir tea gardens in December' 1924 and January' 1925 respectively, complaining about less then promised wages and adverse working condition before the sub-divisional officer (SDO) of Hailakandi. Though the SDO assured them that the tea garden management would be requested to look to their "comfort and convenience", the collies refused to go back. On being refused repatriation they marched on arranging train tickets to reach the nearest embarkation depot and were finally dispatched to their home by the authorities[11].

To conclude between July 1924 and April 1925 an estimated 2500 coolies from various far-flung and unconnected tea gardens had left either on foot or by train, bus or truck for their home and while many of them had been repatriated by the government, a section were struggling their way, sometimes at the pain of extinction.

III. Contextualizing Exodus – Making "Externally Mobile" Labour "Internally Immobile"

Planters and the Issue of Labour Supply

British explorers found tea growing wild in Assam and thus it wasto be tamed and subjected to the civilization of tea gardens to make it a commercial proposition.

[8]Letter from A. G. Pation, Subdivisional Officer, Sibsagar to the Deputy Commissioner, Sibsagar 29th October, 1924,No. 1348,Finance Department, Immigration Branch B, Assam Secretariat

[9]Letter from C.S. Gunning, Offg. Deputy Commissioner,Sibsagar to the Commissioner , Assam Valley Division, 5th March, 1925, No. 5046,Finance Department, Immigration Branch B, Assam Secretariat

[10]Letter from A. Phillipson, Deputy Commissioner, Lakhimpur, to the Commissioner, Assam Valley Division, 11th April, 1925,No. 24, Finance Department, Immigration Branch B, Assam Secretariat

[11]Letterfrom the sub-divisional officer, Hailakandi to the Deputy Commissioner Cachar 20th December, 1924, No. 1025, Finance Department, Immigration Branch B, Assam Secretariat

(Ghosh in Bhadra, Prakash and Tharu (eds), 2003,14). Similarly the large labour force needed for the plantation was also to be tamed.Thus experimental plantations were inaugurated in Assam in the 1830s based on the systematic cultivation of tea. In fact the tea industry was the earliest commercialized industry established by private British capital during the 19th century. Assam became over the latter half of 19thcentury one of the largest producers of tea in the world. In order to make waste lands available for tea cultivation a set of rules were framed known as the Waste Land Rules of 1838. (Guha, 1977, 13-16).It continued to grow phenomenally during the second half of 20thcentury with the production of tea increasing in the three major tea producing districts of the Assam valley (Lakhipur, Sibsagar and Darrang) from 70million lbs in 1900 to 243 million lbs in 1947, while area under tea cultivation expanded from 187,639 acres to 279,299 acres during the same period. (Behal, 1985 PE-19)

Predictably the scale of expansion required a huge labour force not only for planting the tea but more so for cleaning the jungles and making the land suitable for plantations. But compared to other provinces of India, Assam was sparsely populated, most of the inhabitants settling along the fertile tracts of the Brahmaputra where vast areas of cultivable waste land on ownership or tenancy terms were easily available (Das Gupta, 1986, PE-2).

Therefore right from the beginning mobilization of labour force was a major issue wherein the "primitiveness" of the local labour in Assam was seen as driving the very rational of the working of the plantation to stand still. (Ghosh in Bhadra, Prakash and Tharu (eds.) 2003, 15) andcolonial authorities were repeatedly asked by the tea planters to initiate policies that would facilitate supply of labour. It was urged upon the government to further enhancethe land revenue rates so that poor cultivators could be flushed out from their villages to work for wages on the plantations. Thusland revenue rates were almost doubled in 1893 in Assam. (Guha, 1997, 10) but local labour continued to elude plantation.

An indigenous migrant group Kacharis was induced by the planters to work on the plantations but their engagement was marked by irregular condition of life and work. Issues of wages, timing of payment and supply of rice led to frequent work interruption, strikes and mass withdrawal on the plantations. (Guha, 1977, 15).

Outsourcing the Distanced Migrant Labour and its Limitations

The planters attempted to resolve these labour difficulties by sourcing a new group of long distanced migrant labour based on a new system of contract. (Varma, 2011, 47-50).

By the mid-60s the policy of recruitment of labour from other provinces was well underway and planters resorted to a policy of systematic and organized recruitment of tribals as well as communities, inhabiting areas spread over several provinces in eastern and central India, already impoverished due to alienation of their land and continual decay of an agrarian economy characterised by forced commercialization.

The tea planters following the model of overseas plantation recruited their coolies through contract houses and their agents known as arkattis and after 1870, increasingly through sardars or specially appointed tea garden labours who were sent back to their home to recruit more coolies (Ghosh, in 2003, 34). Living far away from their homes and hearths and contract-bound, these labourers were extremely vulnerable. (Guha, 1977, 18).

