

# Redefining Higher Education for Inclusive Development in Eastern India



# About ICC

Founded in 1925, ICC is the leading and only National Chamber of Commerce operating from Kolkata, and one of the most pro-active and forward-looking Chambers in the country today. Its membership spans some of the most prominent and major industrial groups in India. ICC is the founder member of FICCI. Set up by a group of pioneering industrialists led by Mr. G D Birla, the Indian Chamber was closely associated with the Indian Freedom Movement, as the first organised voice of indigenous Indian Industry. Several of the distinguished industry leaders in India, such as Mr. B M Birla, Sir Ardeshir Dalal, Sir Badridas Goenka, Mr. S P Jain, Lala Karamchand Thapar, Mr. Russi Mody, Mr Ashok Jain, Mr. Sanjiv Goenka, have led the ICC as its President.

ICC is the only Chamber from India to win the first prize in World Chambers Competition in Quebec, Canada.

The Chamber has a special focus upon India's trade & commerce relations with other Countries including South & South-East Asian nations, in sync with India's 'Look East' Policy, and has played a key role in building synergies between India and her Asian neighbours like Singapore, Indonesia, Vietnam, Thailand, Bangladesh, and Bhutan through Trade & Business Delegation Exchanges, and large Investment Summits.

ICC's North-East Initiative has gained a new momentum and dynamism, and the Chamber has been hugely successful in spreading awareness about the great economic potential of the North-East at national and international levels. Trade & Investment shows on North-East in countries like Singapore, Thailand and Vietnam have created new vistas of economic co-operation between the North-East of India and South-East Asia. The North East Initiative is also engaging with the state governments in livelihood generation by promoting indigenous products of the region through export oriented projects. ICC is also recognized as Nodal Chamber for development of North East of India by Ministry of DoNER.

The Chamber also has a very strong focus upon Economic Research & Policy issues - it regularly undertakes Macro-economic Surveys/Studies, prepares State Investment Climate Reports and Sector Reports, provides necessary Policy Inputs & Budget Recommendations to Governments at State & Central levels.

The Indian Chamber headquartered in Kolkata, over the last few years has truly emerged as a national Chamber of repute, with full-fledged offices in New Delhi and Guwahati functioning efficiently, and building meaningful synergies between Industry and Government by addressing strategic issues of national significance.

# Foreword

India stands at an inflexion point on its path to be among the fastest growing economies of the world. The nation however is faced with paradoxes. On the one hand India now needs to leverage its vast demographic potential by educating and training over 130 million people in the age group of 18-23 years with skills and capabilities relevant to the demands of a modern knowledge based economy. On the other, there remains an urgent need to reform the vast and unwieldy legacy higher education system that seems to have lost much of its relevance in today's technologically advanced and connected world.

The education infrastructure in the country is inadequate to support our ambitious targets of increased enrolment, suffers from severe issues of quality and relevance to the job market and cannot provide universal access to training and education. Solving these problems has remained a challenge for the Government but the need to arrive at sustainable solutions has now acquired urgency. India is on a high growth trajectory and the Government must ensure that no region is left behind. To be socially, economically and politically sustainable, our growth must be inclusive.

These problems are particularly acute in the eastern and north-eastern States that are the focus of this report. This region presents unique challenges. We believe that conventional market-based solutions may not work here, given the many market failures that exist here – poor infrastructure and connectivity, unemployment and low economic development, law and order problems etc. Hence we are glad to collaborate in organising the Higher Education Conclave, which provides us a unique opportunity to contribute to this important aspect of nation building.

We believe that the Government will have to take the lead in providing solutions to the problems of this region. This is a departure from our consistent view that the private sector should be allowed greater opportunities in vocational and higher education. We believe that education sector reforms need to be realistic. It is well acknowledged that the Government alone cannot and should not try to solve all the problems. For one, it may not be possible to divert the resources required to create the necessary infrastructure for higher and vocational education, given the requirements of primary and secondary education, primary health and nutrition etc. Second, the Government should seek to synergise the creative and entrepreneurial energy, talents and resources of the private sector in vocational

and higher education. The government must not compete with the private sector. It should allow private for-profit and foreign educators in the vocational and higher education space and focus on areas where the private sector would have less incentive to enter -remote, inaccessible rural areas, linguistics, liberal arts etc. In our view, the eastern and particularly the north-eastern regions are areas where there is likely to be limited commercial interest and hence the need for Government funding and provision of vocational and higher education institutions (HEI).

It is well established that formal education is a critical driver of increased productivity and therefore economic development. There is thus a strong rationale behind investment in human capital. The issue of employability and relevance to the needs of industry of our graduates is the topic of intense debate. While we argue for public provision of HEI as well as vocational training institutions, we believe that the focus should be on providing education and training that will provide local employment in sectors in which the State has rich natural resources. This is critical for inclusive growth as it would stimulate economic activity that is relevant to local conditions. This is the key message of this report: training and education for local development and employment.

We found that States in the East have mixed progress in reforming their higher and vocational education system. While Orissa has made significant progress in rolling out a reform road map for restructuring and developing its vocational and higher education system and aligning it to its economic potential, others are yet to prioritize any publicly articulated agenda of actions. Given the constraints of a very tight time line, we have, in this very limited research, endeavored to outline a roadmap of actions in which we find relevance of Orissa's example for other states in the East to gainfully employ. We have also attempted to map local resources and potential with areas of training and higher education for each State of this region.

This report is our contribution to this important event. We hope it will provide new insights and add value to the ongoing interventions to raise vocational and higher education in India in general and in the east and north-east in particular, to higher levels of inclusive economic development.



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# 01 The Higher Education Sector in India



## The higher education sector in India

India, the second most populous country in the world, with over 1 billion people, is home to one-sixth of humanity. It has also become one of the world's new economic giants. Economic reforms and predominance of the market economy have worked to register high economic growth and an increase in per capita income at the national level.

However, its phenomenal growth is not uniform. Large regional and social disparities continue to prevail. Issues of inclusiveness in development have therefore emerged. Education, including vocational and higher education, is a key driver of economic growth and productivity. Its role in driving India's inclusive development, therefore, places it at the centre stage in any policy debate.

A median age of 25 years and a population of about 587 million below the age of 25 years position India among the largest education markets in the world. According to population projections based on 2001 Census figures, in 2011 nearly 144 million of India's population will be between the age group 18 to 23 – the target age group for higher education. The emergence of India as a knowledge-based, service driven economy has made its human capital its major strength and a potential engine for growth. This has put the spotlight on severe inadequacies in India's infrastructure for delivery of education, particularly higher and vocational education. This demographic dividend can become a drag if the demand for skilled personnel that a rapidly growing economy will require is not met both in terms of quantum and quality. These problems are particularly acute in the eastern and north-eastern States that are the focus of this report.

As of March 2009, the country had nearly 26,500 institutes of higher education; 504 universities and university level institutions and 25,951 colleges. At the commencement of the academic year 2009-2010, the overall formal system enrolment in the various universities and colleges was reported at 13.6 million, while the total number of faculty members has been reported at 0.59 million. Though the absolute numbers are large, they form only a small proportion of the potential market; less than half of those who complete their schooling (Class 12) go on to complete a graduate or post-graduate degree, and the Gross Enrolment Ratio (GER) is estimated at 12.4%. When we compare this to the global average of 23% (54.6% for developed and 22% for Asian countries), we realize how far away we are from fully leveraging our much-touted "demographic dividend".

Technical Education is treated as a separate sector. There are 65 centrally funded institutions like IITs, IIMs, NITs, IISc, etc. Additionally, State Governments have also set up technical institutions. AICTE and equivalent sectoral regulators (like the Medical Council of India) both approve and regulate the large number of public and private technical institutions in engineering/technology, pharmacy, architecture, hotel management & catering technology, management studies, computer applications and applied arts & crafts. We shall show in the next chapter that the eastern and north-eastern regions considerably lag the national averages in vocational and higher education infrastructure.

