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Role of Innovative Research in Higher Education in Addressing the Socio-Economic Issues in Northeast India

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Abstract: The innovative and productive research have crucial roles to play in developing differentiated and effective academic systems and make it possible for their countries to join the global knowledge society and compete in sophisticated knowledge economies of the world. Investment in human capital, physical investment in research and development, technological progress are all elements of the search. The present study aims to analyze and to highlight the importance of higher education for economic growth in the northeastern states through innovation and research. Moreover this paper pays special attention to the development of socio-economic conditions and the role which can be played by higher education in exploring the vast potentialities of development in the region. This paper also points out the important barrier and constraints faced by higher education so as to equip the people with skills and knowledge. It also highlights the necessity to find solutions to the constraints to transfer this knowledge into innovations that provide economic and social benefits. Higher education should have a strong role to deliver research that can enhance innovation and productivity.

Keywords: Higher Education, Innovative Research, Skills, Human Resource, Infrastructure

Introduction

Innovative and productive research play a crucial role in generating new ideas, in accumulating and transmitting knowledge, and contribute to the growth of national income and individual earnings. Investment in higher education, particularly academic research has come to be recognized as a potential source that could aid to a nation's development through production of knowledge. According to the OECD report (2012) the "buildup of innovation capacities has played a central role in the growth dynamics of successful developing countries. Innovation is not just about high technology products and that innovation capacity has to be built early in the development process in order to possess the learning capacities that will allow 'catch up' to happen'. This will be achieved through stimulating a shift in the research agenda by fostering links between front line research and policy, by working with leading researchers, research institutions and policy makers from different economic contexts. To deliver research that can enhance innovation, it needs to have a strong role in research provision and strong links with firms and other research providers" (OECD 2012, 4).

The importance of higher education as a source of scientific, technical and analytical skill is increasing. A well trained and highly educated workforce enhances growth, achieve high levels of productivity apply existing technologies and engage in innovation as a means to increase a nation's competitiveness and growth.

India has now become a major player in the global knowledge economy which is contributed by skill based activities. Such activities depend on the large pool of qualified manpower that is fed by its large higher education system. The emergence of global economy due to increased trade and investment mobility of people has forced nation states to adopt their systems of higher education to the changed global realities. Every nation now operates in an increasingly competitive and globalised international environment system, and education and lifelong learning are crucial variables (Agarwal 2009).

It has also made an impact on higher educational institutions in northeast India. Even some of the institutions are venturing towards

introduction of professional and skill based programs in their curricula; several institutes are upgrading their technological environment. In fact some changes are happening all the way around but there is still long way to go for all round development of the educational environment of the higher education institutions of northeast India (Konwar & Chakraborty 2013, 78).

Northeast India at a Glance:

India's northeast consists of eight states: Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. It is spread over an area of 2,62,179 square kilometers. The whole of the Northeast accounts for eight percent of India's geographical area. Its population of 455,87,982 (2011 census) is 3.77 percent of the country's population. There are 953 females per 1000 males in the region, which is better than the national ratio of 943. Population density of the region is 160 persons per square kilometer, which is far less than national population density of 382. Assam, with a population of 3,12,05,576 is the most populous state in the region and Sikkim is the least with 6,10,577 people. Mizoram has the highest literacy rate in the entire region (91.3) and Arunachal Pradesh is the least literate with 65.4 percent literacy. In work participation rate Sikkim is the highest with 50.5%, far better than the national average of 39.8 and the least is Assam with 38.4 percent. For the Northeast as a whole, the work participation rate is 43.8.

Table 1

Sl.	States	Total Population	Sex	Literacy	Work	Population
1.	Arunachal	13,83,727	938	65.4	42.5	17
2.	Assam	3,12,05,576	958	72.7	38.4	389
3.	Manipur	28,55,794	985	76.9	45.7	128
4.	Meghalaya	29,66,889	989	74.4	40.0	132
5.	Mizoram	10,97,206	976	91.3	44.4	52
6.	Nagaland	19,78,502	931	79.6	49.2	119
7.	Sikkim	6,10,577	890	81.4	50.5	86
8.	Tripura	36,73,917	960	87.2	40.0	350
	INDIA	1.21 (billion)	943	73.0	39.8	382
	N.E.	455,87,982	953	78.5	43.8	160

Source: Census 2011, Primary Census Abstract.