In the initial years the most popular source of labour supply were tribals of Chotanagpur. The agents were the most important link in the state who though mostly outsiders managed to impose themselves securely on the rural societies.The plantation labour source slowly came on to be dependent on poor peasants and landless peoples from other parts of the country like Bihar and Eastern UP(Gyan Praksh, 1994,31).

But once in plantation they were to be confined as the success of the scheme depended on immobilizing the mobile. Private arresting was particularly unleashed to retain workforce, apart from powers to track the coolies. They were confined in concentration camp like situation and housed in segregated "coolie line" and remained under strict supervision round the clock. Being bound down under contract, the indentured workers had no freedom. In case of continued refusal to work or absence exceeding certain days he was liable to be imprisoned. The term "absconder" came into regular use and planters were empowered to confine 'absconders' and inflict punishment (Das Gupta, 1986, 3).

Thus uprooting vast number of labours and re-planting them what was achieved was a massive, controlled and assured labour supply.The system of recruitment worked somehow in the first two decades of 20th century, but it had its own constraints which increasingly became evident in the mid 1920s.

First, was the image of Assam as an 'unknown territory' from where no traveler ever returned. It was always a hope for Assam administration that with the development of communication and railways, the condition of employment in Assam would become more widely known, enabling tea gardens to compete successfully in the labour market but it did not happen[12].

Secondly, Chotanagpur had practically ceased to be a productive field alongside United Provinces, Odisha and other parts as recruiting districts were witnessing good crops for some years discouraging out migration.Moreover industrial development nearer the homes of labourers coupled with competition in the shape of rivals in the labour market 'who were unfettered by any acts or restrictions' was also impairing labour supply[13].

[12]Extract from the Proceedings of the Governor in Council in the Finance Department , 3rdNovember, 1925, No. 7440, Report on Immigration labour in the province of Assam, Assam Secretariat

[13]Report on the Working of the Assam Labour Board 30th June, 1922, 45, Assam Secretariat

Also, sustaining labour supply from newly opened areas was not always easy, as once opened it often led to scramble for labour, competing tea gardens giving sardars a free run, compelling the authorities in the recruited areas to prohibit migration. For example, in mid-1920s feudatory state of Bastar in central province was targeted and in 1923, 1700 plantation labour came to tea gardens of Assam which rose to 3000 in 1924, following an active campaign. Garden sardars were sent freely to Bastar without certification or with illegal certificates, with the result that no less than 34 villages of the state were entirely deprived of population. This compelled the authorities in the feudatory state to disallow 'recruiting, engaging, inducing or assisting' any native of Bastar to immigrate to any tea garden[14].

Southward HO

Given the unfavourable recruitment results from the areas old and new, including Chotanagpur, Eastern India and Central provinces, exploring and penetrating new sources of labour supply became a matter of survival for tea industry and a Southward HO thus became the inevitable choice. In 1921, Melligan, Chairman Assam Labour Board wrote to the Secretary to the Government of Madras that in recruitment of plantation labour Assam should not be singled out but should receive same concession as south Indian planter association, the recruitment for whom was "entirely uncontrolled and much more open to abuse"[15]. Thus Ganjam and Vizakapatam which were earlier opened for short period confining recruitment to certain caste, subsequent to persuasion from tea industry from Assam were opened to recruitment of ''labour of all races'' for a period of twenty one month initially in November, 1921 and later in 1923 the whole of Madras Presidency including the ceded districts was thrown open to recruitment. Arrangements were made by TDLA for extensive propaganda relating to immigration to the tea gardens. Two cinematograph outfits were purchased and suitable films procured[16].

So desperate was the tea industry in Assam for coolies that the prospect of engaging those who were registered as 'criminal tribe' (which itself was a colonial stereotype to debunk certain communities) in the recruited districts was also welcome. One such group were Paides whose particular form of 'habitual' crime was said to be house breaking, frequently accompanied by violence.Yet Chairman Assam Labour Board strongly defended their recruitment to the tea gardens of Assam, in view of the fact that large number of members of the other "criminal tribes" whose 'record is worse than that of the Paides have for many years been recruited by the tea gardens of

[14]Letter from the Secretary, Indian Tea Association to the Secretary to the Government of Assam,26th June, 1925, No. 152,Finance Department, Immigration Branch, Assam Secretariat

[15]Letter from J. A. Milligan, Chairman, Assam Labour Board, to the Secretary to the Government of Madras, Law Department 3rd August, 1921, No. 1920, Government of Madras

[16]Tea Districts Labour Association, Assam Secretariat, 1924,4

Assam without any evil results'[17]. Government of Madras was quick to endorse their recruitment as their "caste disabilities and traditions are largely responsible for their present characteristics and their removal from present environment and association would have a marked reformatory effect and that it is not likely that they would be a menace to life and property in their surroundings"[18]. Given the desperation of tea planters, though the recruitment was theoretically permitted through garden sardars, in practice it was done vigorously including middle menand non-sardars, supported by local administration, magistrates countersigning garden sardar certificates for people who were obviously not garden sardar class[19]. Besides deploying non sardars to the ceded districts, instances of obtaining fraudulent Sardar licence by appointing criminals as sardars under assumed names were also reported[20]. Thus a multitude of factors unsuitable men combined with the conditions in plantation ultimately resulted into exodus.