Type of Institution	Number
State Universities	243
State Private Universities	53
Central universities	40
Deemed Universities	130
Institutions of National Importance under Acts of Parliament	33
Institutions establishes under State legislations	5
<b>Total</b>	<b>504</b>
Other Colleges	25,951

Source: MHRD Annual Report, 2009-10

Higher and technical education in India is funded primarily from three different sources, viz, government, fee income from students and other sources of income from philanthropy, industry, sale of publications, etc. At a national level, public expenditure (Centre and States) on education is only around 3.6% of GDP. Government funding of higher education is below 1% of GDP. The percentage expenditure on university and higher education to GDP, which was 0.77% in 1990-91 showed a gradual decrease to 0.66% in 2004-2005. India also has one of the lowest public expenditures on higher education per student at 406 US Dollars, which compares unfavourably with Malaysia (11,790 dollars), China (2,728 dollars), Brazil (3,986 dollars), Indonesia (666 dollars) and the Philippines (625 dollars). In nominal terms, the public expenditure per student in higher education stood at ₹ 12,518 respectively in 2003-04. In fact, in real terms, public expenditure per student in higher education has declined from ₹ 8,961 in 1993-94 to ₹ 7,117 in 2003-04.

The funding needs of the India higher education system have been growing rapidly. It is being increasingly realized that public budgets are inadequate to fund as sectors of mass education are competing for scarce government resources. Hence, in the recent decade, the need for experimentation with several alternative routes of funding, viz. student fees, student loans, graduate tax and privatization has intensified.

From the perspective of entry and regulation of private and foreign participation, economic activity in higher education can be divided into two segments – a regulated and an unregulated segment. The regulated segment comprises formal degree-granting universities and their affiliated colleges, and other organizations offering formal degrees or technical programs that are recognized and regulated by authorities such as the UGC and AICTE. Entities in this sector have to be not-for-profit (Trust, Society or a Company incorporated under Section 25 of the Indian Companies Act). The unregulated segment comprises a rapidly emerging and fast growing collection of innovative services provided, mainly by private sector organizations, to higher education institutions, individuals and even to employers that complement or sometimes supplement the formal higher education system. The entities providing these services can be legitimately incorporated as for-profit as they are outside the purview of the education sector regulations. They are of course subject to all other relevant laws and regulations of the land, e.g. Companies Act etc.

Debate continues, however, over the true value—or possible costs — of the growing privatization of regulated higher education in India. Some experts argue that private colleges should be supported because they are better suited than public institutions to solving the country's skilled labour shortage and matching the supply of skills they impart to the particular demands of specific industries. Others contend that the private institutions put profit before quality and that their skills-driven courses may not help students in the long run because demand for specialized skill-sets will keep changing.

We believe that the Government will have to take the lead in providing solutions to the problems of this region. This is a departure from our consistent view that the private sector should be allowed greater opportunities in vocational and higher education. We believe that education sector reforms need to be realistic. It is well acknowledged that the Government alone cannot and should not try to solve all the problems. For one, it may not be possible to divert the resources required to create the necessary infrastructure for higher and vocational education, given the requirements of primary and secondary education, primary health and nutrition etc. Second, the Government should seek to synergise the creative and entrepreneurial energy, talents and resources of the private sector in vocational and higher education. The government must not compete with the private sector. It should allow private for-profit and foreign educators in the vocational and higher education space and focus on areas where the private sector would have less incentive to enter - remote, inaccessible rural areas, linguistics, liberal arts etc. In our view, the eastern and particularly the north-eastern regions are areas where there is likely to be limited commercial interest. This region presents unique challenges. We believe that conventional market-based solutions may not work here, given the many market failures that exist here – poor infrastructure and connectivity, unemployment and low economic development, law and order problems etc. and hence the need for Government funding and provision of vocational and higher education institutions (HEI). The private sector could play a secondary and supportive role through public-private partnerships and in niche areas.

Expansion, inclusion and quality are the three cornerstones of our national goals in education. The Government has set a

target of 21% GER by the end of the Twelfth Plan (2017). This is a formidable target considering the present GER of 12.4%<sup>1</sup>. This report focuses on the eastern region of the country where the higher education scenario presents, possibly the greatest challenge to the Government. While Nagaland has the highest GER in the country with Manipur at seventh position, the rest of the eastern and north-eastern states are much lower down, and in most cases, below the national average. We suggest that the Government, both the State and Central, will have to take the lead to fund the expansion of higher education in this region. There are some very successful private institutions e.g. Sikkim-Manipal University, the public-private partnership between the Government of Mizoram and New Horizons India (a US-based company) to set up an IT Entrepreneurs Training Centre and Prometric Testing Centre at Aizawl in 2005. The centre provides employment-related training and skills to young, educated unemployed people in an environment equipped with the latest IT technology. However, the challenges that this region presents – inaccessibility, poor physical infrastructure, law and order problems, limited local employment opportunities – will be a disincentive for private participation and investment here.

### **The Play of Higher Education in Economic Development**

It is well established that formal education and training are critical drivers of increased productivity and therefore economic development. There is thus a strong rationale behind investment in human capital. Hong Kong, Korea, Singapore, and Taiwan have achieved unprecedented rates of economic growth while making large investments in education.

The issue of employability and relevance to the needs of industry of our graduates is the topic of intense debate. While we argue for public provision of HEI as well as vocational training institutions, we believe that the focus should be on providing education and training that will provide local employment in sectors in which the State has rich natural resources. As we will show in the next chapter, migration is a major problem in the north-east. This is due to lack of employment. We suggest that students of this region should be educated and trained in areas that can exploit local talent and natural resources. This is critical for inclusive growth as it would stimulate economic activity that is relevant to local conditions. It is the key message of this report: training and education for local development and employment.

We found that States in the East have mixed progress in reforming their higher and vocational education system. While Orissa has made significant progress in rolling out a reform road map for restructuring and developing its vocational and higher education system and aligning it to its economic potential, others are yet to prioritise any publicly articulated agenda of actions. Given the constraints of a very tight time line, we have, in this very limited research, endeavoured to outline a roadmap of actions in which we find relevance of Orissa's example for other states in the East to gainfully employ. We have also attempted to map local resources and potential with areas of training and higher education for each State of this region.

1. There are varying estimates of GER using NSSO, SES or Census data and depending on whether enrolment in unrecognized and informal programmes is included. This estimate is from a MHRD reply to a Parliament Question.