There are severe differences among the states with respect to their resource endowments, levels of industrialization and infrastructural facilities. The economy of all these states remains underdeveloped and primarily agrarian with very weak industrial sectors and inflated service sectors. Geographical remoteness from the rest of India has been a prime factor behind the region remaining underdeveloped. The region is landlocked and remains primarily dependant on the financial grants from the Central Govt. Of late, there have been several suggestions of linking the economy of the region with the Southeast Asia.

Northeast India – Economy Overview

India's Northeast is potentially one of the richest geographical units of the country endowed with vast stretches of fertile land, rich expanse of forests and substantive mineral and hydrocarbon deposits. 52 percent of its total geographical area is covered by forest. Reserves of petroleum and natural gas in the region constitute a fifth of India's total known potential. The region is served by the mighty Brahmaputra – Meghna river system and small rivulets, bringing along the possibility of generating hydro-electricity and inland water transportation systems. However, the region lags behind many of the Indian states in vital developmental indicators.

Partition of India in 1947 transformed the economic landscape of the region which once was in the forefront of development. Creation of East Pakistan (now Bangladesh) virtually disconnected the Northeast from the rest of India. It blocked the natural sea route through the port city of Chittagong. Political fragmentation and a quest for ethnic and regional identity and insurgency in several parts of the region, which combined with several other factors, pulled down the developmental parameters of the region. It has also hampered the growth of tourism and has discouraged potential investors in the region.

The economy of the region continues to be predominantly agrarian. A large number of people inhabiting the hills continue to follow the traditional practice of Jhum (shifting cultivation). Farmers grow only one crop in a year and farming is basically at a subsistence level.

Agricultural surpluses remain meager and are borne out by the near absence of local rice and paddy sold in the markets. Food grains and the basic products like powdered milk, fish, fruit, vegetables, pulses etc. and several industrial goods are imported in large quantities. This results in the draining away of the region's financial resources, overload the transportation network and results in leakage of most of the benefits of investment made in the region.

The growth of infrastructure, both social and physical, has not kept in pace with the rest of the country leading to widening disparities. The per capita income in the northeastern region on an average is ₹12,918 (as per Net State Domestic Product), as compared with the national average of ₹17,823 at current prices (2001-02). (CDPS 2008)

The region generates less than eight per cent of its 63257 MW of hydroelectric power generation potential. Although the literacy rate in the region (78.5) is above the national (73.0), the employability is low resulting in high rate of unemployment and underemployment. The region, according to the Ministry of the Development of the Northeast Region (DONER), has a net unemployment rate of 12 percent. The incidence of poverty in the region is also high. Assam has 36 percent of its population below the poverty line compared to the national rate of 26 per cent. Mizoram, in fact, is the only state in the region, which has less percentage of people below the poverty line (19 percent) compared to the national rate.

Although infrastructure has developed over the years, the region has a long way to go before it catches up with the national standards. The total rail length in the Northeast is 2578 kilometres, which is only four percent of the total rail length in the country. Similarly, the 1.74 lakh kilometer road length in the region is seven percent of the total roads in the country. Compared to the all India road density (road length per 10000 square kilometer area) of 749, Manipur has a poor density of 490 and Meghalaya 379. Assam has a healthy density of 872 and Tripura 1405. The longevity of the majority of roads, the region's main communication link, however, remains affected by recurring

floods, landslides and erosion. Serious erosion occurs in about 15 percent of the total geographical area of the region and moderate erosion in about 47 percent area.

The industrial sector in the region has mainly grown on tea, petroleum, natural gas in Assam, and mining, saw mills and steel fabrication units in other parts. However, except Assam, manufacturing capabilities in all the states are virtually non-existent. Industrial production is only 2.16 per cent of the Gross Domestic Product (GDP) in the Northeast, compared to the all India figure of 27 percent.

This creates endemic problems for finding remunerative prices or basic commodities and agricultural produce. One of the end results has been the proliferation of activities in the unorganized sector and dependence of the people on government schemes for employment avenues. This in turn has inhibited growth of entrepreneurship on the part of the population while impacting on the credit deposit ratio (CDR). The CDR is varied between 16.8 and 38.3 compared to the national ratio of 58.7. The primary and secondary sectors of the region's economy continue to be overwhelmed by the tertiary sector.