IV. Framing the Discourse on Exodus: Coolies, Planters and Colonial Bureaucracy"

Withdrawal of the coolies and their long march engaged planters represented by ITA and TDLA on the one side and colonial bureaucracy in Assam on the other in a protracted negotiation and debate to ascertain the cause and fix blame for it which brought the complexities in the relation between the two. The "adventurism" involved in recruitment as evident in the previous section and the prevailing working conditions in the tea gardens were largely to blame for this as was also evident from the petitions and statements of the tea garden coolies themselves. The coolies in their accounts presented before the district authorities before proceeding on long march, mentioned a variety of grievances -the recruiting Sardars misled them to believe that they would have lighter work to doand will be paid higher wages, many of them disliked climate and condition of life and labour in Assam, the other complaints were about excessive and unaccustomed labour, inferior quality of rice and poverty. They also complained that there had been a number of deaths amongst them since they came out to Assam.

This was reaffirmed by enquiry conducted by the Labour Commissioner of Madras in the ceded districts of Bellary, Ananthpur and Cuddaph from where majority of labourers to Assam tea gardens had been recruited. The Labour Commissioner,

[17]Letter from J. A. Milligan, Chairman, Assam Labour Board, to G.E. Soames, Second Secretary to the Government of Assam, 17th June, 1924, No.2804,Magistracy Department, General Branch, Assam Secretariat

[18]Letter from Bahadur V. T. Krishnama, Secretary to the Government of Madras to the Second Secretary to the Government of Assam 15th October, 1924,No. 2884 Government of Madras, Law (General) Department

[19]Letter from G.E.Soames, Second Secretary, to the Government of Assam to TheR A Deputy Commissioner, Goalpara 25 September, 1924, No.5507-14, Finance Department, Immigration Branch, Government of Assam

[20]Letter from G. W. Selle, District Magistrate, Visagapatam to The Chairman, Assam Labour Board, 24 October, 1924,No.3681- 24R43, Magistraty Department, General Branch, Government of Assam

Government of Madras recorded statement of coolies wherein they narrated a long list of grievances- Wages, fever, leaches, medicines, heat, excessive nature of the task set, methods used to compel them to fulfill these tasks[21].

Reasons for exodus given by the coolies themselves were summed up by the Labour Commissioner as follows:-

Reasons given by repatriates for leaving Assam

Fever	23	Medicines	3
Leeches	19	Ill-treatment	3
Insufficiency of wages	16	Climate	2
Excessive task	6	Language difficulty	1
Dysentery	6	Domestic reasons	1
Rain	4	Bad water	1

The Commissioner concluded that a multitude of factors were responsible for their exodus. In some cases the wages might be too low and improper methods might have been used to compel the coolies to work, the difference in language, the climate, especially the rain, malaria, leeches, recruitment of unsuitable people - all may have had some effect[22] and summed up, "the new Madrasee coolies from the Ceded districts were 'strange people in a strange land speaking a strange tongue[23]. But perplexed both by the spread as well as the speed of its transmission exodus was seen by planters as triggered by outsiders; blaming it on influence brought in by 'non-cooperationist', thereby criticizing any move to repatriate the coolies and askingthe government officials to send them back to the tea gardens, if required forcibly. The colonial authorities on the other hand defended repatriation citing adverse public opinion that the wandering group of coolies may create in Madras Presidency.

However the tea industry was "convinced" that the exodus, was not due to chronic grievances but was a conspiracy engineered by outside influence emanating perhaps originally from Madras, where Assam recruitment had all along been seriously opposed by political agitators and undoubtedly fostered by similar agencies in Assam.

Planters also argued that the exodus was causing "breach of peace" and "disturbance to public tranquility", an interpretation which the colonial bureaucracy was not ready to accept and authorities made it clear that sending them back to the tea gardens was illegal. In the process what followed was a debate over "public tranquility", "rule of

[21]Letter from G.F. Paddison, Commissioner of Labour, to the Secretary to Government, Law (General) Department, 22 November, 1924, No. 61, Finance Department, Immigration Branch, Assam Secretariat

[22]Letter from G. F. Paddison, Commissioner of Labour, to The Secretary to Government, Law (General) Department, 22 November, 1924, No.61, Government of Madras

[23]Noting of J. A. Dawson, Offg. Commissioner, Assam Valley Division, 22 September, 1924, No. 575, Finance Department, Immigration Branch, Assam Secretariat

law" and what is "legal or illegal" and who was entitled to define it, officials resisting any attempt by the tea industry to appropriate "state power". The contest was not about definitions and claims and counter-claims alone but an indication that planters, when inconvenienced, wanted the entire apparatus of state power and law to their side, which the colonial bureaucracy was not willing to accept, asserting that they were not to be solely guided by planters' interest.