## 02 Supply Side Analysis : Existing Infrastructure



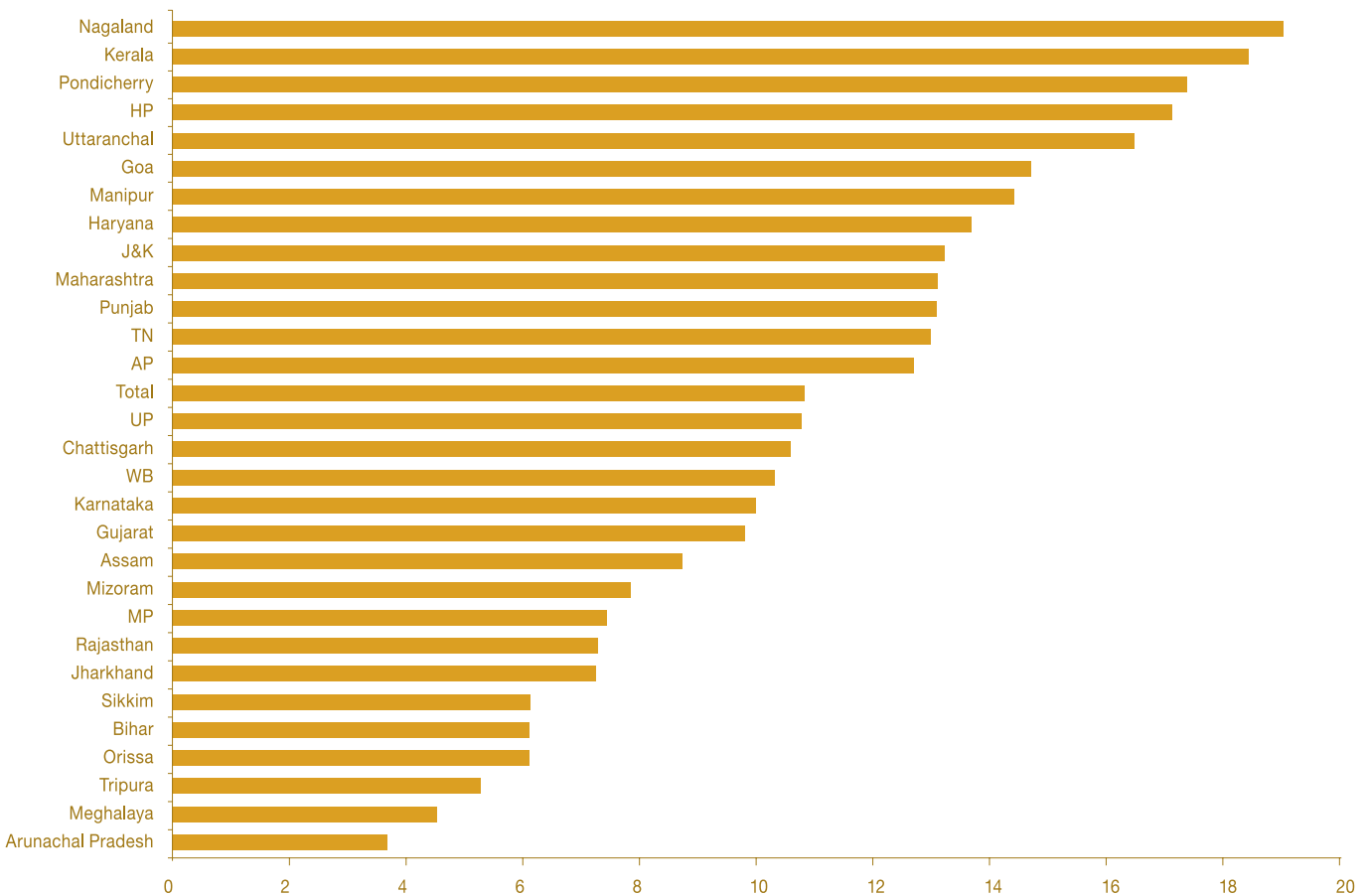
## Profiling the higher education space in the east – a supply side perspective

In this chapter, we undertake a brief analysis of the education infrastructure and outcomes in this region and show the great inadequacies, with most parameters falling well below the national average.

### GER as a measure of inclusion low in the East

The enrolment rate in India at aggregate level was about 11% in 2006/7 at overall level. This varied significantly across the states and districts. Several states in the Eastern and North Eastern Region (NER) of India feature among the states having the lowest levels of GER. These include Arunachal Pradesh, Bihar, Meghalaya, Mizoram, Sikkim, Tripura and Jharkhand.

### Gross Enrolment Ratio for Graduates 2004-05



Source - UGC paper, based on NSS

Another aspect of the education infrastructure, especially in the NER, is that the bulk of the capacity is in arts and social sciences, who rely on the government for employment as there are few opportunities in the private sector. This lack of choice also drives migratory patterns in these states. For example, the engineering colleges in the region are primarily located in West Bengal and Tripura. Technical colleges and professional institutes are far and few and not evenly distributed in the NER and the East especially in states like Mizoram, Sikkim, Arunachal Pradesh and Nagaland.

### College enrolment by subject stream (general), 2000-01

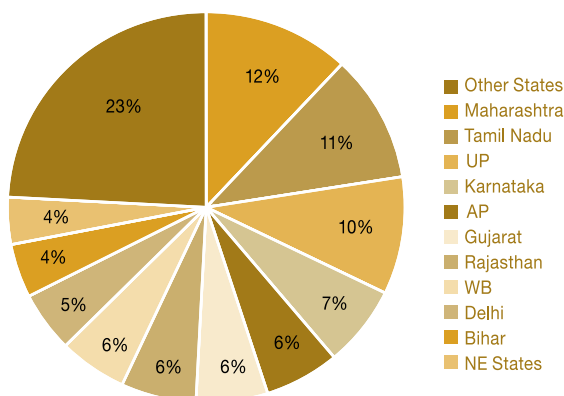
(Per cent of total enrolment)

State	Arts	Science	Commerce	Education	Others
Arunachal Pradesh	68.0	8.0	5.0	2.0	0.0
Assam	74.0	12.0	6.0	1.0	0.2
Manipur	52.0	35.0	5.0	1.0	0.4
Meghalaya	71.0	14.0	6.0	8.0	0.2
Mizoram	86.0	4.0	2.0	1.0	0.0
Nagaland	77.0	9.0	7.0	2.0	0.0
Sikkim	49.0	16.0	6.0	2.0	0.0
Tripura	70.0	14.0	11.0	0.6	0.8
India	46.0	20.0	18.0	1.0	0.9

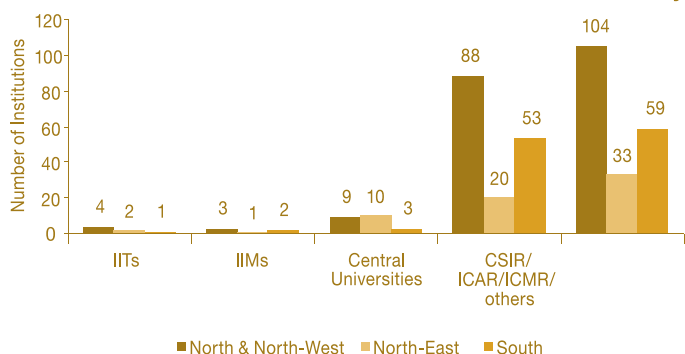
Source: University Development in India, 1995-96 to 2000-01, University Grants Commission, Information and Statistics Bureau, New Delhi

### Disparity in distribution of Universities, Engineering Colleges, Business Schools and Central institutions

No. of Universities (including Deemed Univs.)



### Skewed distribution of National Institutions across the country



### Region/State-wise Number of Engineering degree colleges and their Intake in India (2000-2001 to 2005-2006)

Region/States/Uts	2005-06	
	NOI	Intake
Mizoram	1	120
Sikkim	1	513
West Bengal	43	11517
Tripura	58	13305
Meghalaya	2	286
Arunachal Pradesh	1	240
Andaman & Nicobar	1	198
Assam	0	0
Manipur	4	865
Nagaland	1	120
Orissa	0	0
Jharkhand	10	2483
Bihar	12	2673

The distribution of business schools also is skewed with the bulk of them being located in Orissa and West Bengal.

#### Region/State-wise number and intake of Business Schools approved by AICTE in India (As on 30.06.2009)

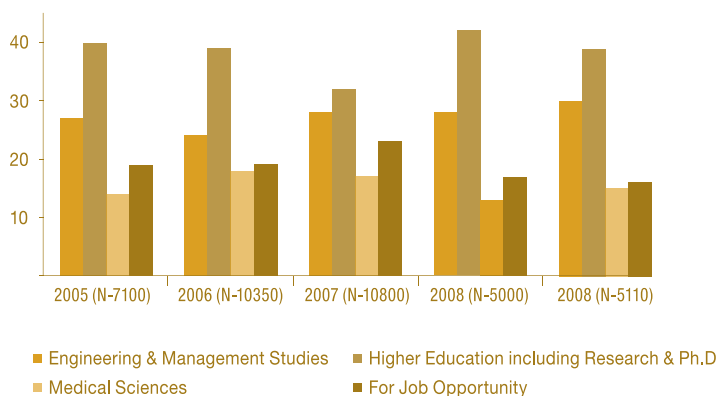
Region/States	NO	Intake
Eastern		
Mizoram	0	0
Sikkim	1	60
Orissa	53	4289
West Bengal	33	2815
Tripura	0	0
Meghalaya	0	0
Arunachal Pradesh	0	0
Assam	9	405
Manipur	1	30
Nagaland	0	0
Jharkhand	9	1065
Bihar	13	1225

Source - indiastat

### Demographic movements

As a result of disparity in quality capacities, students with intent to pursue higher education and employment invariably migrate to other states in India or abroad to obtain the same. A trend analysis of reasons for this migration evinces the largest reasons for migration of students from NER is not only to pursue higher education like research and PhDs but also a basic level of higher education like graduation.