Significance of Innovative and Productive Research in NER

The Northeastern states of India have experienced a comparatively slower pace of industrialization and socio economic growth. It consists of a bulk of educated people depending on the service sector. The region is also characterized by widespread poverty, low per capita income, high unemployment and low agricultural productivity leading to food insecurity. Though the region is blessed with abundant natural resources for industrial and social development, they have not been fully utilized to their potential. If skilled human resource of the region is developed, it would offer an immense potential for the economic progress of the region. The pre-requisite for creation and development of skilled human resources is quality higher education. Thus, innovative and productivity research in the northeastern region will help to circumvent the constraints of natural resources and creation of knowledge infrastructure towards self empowerment.

Higher Education and Research Scenario in the NER:

Before independence, there were only 15 colleges in the NER. The first college i.e., Cotton College was established in Guwahati (Assam) on 27th May 1901 which was affiliated to Calcutta University. Before the Indian independence there was no university in NER and all the colleges were affiliated to Calcutta University. Later on, a Central University which is called North Eastern Hill University (NEHU) was established in Shillong, Meghalaya. Later, more colleges were established extensively in different states of NER. Until the Indian Independence, Arunachal Pradesh, Nagaland, Mizoram, and Sikkim did not have colleges due to isolation and late formation of statehood in the country. Among the states in NER, Assam enjoyed the unique position of attaining education in both pre- and post- independence period (Kengoo 2012, 29-30).

At present, there are fourteen Central and State Government Universities in Northeast India. Except in the state of Assam where there are six universities and Manipur with 2 universities, the rest of the states have only one university each. However, this region has another 16 private and deemed universities.

The state wise number of universities in the North-East included under the U.G.C Act, 1956 as on 31 March, 2011 is as under:

Table 2

State	No. of University				
	Central	State Govt.	Private	Deemed	Total
Arunachal Pradesh	1	-	-	1	2
Assam	2	4	1	-	7
Manipur	2	-	-	-	2
Meghalaya	1	-	6	-	7
Mizoram	1	-	1	-	2
Nagaland	1	-	2	-	3
Sikkim	1	-	4	-	5
Tripura	1	-	1	-	2

Source: UGC Annual Report 2010-11

As shown in Table 2, the university-network in the North East India consists of 14 central and state universities namely:

1. Guwahati University, Assam
2. Dibrugarh University, Assam
3. Assam University, Silchar
4. Tezpur University, Assam
5. Rajiv Gandhi University, Itanagar
6. Manipur University
7. Mizoram University
8. The North Eastern Hill University, Meghalaya
9. Nagaland University
10. The Tripura University
11. Sikkim University
12. Assam Agricultural University, Jorhat
13. Krishna Kanta Handique State Open University, Guwahati, and
14. Central Agricultural University, Imphal.

At present there are 8 NITs in NE. Many regional institutes and centres of Indira Gandhi National Open University and Open Distance Learning (ODL) have also been set up in the region.

According to the Ministry of Human Resource Development, Annual Report (2009-2010), Assam has the highest number of 369 higher educational institutions with 217652 student enrolments among the northeastern states. It was followed by Manipur and Meghalaya with 62 and 56 higher educational institutions respectively. But Meghalaya had the higher number of enrollment of 38658 students than Manipur with enrolment number of 38177 students. Nagaland has 42 higher educational institutes with total enrollment of 28965 students which is followed by Mizoram, Tripura, Arunachal Pradesh and Sikkim with 28, 20, 17 and 8 higher educational institutions with a total enrollment number of students of 14575, 24845, 8839 and 8985 respectively. Tripura has higher number of students' enrollment than Mizoram in spite of more number of higher educational institutions as Tripura is one of the most populated states in NER. Sikkim has the lowest number of higher educational institution but the least numbers

of students enrollment is found in the state of Arunachal Pradesh as shown is Table 3.

Table -3

No. of Higher Education Institutions and Enrollment of Students in NER (2005-06).

State	No. of Institution Higher Education	Enrolment
Arunachal Pradesh	17	8839
Assam	369	217652
Manipur	62	38177
Meghalaya	56	38658
Mizoram	28	14575
Nagaland	42	28965
Sikkim	08	8985
Tripura	20	24845

Note: Enrolment figures include Ph.D., PG and Other Professional courses.