Planters asserted that in a region like Assam where labour was short and prices of tea were high, managers would do all in their power to induce labourers to settle and earn good wages and hence Madras coolies had no real grievances from their employees.

What however flummoxed planters the most was the plan of campaign employed in every case, even by the small, isolated groups of 'absconders'; the similarity of the grievances alleged; the actual words used in rejecting all the persuasions; arguments; tactics; watch, words and manifesto adopted by coolies, which warranted the conclusion that in every case inspiration came from a common source[24].

The fact that the coolies spread over many tea gardens, isolated from each other, were linked by common grievance was denied and 'simultaneity' and 'similarity' became a convenient peg to hang the outside influence theory on. The planter overlooked the fact that if there had been any desire to embarrass the Government or the tea industry the matter could certainly have come up in some form in the Legislative Council, which was in session shortly after the exodus occurred but it was not even mentioned once during its proceedings.

The confidential police reports also never mentioned any outside influence and the subsequent enquiry failed to elicit any proof that the exodus was organized by non-cooperationists[25].

But, afraid that exodus might spread to other classes of labour, the tea industry was anxious for an assurance of no repatriation from the Government in such an event. They suggested that instead of repatriation coolies should be sent back to the gardens and a complete change of policy and use of effective means were needed to stop it and deal drastically with those responsible. The Government contended that while as matter of general policy no encouragement or help was to be given to 'absconding' coolies who could substantiate no grievance and every possible effort was to be made to induce them to return to their employment, but if they refuse to do so neither the Government nor the employers have any powers 'under the law' to compel them to

[24]Letter from The Chairman, Indian Tea Association to The Second Secretary to the Government of Assam 1 October, 1924, No- 590,Assam Secretariat, Finance Department, Immigration Branch, Assam Secretariat

[25]Letter from G. E. Soames, Second Secretary to the Government of Assam, to-The Chairman, Indian Tea Association 18 October, 1924, No. 604,Finance Department, Immigration Branch, Assam Secretariat

return[26].

Officials also arguedthat the case of Madras recruitment was different because labour was recruited from districts not opened for recruitment and in no circumstances the coolies should be allowed to wander helplessly around the districts.In a veiled threat the industry was told that if they refuse to pay for the repatriation, Government must pay and then ask the council to vote the necessary funds which will invite debate in council, a situation that the tea industry would not like. Moreover, march of these coolies through the length of the tea districts would have resulted in serious sufferings and many causalities and would have done far more harm to the tea industries than their prompt repatriation as the spectacle of gangs of men, women and children wandering in a destitute state all over the country could not failed to have a public opinion in India, asserted the Government officials[27].

The tea garden industry nevertheless backing on the outside influence theory reiterated that on the occasion of each exodus there had been leaders among the coolies who led them to leave and organize exodus and suggested proceeding under section 107 Cr.Pc. against them.

Official on the contrary, explaining the legal position contended that there could be no such proceeding unless there was an apprehension of breach of peace and Government cannot take any illegal action[28]. It was further elaborated that although section 107 did mention "disturbance of public tranquility" as well as "breach of the peace" no one could be said to disturb the public tranquility because he induces his fellow man to leave work and return home[29]. However this did not satisfy Tea Industry, which pointed outthat government will be fully justified in taking action in a case where the 'ring leaders' were inducing coolies to leave tea gardens and walk home at the risk of dying on the roadside and disturbing other labour forces on the way in as much as such action must be considered to be likely to cause disturbance of public tranquility and the section is worded in such a way to give it a much wider application.

There were also differences about the procedure to be followed during repatriation. The tea industry wanted a set of instructions to be framed for guidance of district officers and repatriation to be resorted only if there was "real necessity". They lamented that in absence of any specific policy each case depended on the personality and

[26]Letter from G. E. Soames, Second Secretary to the Government of Assam, to the Secretary to the Indian Tea Association, 4th December, 1924, no.611, Assam Secretariat

[27]Letter from Second Secretary to Government of Assam,No.591 to The Secretaries, Tea District Labour Association,!9th December,1924,Finance Department, Immigration Branch, Assam Secretariat

[28]Proceedings of a meeting held at Government House, 22 September 1924, no.578, from Immigration Branch, Assam Secretariat

[29] Letter from Second Secretary to Government of Assam, to The Secretaries, Tea District Labour Association, 19 September, 1924, No-562, Finance Department, Immigration Branch June, 1925, Assam Secretariat

idiosyncrasies of the local officers. But the Government officials were of the view that labour exodus must be treated with reference to its causes and application of general instructions to individual cases would only lead to confusion[30]. They also made it clear that it was the Government who was responsible for deciding whether a coolie shall or shall not be repatriated and they will decide what is meant by the term ''real necessity'' and even if the tea industry undertook financial liability to repatriate, it did not invest them with the power to control the 'discretion of magistrate' who were responsible solely to the Government[31].