#### Trend Analysis (2005-2009)



Source - Assam Chronicle

This migration is a major concern. Statistics reveal 95% of students from the NER do not come back to these states after obtaining higher education elsewhere. During the period 2005 to 2009, maximum number of students had gone abroad for Research & PhD, which is regarded as the most promising talent pool.

### Quality Issues

This trend raises questions about the quality of even undergraduate level education available in the NER. In fact, the number of colleges and universities in these states which have received the NAAC accreditation is woefully low. For example, Karnataka has 36 colleges and 7 universities that have received the accreditation and the same numbers

for Tamil Nadu are 82 and 7 respectively as compared to 2 colleges and 7 universities even in West Bengal, which is among the more developed states in the Eastern region.

### Limited opportunities for Research

The numbers of research institutions available in the region are almost nil except in states like West Bengal and Bihar.

#### Research institutions in India (2006-2007)

States/UTs	University		Deemed University	Institutions of national importance	Research Institutions
	Central	State			
Arunachal Pradesh	0	1	1	0	3
Assam	2	3	1	1	0
Bihar	0	13	2	0	14
Jharkhand	0	4	3	0	1
Manipur	2	0	0	0	0
Meghalaya	1	0	0	0	0
Mizoram	1	0	0	0	0
Nagaland	1	0	0	0	0
Orissa	0	10	2	0	3
Sikkim	0	1	0	0	0
Tripura	0	2	0	0	0
West Bengal	1	15	2	2	11
India	20	229	109	13	140

Source - indiastat

### Inadequate vocational training infrastructure

The Eastern region is also lacking in the area of vocational educational. This is an essential value addition to make the labour force more productive and employable. The number of ITI/ITCs in the region, 970 including the NER, is way behind the southern region's number of 2975 or the northern region's 2190. The hospitality industry, for example, has seen a thriving growth in India in the recent times. Although a large number of students

### Number of private and Government hotel management and catering technology institutes in India

(2006-2007)

Region	State/Union Territory	Private Aided		Private Unaided		Govt. Institutions		Total	
		NOI	Intake	NOI	Intake	NOI	Intake	NOI	Intake
Eastern	Mizoram	0	0	0	0	0	0	0	0
	Sikkim	0	0	1	60	0	0	1	60
	Orissa	0	0	2	120	0	0	2	120
	West Bengal	0	0	4	240	0	0	4	240
	Tripura	0	0	0	0	0	0	0	0
	Meghalaya	0	0	0	0	0	0	0	0
	Arunachal Pradesh	0	0	0	0	0	0	0	0
	Andaman & Nicobar	0	0	0	0	0	0	0	0
	Assam	0	0	0	0	0	0	0	0
	Manipur	0	0	0	0	0	0	0	0
	Nagaland	0	0	0	0	0	0	0	0
	Jharkhand	0	0	1	20	0	0	1	20
Northern	Bihar	0	0	0	0	0	0	0	0

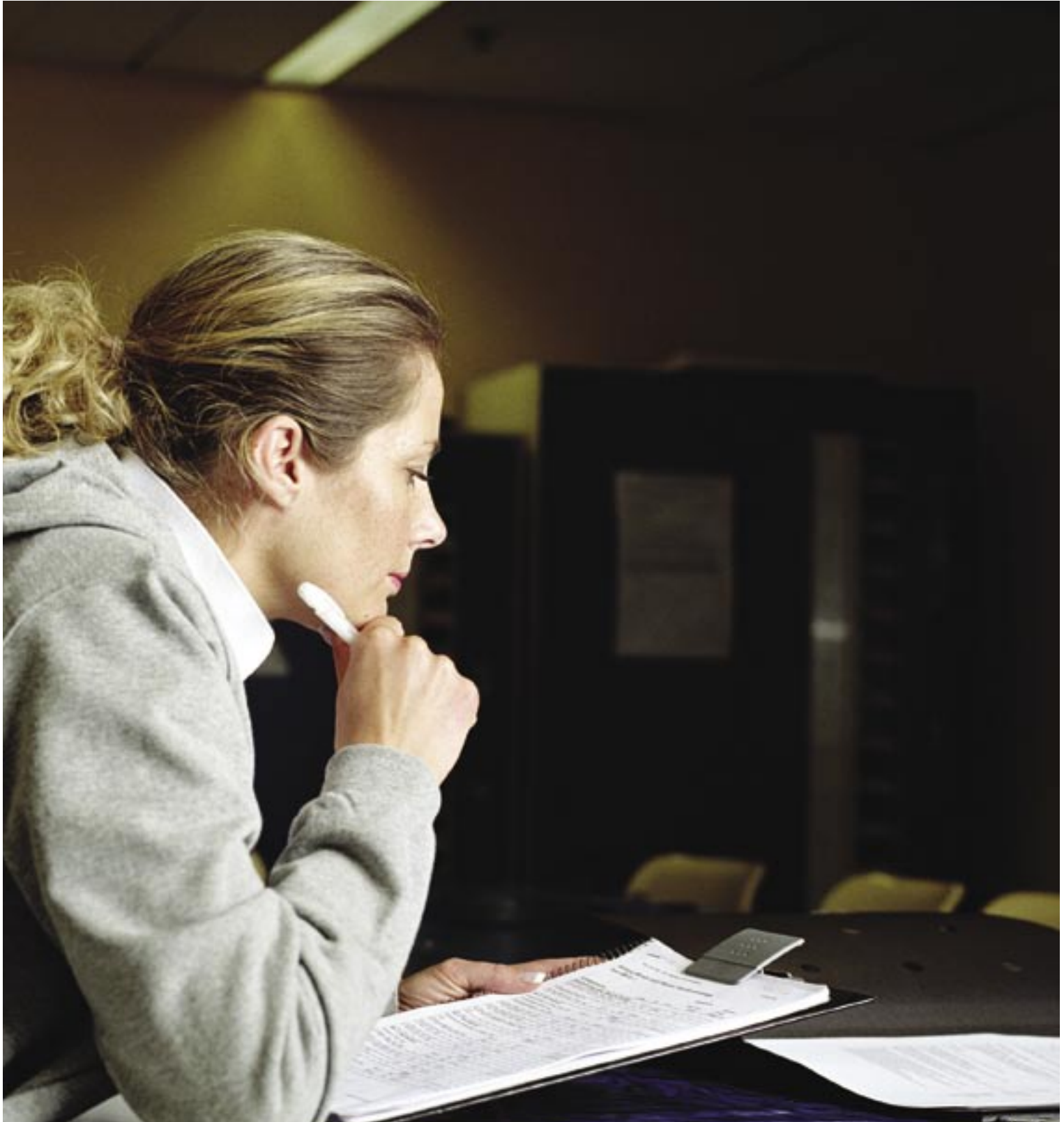
Source - indiastat

from Eastern and North Eastern states get absorbed in the hotel and hospitality industry all over the country, there is a lack of opportunity to study the same in their own states. This is the primary driver of migration to metros or to the north or west of India.

Clearly, the States in this region have very poor infrastructure for vocational training and higher education. While the Central Government has taken steps to address this situation (e.g.

setting up IIT Guwhati, IIM Shillong) these are for students from across the country and cater more to the national and international markets and less to local requirements. We now turn to reviewing the natural resources and economic potential in the States of this region before attempting to map them with vocational training and higher education in the final chapter.