Source: MHRD, Annual Report (2009-10)

The history of institutions of higher education in the Northeast and growth in the number of institutions, students and researchers is a recent phenomenon. Higher education and research scenario in the region requires attention. The North-East has the lowest number of Ph.D.s compared to all zones (4.3 percent of the total). It also has lower number of research universities and institutions compared to the other zones (20) as shown in Table 4.

Table 4
Zone wise Distribution of Ph.D.s across ten years

Zone	No. of Ph.D.s	Percentage of Total Ph.D.s	No. of University Samples	Actual No. of University	% of University samples
South	9282	20.4	51	101	50.49
East	4601	10.1	35	83	42.16
West	5854	12.8	45	160	28.12
Central	4206	9.2	15	25	60.00
North east	1962	4.3	14	20	70.00
North	19656	43.1	56	121	46.28
Total	45561	100	216	510	42.35

Source: MHRD, Annual Report (2009-10)

From Table 4, it can be seen that the highest number of Ph.D.s has been awarded in the North Zone. It was followed by the Southern and Central zones. The Northeast accounts for the least number of Ph.D.s. The reason for this may be the least number of research institutions in the region and hence the number of students having an opportunity to complete doctorates in the North east may be low.

The importance of higher education as a source of scientific, technical and analytical skills is increasing. A well-trained and highly educated workforce underpins growth: skilled labour can deploy flexibility and achieve high levels of productivity, apply existing knowledge and engage in innovation as a means to increase a nation's competitiveness and growth. Additionally a few research universities began contributing to innovation through basic research that generates ideas or upstream applied research and technology transfer that initiates the process of transmuted knowledge and ideas into applications with potentially commercial relevance. Higher education provides economic benefits as well as several non-economic benefits, such as nation building and socialization.

Economic Benefits:

Higher education facilitates employment; increases salaries and savings; improves working conditions and mobility for the individual. It brings about greater productivity, national development, increased consumption and transformation of low skill industries to knowledge based global economy. Tertiary education exercises a direct influence on national productivity which largely determines the levels of living and a country's ability to compete in a global economy. (Yizengaw 2008, 5)

Social and Political Benefit:

Social improvement credited to higher education include improved quality of life for self and family, better decision making, increased status and opportunity for individuals, social mobility, social cohesion and reduced crime rates. It facilitates national development by promoting democratic ideals and intellectual and industrial competitiveness through greater social cohesion, peace and

democratic participation. Tertiary educations also improve the accountability of government and generate independent research and analysis that can greatly improve the effectiveness of government policy and other services (Yizengaw 2008, 5).

Human Capital and Professional Development:

Higher education is critical in building the human capital that in turn builds the very institutions that are regarded as indispensable for development. Diffusion of technical innovations leads to higher productivity and most of these innovations are products of basic, applied research undertaken in universities. Progress in agriculture, health and environment, science, engineering and technology is heavily dependent on the application of such innovations. Higher education, through their curricula, research and community services, serves as a platform to integrate the demands from industry and educated workforce with relevant training. In this way higher education meaningfully contributes to progress and development (Yizengaw 2008, 5).

Problems of Higher Education in Northeast India:

a) Inability to meet increasing demands for access and equity:

Institutions in Northeast are increasingly unable to absorb the growing demands for higher education. NER is urgently in need of educational institutions that encompass skill development facilities. Development of higher education is drastically changing but the region is developing lately compared to other parts of the country. Overall, the change has not occurred equally in all the Northeastern states; some states attain vertical development and some states remain low in progress of higher education. In the Northeast, there is also lack of professional educational institutions relevant to the present job market and job oriented courses that can drive economic development.

b) Inadequate physical infrastructure:

Higher education institutions in Northeast are critically constrained by lack of adequate finance. Quality education is possible when facilities, resources and technologies are upgraded and it is not possible without adequate funds. According to NAAC's assessment and

accreditation, most of the higher educational institutions in the region are not ranked highly. “The report of NAAC Quality Assessment Analysis (2000) shows that NEHU and Guwahati University attained four star (A****) which is considered as the highest grade achievement among the universities in NER” (Kengoo 2012, 53). The higher educational institutions of this region are bound to grade in the lower side since quality of input is also low – inadequate teacher student ratio, poor communication etc. There are many colleges and universities in NER which lacks in resource allocation facilities and have poor administration which degrade the value of higher education.