The question of 'legality of repatriation' was also subject of contention between planters and colonial officials. Alluding to the Assam Labour and Immigration Act 1901, tea industry asserted that only legal ground on which repatriation at the expense of employers could be possible was if recruitment contained elements of fraud and misrepresentation or those recruited were permanently incapacitated from earning their livelihood and in the instant cases neither of the two was attracted. Defending their action officials responded that the issue of misrepresentation and fraud can be settled bestonly after a detailed enquiry in the recruiting districts. Moreover, it could be interpreted that the labour who could not stand the climate or weather were called permanently incapacitated from earning their livelihood in labour districts.

Another suggestion from the planters was that instead of repatriating the coolies they should have been allowed to march accompanied by doctors and a commissariat and forced to halt at different stages to recover their strength.Officials termed it impractical as it was difficult to halt them for long enough to enable them to recoup their strength on account of possibility of epidemic[32]. It was added that the state of coolies was such as to render immediate repatriation necessary and a continued march accompanied by deaths and sickness might create 'public scandal' and lead Government of Madras to impose restriction in recruiting and it would therefore be appropriate to repatriate the coolies at once[33].

What emerged from the long drawn negotiation and debate was that the tea industry wanted to return the administration and law as a apologia for planters interest, but the officialsconcerned about protecting their turf, would not allow legal powers, which were in their 'domain' in hands of men who did not have any claim on issues like

[30]Letter from G. E. Soames, Second secretary to the Government of Assam, to The Chairman, Indian Tea Association, 18thOctober, 1924, No. 604,Finance Department, Immigration Branch, Assam Secretariat

[31]Letter from H. C. Barnes, Commissioner, Assam Valley Division to The Deputy Commissioners of Lakhimpur, Sibsagar, Nowgong, Darrang, Kamrup and Goalpara 14 December, 1924, No- 622,Finance Department, Immigration Branch, June, 1925, Assam Secretariat

[32]Letter from the Secretary, Indian Tea Association to The Second Secretary to the Government of Assam 1 October, 1924, No. 590, Finance Department, Immigration Branch, Assam Secretariat

[33]Letter from G. E. Soames, Second Secretary to the Government of Assam, to The Chairman, Indian Tea Association 18 October, 1924, No.604,Finance Department, Immigration Branch June,Assam Secretariat

'public tranquility' or 'law' but a direct interest only in sending the coolies back whose 'stampeding' was a nuisance to them.

In the inequitable colonial context of tea plantation, equity of the law must always be in some part sham and it could become an instrument in the hands of powerful planters. But even here the rules and rhetoric imposed limitations upon the unbridled exercise of power both for colonial authorities and planters and which could not be twisted at will.

V. Conclusion

i) Labour Response and Success of Exodus

The limitations imposed upon the unrestrainedexercise of power by the existence of law was seized by the plantation labour to work the system to their advantage and to achieve their objective, by taking recourse to wide ranging modes of avoidance protest that stopped well short of collective outright defiance and survived mostly on self-help- taking the 'legal' course of deputation and petition before local authorities about their grievances and then proceeding on long march to legitimize exodus, splitting into small groups to avoid detection, arranging transport on their own with their limited resources, continuing their march despite extreme adversaries, 'false' compliance and thwarting any negotiation to send them back to the gardens and ultimately making the exodus a success. By their act of "denial of labour through exit" they could demonstrate that Planters' Raj was something less than it claimed to be and its agenda could be altered by everyday struggle of plantation labour.

Exodus was invariably followed by deputation and petition before the district authority - to obtain justice from them, starting from Tipuk through Ethel wood, Lakwa, Melleng to Khomtai. The petition, 'respectfully' submitted by plantation labour of Barbaritea estate collectively complained about the working condition and the quality of rice and actually produced the specimen of rice to substantiate their claim. In the same petition they also invoked their 'right to subsist' by pointing out that they were men, women and children so poor as to scarcely feed themselves for long and they should be repatriated for "which act of kindness the petitioners as a duty bound ever pray[34]. Once the exodus had the legitimacy of deputation and petition, the next step was to proceed on long march. Thus, assurance given by the district authorities that immediate enquiries would be made was turned down by coolies, who refused to return in any circumstances. In many instances, the coolies after hanging about near the D.C office marched further refusing to go back to the tea garden.By starting on a long march after duly informing the administration,which in way legitimized their action and showing sufficient resolution, they were able to successfully pressurize the government to repatriate them.