# 03 The Local Context: Overview of the Economic Potential in The East



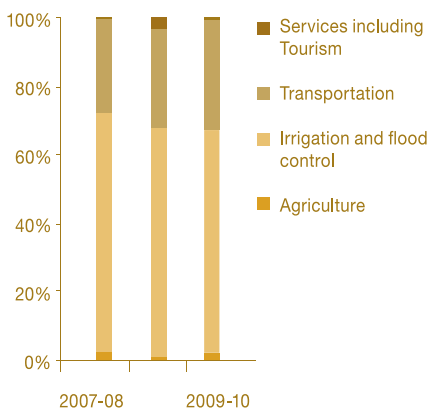
# Orissa

## State Economy

The GSDP of the State is mainly fuelled by the growth of industrial sector. The 5 year CAGR of GSDP is 17% as against an all India average of 12.5% making the State one of the fastest growing state in the country. There has been steady increase in per capita expenditure on education and health in the State. The potential for growth remains for the mineral-based industries (the State has vast and diverse mineral deposits amounting to almost 16.92% of the total reserves of the country). Tourism has been a traditional forte. A strong agricultural base offers opportunities for commercial farming while handicrafts and handlooms command a long time market following. In the IT / ITeS space, anchor investors like Wipro and Infosys have for long set up operations.

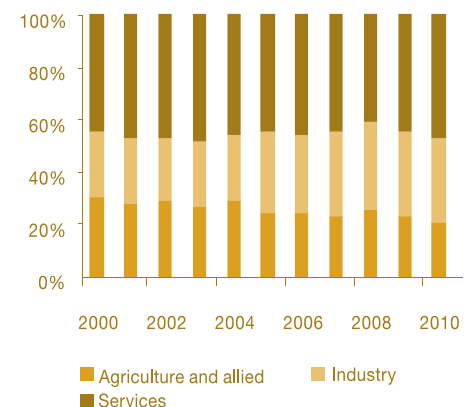
- ASSOCHAM Investor Meter Ranked Orissa 2<sup>nd</sup> and recorded investments worth ₹ 2 lakh crore
- Morgan Stanley’s Global Economic Forum reports Orissa can attract investments upto US\$ 30-40 billion
- CMIE puts Orissa’s share in manufacturing sector projects in India at 38%

### Capital Expenditure Pattern



Population	36,706,920
Human Development Index (HDI)	0.404 (2001 figure)
Educational Development Index (EDI)	0.545 (Rank 28)
Literacy Rate	63.61
Per Capita Income	₹ 29,464 (2008-09)
Growth Rate Per Capita Income	16%
Per Capita Education Spending	₹ 1,489

### Sectoral contribution to GDP (2000-2009)





# West Bengal

## State Economy

The 5 year CAGR of GSDP is 13.5% as against an all India average of 12.5%. This growth is mainly fueled by the growth of industrial and services sector. Capital expenditure pattern of the State over the last few years also highlights that the focus was substantially on sectors such as energy, transportation and irrigation & flood control.

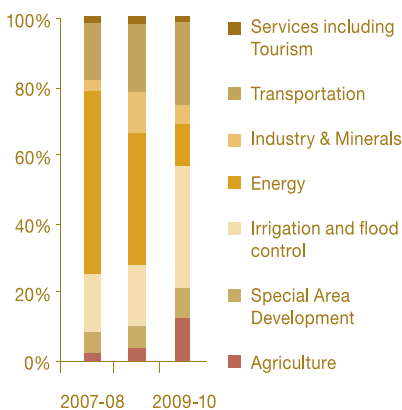
Iron & Steel continues to be a key industry due to favourable supply chain advantages grossing total investments of US\$ 1,856.8 million in 1991-2004. Leather & Leather Products originating in the State accounted for 25% of India's leather exports. In the food processing sector, the State has a natural forte being a predominantly agrarian economy with agriculture contributing 30% to the SDP and employing 57% of the workforce. The State accounts for 30% of potatoes, 27% of pineapples,

12% of bananas and 16% of rice produced in India. Floriculture offers great potential with excellent logistics, research and extension support poising the State to capture the booming export markets. IT & IT Enabled Services (ITeS) is a success story being one of the key growth drivers in the last decade with more than 500 IT & ITeS companies employing more than 60,000 professional and a growing talent pool.

Gems & Jewellery industry's growth is fuelled by the rich tradition of craftsmanship for handmade gold jewellery and the Manikanchan SEZ. Petrochemicals downstream industries supported by excellent port and liquid cargo handling facilities are set to grow.

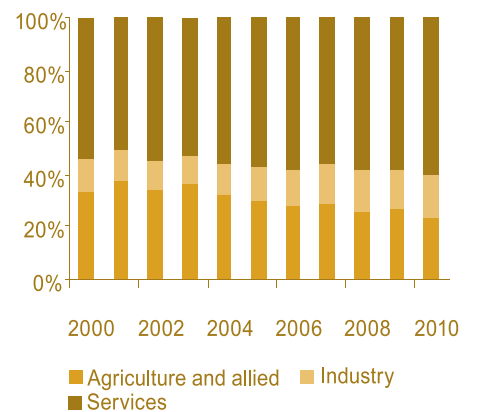
- Floriculture park at Mungpoo in North Bengal
- Mega flower mart constructed in Mullickghat
- Flower market with cold storage at Panskura
- Floriculture park being developed at Nadia
- Government proposes an open air floriculture park at Rajarhat

### Capital Expenditure Pattern



Population	80,221,171 (2001 Census)
Human Development Index	0.472 (2001 figure)
Educational Development Index	0.494 (Rank 32)
Literacy Rate	69.2%
Per Capita Income	₹ 36,322 (2008-09)
Growth Rate Per Capita Income	12%
Per Capita Education Spending	₹ 1395

### Sectoral contribution to SDP (2000-2010)



## Jharkhand

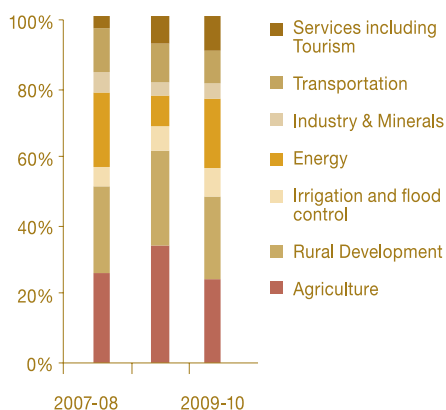
### State Economy

Jharkhand is rich in mineral resources but the economy remains predominantly agricultural with 80% of its population dependent on agriculture. The 5 year CAGR of GSDP is 12.3% as against an all India average of 12.5%. Lack of development is reflected in poor HDI and EDI. Abundant coal, iron ore (38% of India's mineral reserves) continue to attract private investments (close to ₹ 198,362 crore). The power sector holds great potential too with a total installed capacity of 1,394 MW and the upcoming UMPP at Talaiya promises to add 15,000 MW more. Auto and white goods sector is slated to grow fueled by availability of raw materials and a large adjoining consumer market. Large tracts

of forests and woodlands with 5 bird sanctuaries, 2 wild life sanctuaries and 2 national parks besides several religious spots make way for a vibrant wildlife and religious tourism industry. With manufacturing and infrastructure sector growing, the Government is charting a growth for the IT/ITeS sector with a STP and related higher educational infrastructure coming up.