c) Weak research and innovation capacities:

Higher education institutions in Northeast India do not possess adequate research capabilities, infrastructure and facilities and funding needed to make them active beneficiaries of global knowledge innovation and problem solving. The lack of innovative outlook and ingredient of research also hinders the development of the teachers, students and overall infrastructure of the institutions. Educational institutions are still following the traditional mode of teaching and learning instead of modern devices like use of digital classroom and other technologically sophisticated instruments to help to improve classroom atmosphere. Specialized vocational educational fields like medicine, veterinary medicine, teacher’s training, technological colleges and colleges offering other vocational courses are a rarity in this region.

d) Faculty shortage and development:

Availability of adequate and qualified teachers is a prerequisite of quality education. Higher education institutions in almost all the northeastern states are largely unable to retain qualified faculty and research scholars. Shortage of faculty may be due to lack of communication, poor physical infrastructure standard, high teacher student ratio, and poor research facilities and unattractive working conditions

Findings and Suggestions:

According to the NAAC report (2004), from the statistical point of view, there has been rapid increase in the number of higher education

institutes in the northeastern region but needs improvement in the quality perspective the performance. The higher education in NER is not up to the standard compared with other states in India. Colleges and universities in the northeast have produced excessive quantity output of educated persons which is not in equilibrium with the quality output of educated persons. The low level of skills cannot generate larger economic production in the region.

Most students from the NER availing higher education in other states or outside the country cannot go back to the region for lack of professional opportunity that meets their demand, considerably limiting their scope to contribute to the society they grew up in. It is important for policy planners to recognize the constraints faced by the region and support the growth of research and academic culture by setting up new institutions, policies, fellowships and other such provision to encourage the growing research culture. An important dimension will be the quality of Ph.D.s in terms of its contribution to the body of knowledge through publications in journals and books, its forward and backward linkages to technology and society, and its contribution to the contemporary knowledge production process.

Women should be provided incentives to ensure greater participation. The declining number of women in academic research indicates a loss of skilled/trained human power as well as the loss of diversity which can contribute to innovation in research. Since the period of doctoral education crucially clashes with women's age of marriage and family in India, special provisions such as part time Ph.D.s, more flexibility in terms of time period for completion, scholarships, etc. may be useful in increasing their participation. (Kurup and Arora 2010, xiv). There has been a widespread need of education system towards various vocational studies to minimize the problems of mismatch between the high rise of educated unemployment and low level of educated employment in the region (Kengoo 2012, 45). The education streams which content the course of employment, personal development, entrepreneurship etc. are found lacking in the region.

Education systems which are offered in allied sectors such as agriculture, animal husbandry, forestry, dairy farming, handicrafts, water management and water harvesting should be encouraged. Such types of educational streams are very much relevant to the hilly region which has a large chunk of forest where the minorities are inhabited.

In order to improve the higher education scenario in the region, the UGC as well as Government of India should provide more support directly to those institutions suffering from limited funds. Government should even think of a particular strategy to eradicate the problem of increase in the number of educationally backward districts.

Faculty development and institutional capacity building should be the major priorities. Higher education institutes in the NER are not in a position to provide large number of qualified professionals and educated workforce needed for social progress and economic transformation in the region. The root cause of these problems lies in the lack of faculty and debilitated institutional capacities of the higher education institutions.

Thus, priority should be given to revitalize the institutions on developing faculty improving management, redeveloping curriculum and enhancing physical facilities and infrastructure.

Conclusion:

Higher education and research scenario in the North-East requires attention. It plays an important role in Northeast India's development and its position to effectively advocate and facilitate the cause of bringing higher education as a priority and a critical element of development and transformation in the region. But it was found to be lagging behind in quality education and lack of constructive higher educational institutions as compared to other regions of India. It is clear that higher education requires focussed attention within the overall planning of education systems. It is important for policy planners to recognize the defects of higher education in the region and support the growth of research and academic culture by setting up new institutions,

policies, fellowships and other such provisions to encourage the growing research culture.

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