[34]The 'humble' petition 22 November, 1924, No. 81, Finance Department, Immigration Branch, Assam Secretariat

Evidence also indicates that the coolies acted through a web of informal network to communicate. For example a day before one thousand Lakwa coolies 'absconded', some 'Madrassi' coolies from Muttrapur garden ''without taking leave visited them[35]. It seems that market place played an important role in transmission of verbal message, as evident in the exodus of coolies from Amguri plantation which was summed up as follows "a most unexpected exodus no sign of unrest and apparently quite happy on Sunday visited the bazar making their usual purchase of fish. Chowkidar reported all correct at 9 P.M. During the night they evidently filed out individually, met in jungle"[36].

It appears that in furtherance of their strategy of avoidance, combined with lack of trust in the colonial authorities, coolies tactfully refused any shelter provided by them. Lakwa coolies refused to occupy the sheds erected for them by the Deputy Commissioner and many of them stayed on the road side exposed to the rain[37]. In case of Khomtai after petitioning Deputy Commissioner they scattered about different places and their names and address could not be ascertained, thus foiling any attempt by the administration to deal with them collectively[38].

Work avoidance or go slow was another mode adopted by the coolies. After the exodus the remaining Lakwa and Meleng Coolies did as little work as possible and some did not do enough work to earn a 'decent living wage'. They also ceased to work regularly and their demeanor changed entirely[39].

A between the line reading of the following official report, despite its colonial connotation and categorization provides an interesting account as to how any attempt to negotiate with the coolies to send them back to the garden and break their combination was thwarted by them -

"After the Meleng and Lakwa coolies arrived at Jorhat, attempts were made to persuade them to send them back, but the ring leaders remained obstinate, argumentative and unreasonable and whole of 'Madras' labour crowded around listening, but the rank and file were "laughing and joking". The first piece of propaganda staged was sudden emergence of diseased or injured in front whowere loudly proclaimed as evidence of

[35]Letter from the Chairman Indian Tea Association, to the second Secretary, Government of Assam, 1 October, 1924, No. 590, Immigration Branch, Assam Secretariat

[36]Memo by the Assistant Commissioner, Assam Valley Division, March 1925, No.106, Finance Department, Immigration Branch, Assam Secretariat

[37]Letter from The Chairman, Indian Tea Association, to The Second Secretary to the Government of Assam, 1st October, 1924,No.59O,Finance Department, Immigration Branch, Assam Secretariat

[38]Letter from V.T. Krishnamma Achariyar Avaragal, Acting Secretary to the Government of Madras, Law(General Department) to the Second Secretary of Government of Assam,16th September,1924,No.66,Finance Department, Immigration Branch, Assam Secretariat

[39]Letter from G. E. Soames, Second Secretary to the Government of Assam, to The Secretary to the Government of Madras, Law Department 25 September, 1924, No.579, Finance Department, Immigration Branch, Assam Secretariat, June, 1925

hardship of garden life. The ring-leaders stated that they heard good rain had fallen in their country and there was prosperity so they wanted to return. To counter this latest Madras Government weather and crops reports were produced by the authorities, who also proposed a deputation selected by coolies to be sent. The authorities thought that the ring- leaders were apparently impressed but the balance was trembled when suddenly the organization in the back ground made itself felt and turned the scale. "Without warning the front row of the spectators were cleft by a well marshaled phalanx of women throwing instantly themselves on the ground and grasping the manager and the authorities by the feet from all sides, while a chorus of hysterical weeping and wailing made further parley impossible". When the authorities sought to depart row of all women linking arms laid down on the road in front of the motor car.

Next morning same tactics was repeated by the labour marching in a procession towards Jorhat. Again the argument put forward seemed to impress the coolies when the tactics of previous day was repeated and the intervention of the women brought the negotiation to an end[40].

The expressions like 'ring leaders', 'stampeding',' absconding' and 'contagion' were variously used both by the planters and colonial officials for the coolies and their movement to delegitimize the exodus.Also by blaming their collective withdrawal on "outside influence", attempt was made by the planters to deny recognition to the coolies as a subject of history even for a project that was their own. But though bound by contract and immobilized in routine of work and discipline by the planters, immobilization was successfully contested as success of exodus showed. In the process they also demonstrated remarkable courage, solidarity and determination, emboldened by the fact the situation was one which no provision of law has been designed to cover.

ii) Invoking Mahatma

An interesting aspect of exodus was the way Mahatma Gandhi was invoked by the coolies to make their collective withdrawal a success. Though it was the Government of Assam, which in most cases paid for repatriation, in the accounts about the journey back home, many of them stated before the Labour Commission of Madras that they were helped by Gandhi Maharaj in their journey, claiming that Gandhi gave them tickets or Gandhi took pity on loss of human life they suffered during long march and arranged tickets. Yet another version was that some people came and asked them to go away and on the way they told the coolies that they belonged to Gandhi Maharaj or Gandhi Maharaj gave railway fare, which was handed over to them by a constable, as a present of Gandhi Maharaj. Another coolie told that they walked for many days suffering loss of life and then Sarkar Gandhi Maharaj sent them home.