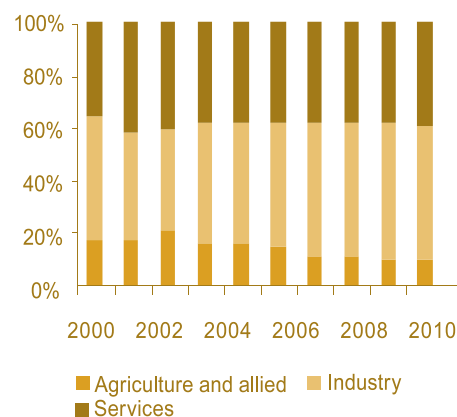
- 100% of prime coking coal, 93% of medium coking coal and about 30% of the semi coking coal or blendable coal reserves in India
- 46% of the mica reserves in India
- 80.5% of iron ore reserves in India

### Capital Expenditure Pattern



Population (2001 Census)	26,909,428
Human Development Index	0.367 (2001 figure)
Educational Development Index	0.456 (Rank 35)
Literacy Rate	54.1%
Per Capita Income	₹ 21,465 (2008-09)
Growth Rate Per Capita Income	11%
Per Capita Education Spending	₹ 1,275

### Sectoral contribution to GDP (2000-2009)



# Bihar

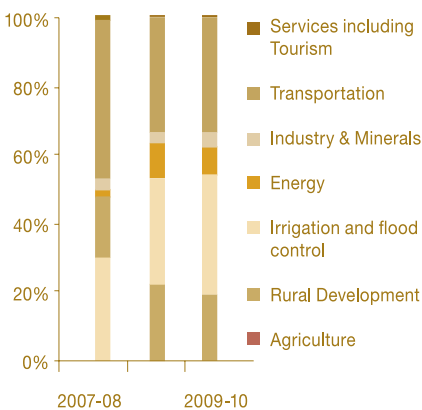
## State Economy

The GSDP has consistently risen over last few years, fuelled by the growth of the services sector. The 5 year CAGR of GSDP is 16.6% as against an all India average of 12.5%. HDI record remains poor, however, policy corrections are on the way.

With agriculture being the main contributor to State's GDP, the State leads in vegetables and fruits production. The food processing industry is set to grow with active state intervention. Sugar industry remains the largest agro-based industry in Bihar owing to natural advantages; the Government initiating measures

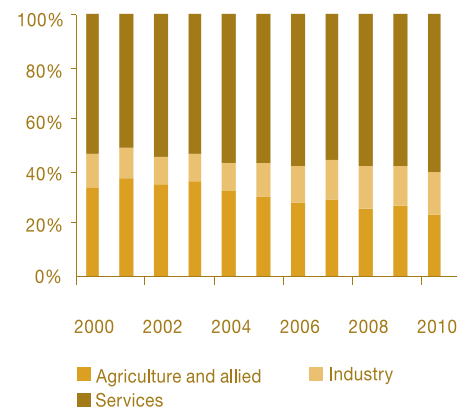
to revive the industry and attract private investors. Animal husbandry is set to grow as an adjunct of food processing while the State historically is endowed with the potential to develop the tourism industry. The carve out of Jharkhand has severely depleted Bihar's power sector which is in for a major revamp; 13,000 MW of capacity is set to be added by 2015.

### Capital Expenditure Pattern



Population (2001 Census)	82,878,796
Human Development Index	0.367 (2001 figure)
Educational Development Index	0.463 (Rank 34)
Literacy Rate	47.53
Per Capita Income	₹ 13,663 (2008-09)
Growth Rate Per Capita Income	15%
Per Capita Education Spending	₹ 926

### Sectoral contribution to GDP (2000-2010)



# Assam

## State Economy

The 5 year CAGR of GSDP is 10.9% as against all India average of 12.5%. In the NER, Assam has a comparatively better connectivity and infrastructure with a total road length of approximately 69,000 kms (approximately 60% of the total NER's road length). Poor connectivity is a hindrance to higher growth but higher outlays indicate the State's keenness to correct it.

**Infrastructure development** therefore remains high on the agenda of policy intervention. To improve the reach of the National Highways in the NER, 4-laning of 678 km length has been taken up as part of East-West Corridor and 1,246 km length identified for 4-laning under NHDP-III on BOT basis. The SARDP-NE) has also been rolled out.

Assam accounts for 50% of India's domestic onshore **oil production**, has four out of its twelve refineries with a refining capacity of 7 million tones and the biggest pool of oil & gas professionals. The Government of India continues to offer exploration blocks and discovered fields to various private/ joint venture parties as well.

The State is rich in arts and crafts skills, is famed for its exemplary silk quality, cane and bamboo items, metal crafts,

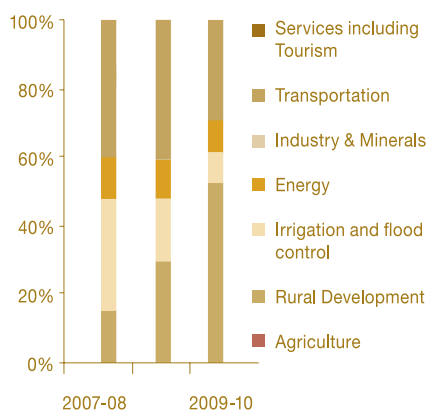
pottery and woodcrafts and their master artisans. The state Government advances and improves marketability of the products for ensuring livelihood of the stakeholders in the **handicrafts and handloom industry** through its nodal agencies.

Assam's **tourism** potential has historical significance. A rich repository of scenic beauty, arts and crafts, dances and theatre, handlooms and handicrafts, rare and rich flora and fauna and places of worship, the State holds the potential of continuing to attract increasing numbers of global tourists.

The potential for IT and ITeS industry to grow in Assam lies in the pool of skilled human resources, high literacy and the Government's conscious measures through an IT policy and resolve to build infrastructure.

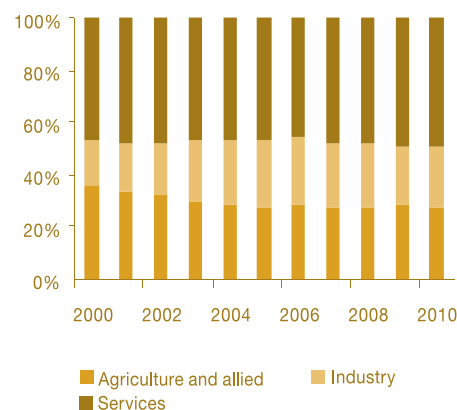
Arguably, **tea** remains the largest commercial crop for which NER is known worldwide. Assam's tea industry has consistently been a major foreign exchange earner. Assam produces around 53% of India's total production (which is 28% globally) employing more than 10% of the State's work force.

### Capital Expenditure Pattern



Population (2001 Census)	26,638,407
Human Development Index	0.386 (2001 figure)
Educational Development Index	0.483 (Rank 33)
Literacy Rate	64.28%
Per Capita Income	₹ 22,993 (2008-09)
Growth Rate Per Capita Income	9%
Per Capita Education Spending	₹ 1,593

### Sectoral contribution to GDP (2000-2010)



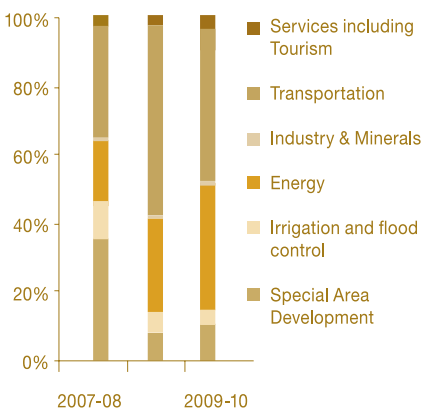
# Arunachal Pradesh

## State Economy

The contribution of industrial sector in GSDP has risen from 21% to 34% since 2000 due to significant investments in hydro power. The 5 year CAGR of GSDP is impressive at 13.9% as against all India average of 12.5%. A higher outlay on transportation shows that the government is keen to remove the infrastructural bottlenecks. The planned outlay for the State for the 11th Five Year Plan is ₹ 8,000 crores.

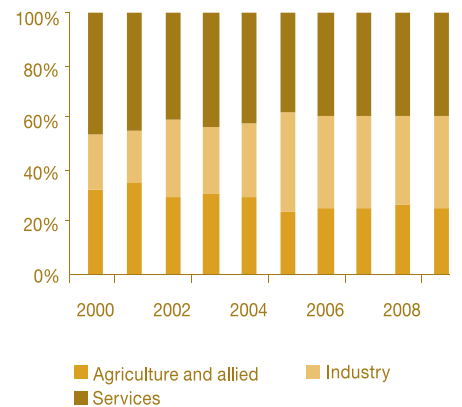
Development of hydropower is a planning priority with a potential of 55,000 MW waiting to be tapped by investors. The New Agricultural Policy 2001 incentivises the commercialization & participation of private players in the establishment of Agro-based industries. Tourism offers potential for growth.

### Capital Expenditure Pattern



Population (2001 Census)	1,091,117
Human Development Index	0.328 (2001 figure)
Educational Development Index	0.516 (Rank 30)
Literacy Rate	54.74%
Per Capita Income	₹ 33,302 (2008-09)
Growth Rate Per Capita Income	12%
Per Capita Education Spending	₹ 3,360

### Sectoral contribution to SDP (2000-2008)



# Tripura

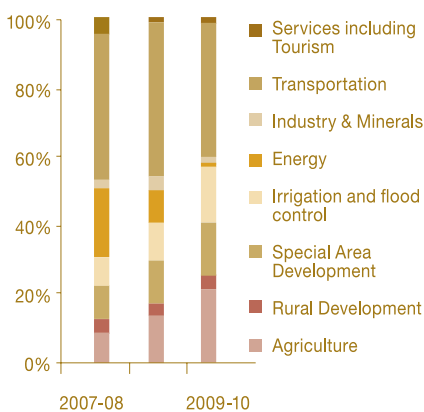
## State Economy

The contribution of industrial sector in GSDP has risen from 15% to 24% since 2000. The 5 year CAGR of GSDP is 10% as against all India average of 12.5%. Government is keen to improve the growth figures by giving strong focus on social development through education. A higher outlay on transportation shows that the government is keen to remove the infrastructural bottlenecks.

potential for setting up of rubber-based industries is sought to be developed through industrial parks and appropriate fiscal incentives. bamboo & bamboo handicrafts & products, it and biofuel (jatropha based) are other industries that are being actively developed.

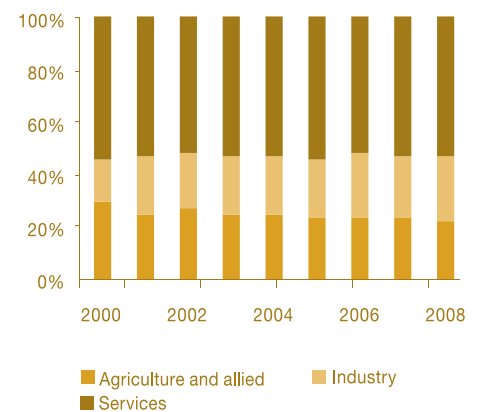
Tourism is a major attraction with the State having important temples, several lakes, wild life sanctuaries and 60% natural forest cover. The agro-climatic conditions are favourable for a flourishing food processing industry with the State being a top producer of pineapples. Tripura is second rubber capital in the country with a production at 18,455 TPA. The vast

### Capital Expenditure Pattern



Population (2001 Census)	31,91168
Human Development Index	0.389 (2001 figure)
Educational Development Index	0.539 (Rank 29)
Literacy Rate	73.66%
Per Capita Income	₹ 28,806 (2008-09)
Growth Rate Per Capita Income	9%
Per Capita Education Spending	₹ 2,497

### Sectoral contribution to SDP (2000-2008)



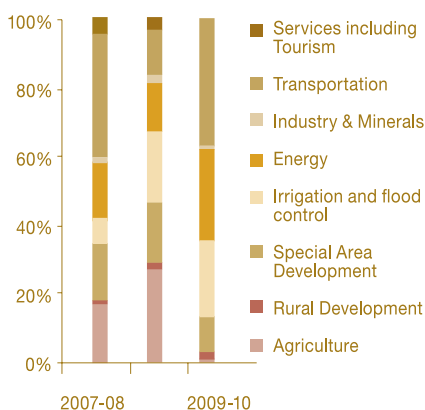
## Mizoram

### State Economy

The share of services and industry sector towards GSDP is on a rise showing a shift from agrarian economy towards a services and industrial based economy. The 5 year CAGR of GSDP is 9.5% as against an all India average of 12.5%. The Government is keen to embark on growth by delivering an impetus on social development through education. With three-fourths of the population engaged in agriculture, favourable climate and soil conditions, a rich and varied flora and horticultural products offer potential for agro-horticulture based industry to succeed. Mizoram is home to a bounteous naturally growing bamboo

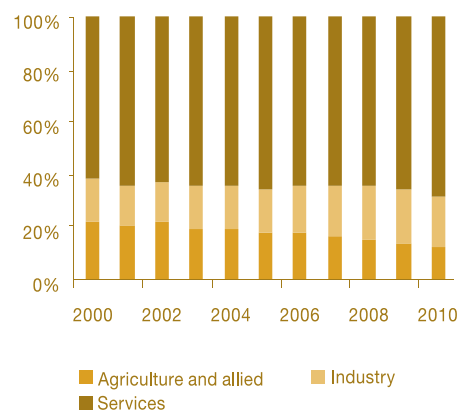
– therefore the State has the long term potential for handicrafts industry to grow. Natural endowments allow for tourism sector to thrive. Mizoram State has as many as 73 possible locations for small hydel plants, of which 11 projects sites have been cleared for NEEPCO to execute. With high literacy rates and a large English speaking population, the State has the potential to grow into one of India's IT hubs. An IT Policy 2001, complete with incentives and opportunities for entrepreneurs has been unveiled to run a development road map for IT/ITeS in the next 5 to 10 years to create knowledge based industries for the development of the State.

### Capital Expenditure Pattern



Population (2001 Census)	891,058
Human Development Index	0.548 (2001 figure)
Educational Development Index	0.714 (Rank 11)
Literacy Rate	88.49%
Per Capita Income	₹ 29,576 (2008-09)
Growth Rate Per Capita Income	6%
Per Capita Education Spending	₹ 5,041

### Sectoral contribution to SDP (2000-2010)

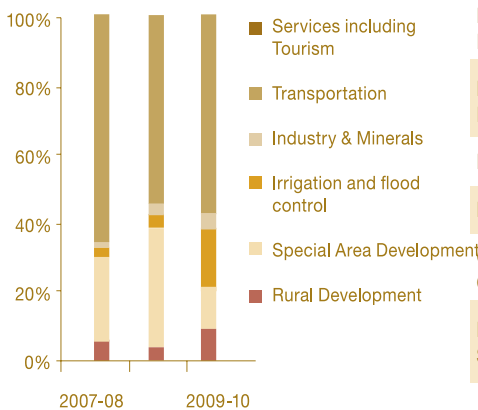


# Meghalaya

## State Economy

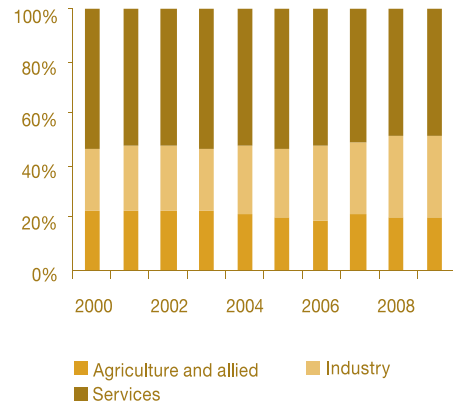
The contribution of industrial sector in GSDP has risen from 23% to 32% since 2000. The 5 year CAGR of GSDP is 12.7% as against an all India average of 12.5%. The State has a hydro-electricity potential of nearly 1,200 MW which is yet to be effectively harnessed. With increased focus on hydro generation in NER, the investment is set to increase. A higher outlay on transportation shows that the government is keen to remove the infrastructural bottlenecks. Agro-horticulture based food processing industry has the potential to develop the State's economy.