[40]Letter from The Chairman, Indian Tea Association, to The Second Secretary to the Government of Assam, 1 October 1924, No-590Finance Department, Immigration Branch June, 1925, Assam Secretariat

The study of non-cooperation movement in Gorakhpur (Eastern U.P.) 1920-22 has shown that there was no single authorized version of Mahatma Gandhi to which people subscribed and indeed many of the ideas about Gandhi's "orders" and "powers" were often at variance with those of the leadership of national movement.(Amin in Guha (ed.), 1984) Similarly, during the non-cooperation movement in Surma Valley in May, 1921 the tea plantation labour recruited from United Provinces demanding a wage increase had left in thousands amidst declaration that such was Gandhi's order (Sarkar, 1983,217). But while radicalization of Mahatma Gandhi's message during a momentous even like non-cooperation and interpretation of his 'orders' differently by different sections of people to align with what they regarded as just, fair and possible was not uncommon, 1924-25 was relatively a non – momentous phase in Indian history of relative 'peace'. Non-cooperation movement had been called off in 1922 and the pros and cons of council entry was engaging the attention of national leadership. Use of Gandhi's name in such a context was exceptional as his authority was invoked when there was no possibility of linking it or drawing sustenance from a larger, widespread, national movement, to legitimize collective withdrawal from the tea gardens. Also use of Mahatma Gandhi authority shows his emergence as an alternative source of power to the colonial state, a savior more powerful than the latter and even if invoked as an afterthought, it was based on the firm believe that it would protect them from any future repressive action of colonial government.

Thus even though a constable who gave the ticket, did it on behalf of government, it was attributed to Gandhi. That the ground of colonial rule was shifting and Raj was giving way to Gandhi Maharaj could not be comprehended by the planters or the officials. The dilemma was summed up by the Chairman of Indian Tea Association - "It is really amusing that government at present paid for their repatriation but Mahatma Ji came in for the credit"[41].

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Book Review

The Muslim Question in Assam and Northeast India

The Muslim Question in Assam and Northeast India**,** by Manoj Kumar Nath, Routledge, Oxon, New York, 2022, Pages-191

Bhupen Sarmah[1]

Sustained academic engagement of Manoj Kumar Nath with what he has perceived as "Muslim Politics in Assam" is evident from his number of publications including the recent one - *The Muslim Question in Assam and Northeast India*. The primary concern here is to comprehend how have the Muslims been responding to the dynamics of the post-colonial electoral politics of Assam. Specifically in the context of the Brahmaputra Valley, though the community is divided into at least two distinct cultural identities, its role in the electoral politics is significant for its constantly growing numerical strength especially since the beginning of the last century. Inevitably, the author reiterates the historical process of immigration and the consequent demographic change. The Muslims in Assam, despite being a culturally and linguistically heterogenous community sharing a common religion has been projected as a political threat to the indigenous people and the process of 'othering', especially engineered through the Assam Movement, became an effective instrument in the electoral politics of the state during the subsequent decades.

Contesting the position taken by some scholar that the problems of Muslims of Assam are not very different from that of the socio-economic problems of the rest of the Indian Muslims, the author tries to argue that myriad historical factors have tangible impacts on construction of distinct state-specific identities of the Muslims of Assam, essentializing a sensitive position of the community in the socio-political milieu of the state. Therefore, with an attempt to analyze the process of formation and transformation of the distinct state-specific identities, besides reiterating the nuanced questions of immigration and settlement of the Muslims at different historical junctures, the author tries to theorize Islamisation in the specific context of medieval Assam. To depict the process historically, the author has broadly accepted what has been conceived as social liberation theory of Islamisation, where conversion became instrumental. The

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author, therefore, finds the basis for emergence of an indigenous Muslim identity *vis-a-vis* the political identity constituted by the immigrant Muslims who started settling in the state particularly since the beginning of the last century. For the proclivity it demonstrated to become an integral part of the Assamese linguistic nationalist identity, the later assumed a new identity, Na-Asomiya Muslim after partition and independence. Nevertheless, the consolidation of this new identity, as the author comprehends it, is an outcome of an inevitable social and cultural adjustment with the Assamese linguistic nationalist ethos on the one hand and political alliance with the Congress hegemony on the other. While linguistic adjustment identifying themselves as Assamese speakers placed the immigrant Muslims in a conducive social milieu, political alliance with the hegemonic Congress ensured security in the Hindu majority political environment of Assam in absence of the Muslim League. The argument has been substantiated by analyzing the political response of the community especially during the decade before independence marked by a conspicuous political presence of the Muslim League and its unequivocal position on partition appealing the Muslims living in Assam to support the cause of Pakistan.

In absence of any stringent measure to prevent illegal immigration to Assam after independence, now from East Pakistan, the numerical strength of the immigrant Muslims in the state increased considerably. However, the visible linguistic and political position taken by the community ensured a safe political space amidst the violent linguistic movements experienced by the state. The Assam Movement, an unprecedently aggressive form of identity movement, nevertheless, drastically changed the political environment when the immigrants were projected as a threat to the cultural-national identity of the indigenous Assamese. Though the prolonged movement could not achieve much for the indigenous Assamese, one of the significant consequences of the movement is reinforcement of religious polarization in the postcolonial political landscape of Assam. The wider section of the immigrant Muslims started asserting themselves autonomously to start a new political discourse in the changed political milieu.

The book has extensively dealt with the process of political consolidation and reappearance of the immigrant Muslims as a distinct category to significantly influence the electoral politics of the state, paving the road for communal politics. Notwithstanding the unresolved issue of citizenship was reduced to a mere electoral issue during the decades after the Assam Movement, the contentious issue assumed a more vigorous political character when the immigrant Muslim community has been projected as a political threat to the indigenous Assamese. Now, the issue was sought to be resolved through judicial activism culminating in the process of updating the NRC.

Deeply engaging with the trajectory of Muslim politics in Assam, particularly since the later phase of colonial rule in the state, the book has tried to address many nuanced issues pertinent especially to electoral politics in the specific context. The author comes to the conclusion that the political dispensations of the Muslim League and

continuous immigration even after independence made the Muslims in Assam a sensitive political category. However, the Assam Movement created an everlasting distrust between the indigenous Assamese and the Muslims through a process of 'othering' of the later. Though the community did not become a communal bloc even after the Assam Movement, as the overwhelming majority of it preferred to remain secular in electoral politics, the efforts made by certain political force to mobilize the community on communal line paved the way for Hindutva political forces to grow in Assam. Moreover, as the author has tried to argue, indiscriminate characterization of the community as illegal immigrants from Bangladesh - 'Bangladeshi' in popular political discourse – culminated in a sense of alienation of the neo-Assamese Muslim community from the idea of Assamese. With this backdrop, the author tries contextualize some of the basic contemporary and contentious political issues such as the process of updating the NRC and the Citizenship Amendment Act etc.

The book provides an interesting account of the electoral politics in Assam centering around the immigrant Muslims, and unmistakably, it is a worth contribution of the author specially to encourage a new spate of scientific research detaching from many prejudices and stereotypes. Nevertheless, author should have taken cognizance of history before making certain generalizations. First, the author tries to argue that "While the Ahoms did not enter Assam as invaders, Muslims did" and he substantiates it by saying that "the first ever contact of Kamrupa with Muslim invaders was in 1206". However, immediately he asserts that Muhammad-Ibn-Bakhtiyar-Khilji, was son of Bakhtiyar and a Turk of the Khilji dynasty (p.17). Second, to quote the author, "There is no government data on the population strength of the Ahoms in Assam, and it has remained a small community in comparison to Muslims in present Assam. This clearly indicates a mass Islmisation in Assam since Muslims started to immigrate to the state" (p.47). Third, "After independence, the indigenous Muslims became politically passive" (p.52). Fourth, "After independence, present Nagaland, Mizoram and Meghalaya became parts of Assam. The central government had to face a revolt from the Nagas for sovereign state just after independence" (p.59). These are some of the generalizations/statements made in the book, which deserve adequate attention for revision.

Further, a deeper engagement with the twin processes of Islamisation and peasantisation in the specific context of Assam would have provided a stronger footing for scientific analysis of the main theme of the book i.e., what the author perceives as Muslim question in Assam. Similarly, while discussing Muslim League politics, the unavoidable question is the political role played by the Tribal League. The book is conspicuously silent on the political alliance between the Muslim League and the Tribal League. Similarly, though the book provides a detailed account of the Assam Movement to comprehend the process of consolidation of Muslim as a political identity in the subsequent period, the author prefers to remain silent on the other consequences of the movement, which have considerably influenced Muslim politics in Assam. To be more specific, the violent identity movements of the Bodos cannot be detached

from the process of political consolidation of the religious minorities specifically in the context of the Brahmaputra valley. Despite being sound in narrativizing the contemporary political questions intrinsic to the Immigrant Muslim community, the NRC and the CAA are two sides of the same coin. An informed reader would have to remain curious to know about the author's position regarding political necessity of the both, even after carefully going through the book.

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