### Capital Expenditure Pattern



Population (2001 Census)	2,306,069
Human Development Index	0.365 (2001 figure)
Educational Development Index	0.51 (Rank 31)
Literacy Rate	63.31%
Per Capita Income	₹ 33,674 (2008-09)
Growth Rate Per Capita Income	11%
Per Capita Education Spending	₹ 2,520

### Sectoral contribution to GDP (2000-2009)





# Manipur

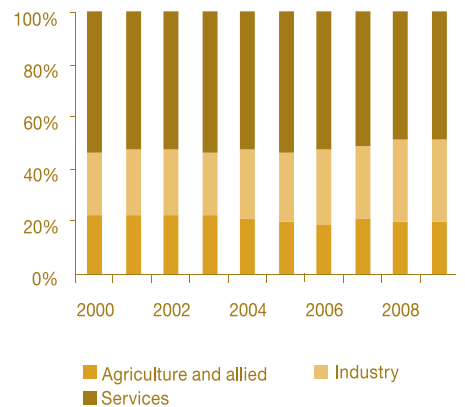
## State Economy

The contribution of industrial sector in GSDP has risen from 22% to 35% since 2000. The 5 year CAGR of GSDP is 9.8% as against all India average of 12.5%. The State possesses a hydro-electricity potential of nearly 1,350 MW, however, barely 108.2 MW has been harnessed. Significant capital expenditure has been on energy development.

The State has the natural potential for agro and food processing industries, hydel power generation, handicrafts, IT and tourism industries to succeed.

Population (2001 Census)	2,388,634
Human Development Index	0.536 (2001 figure)
Educational Development Index	0.547 (Rank 27)
Literacy Rate	68.87%
Per Capita Income	₹ 21,062 (2008-09)
Growth Rate Per Capita Income	7%
Per Capita Education Spending	₹ 2160

Sectoral contribution to GDP (2000-2009)

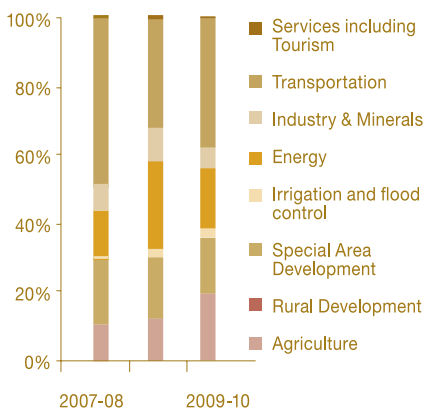


# Nagaland

## State Economy

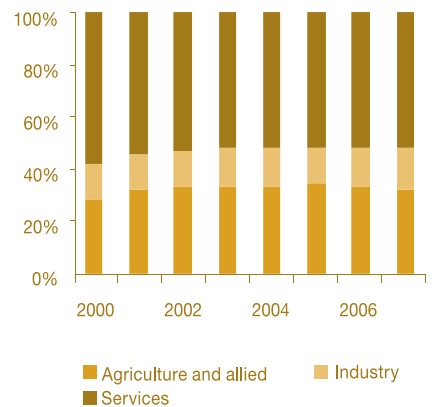
The 5 year CAGR of GSDP is 8.5% as against an all India average of 12.5% showing that the State has lagged in the growth rate. The State has the potential for agro based commercial production for horticulture, floriculture, aromatic and medicinal plant production besides sericulture, animal husbandry and apiculture production to be gainfully tapped tourism, animal husbandry and meat processing are some other promising industries that have the natural potential to develop.

### Capital Expenditure Pattern



Population (2001 Census)	1,988,636
Human Development Index	0.486(2001 figure)
Educational Development Index	0.654 (Rank 20)
Literacy Rate	67.11%
Per Capita Income	₹ 20,892 (2008-09)
Growth Rate Per Capita Income	3%
Per Capita Education Spending	₹ 2139

### Sectoral contribution to SDP (2000-2007)

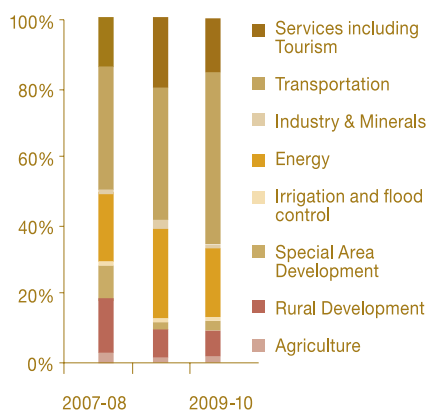


# Sikkim

## State Economy

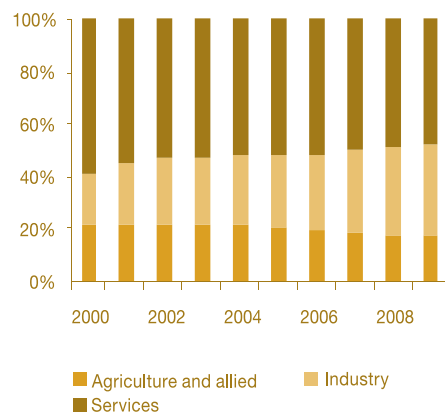
The 5 year CAGR of GSDP is 12.8% as against an all India average of 12.5%. The State holds a hydro-electricity potential of nearly 8,000 MW. With naturally growing orchids and production of fruits, agro based industries & food processing industry is set to develop further. Tourism remains the backbone of the State's economy while recent advancements in the higher education base allows the State to leverage it for growing the IT and healthcare sectors.

### Capital Expenditure Pattern



Population (2001 Census)	540493
Human Development Index	0.425(2001 figure)
Educational Development Index	0.67 (Rank 18)
Literacy Rate	67%
Per Capita Income	₹ 37,553 (2008-09)
Growth Rate Per Capita Income	12%
Per Capita Education Spending	₹ 6056

### Sectoral contribution to SDP (2000-2009)



# 04 Way Forward: Creating Educational Infrastructure for the Local Economy



The natural resources and economic potential that each individual State holds is the key driver for growing opportunities and markets for human capital and skills, building linkages within the local community and helping inclusive development. Given the many market failures that exist in this region, this interplay, therefore, supports the case for a planned policy intervention to restructure and develop institutional capacities for the higher and vocational educational sector in each of the States in the East, capturing key facets of their unique socio-economic canvas.

The NEC Vision 2020 document suggests developing vocational and higher education to create choices for employment locally and outside. We believe any action to strengthen the higher and vocational education system in this region needs to leverage local human talent and natural resources.

Our study indicates that States in the East have made mixed progress in reforming their higher and vocational education system. Orissa has made significant progress in rolling out a reform road map for restructuring and developing its higher education system over a perspective horizon, broken into identifiable stages aligned with the economic potential the State intends to exploit. However, other States are yet to prioritise any publicly articulated agenda of actions. We, therefore, present a brief summary of Orissa's road map, along with examples from other States to show how the State could plan to develop its education and training around its local resources. We conclude by presenting a sample mapping of local resources with vocational and higher education.

## Orissa

Orissa is at the cusp of an economic rejuvenation. The State has taken a lead in the area of policy interventions to reform the Higher Education sector for the welfare of the local community and delivering inclusive economic development.

### Reforms in Higher Education

The Government of Orissa constituted a Task Force (TF) in October 2009 with the objective of preparing a State "Perspective Plan Document for Higher Education" which, while

considering the needs of industries, agriculture and medicine suggested ways to transform the Higher Education sector into a world class one by a three stage action plan running up to 2021-22.

These stages were: Quick Restoration (2010-2012); Rapid Expansion (2012- 2017); and Steady Consolidation (2017 - ).

Quick Restoration inter alia recommended, delinking Higher Secondary (10+2) from Higher Education, filling up vacant sanctioned seats in colleges to increase GER, setting up Orissa State Higher Education Council, an Education Development Bank, leveraging technology enabled learning per District to start with, language laboratory in colleges in stages to improve communication skills and employability, UGC model colleges in low GER districts, attract central institutes (viz. IIM), encourage private investment in remote, tribal and low GER districts, etc.

Rapid Expansion included (a) creation of new universities and institutes of higher learning (b) measures to strengthen Higher Education sector

Creation of new universities and institutes of higher learning include setting up new affiliating universities to reduce the burden of affiliating colleges on existing universities, setting up new Unitary Universities viz. the State Open University, new autonomous institutes (5 State Institutes of Technology, Institute for Tribal Art and Culture, Institute for College and University Teachers' Training and Institute of Textile Technology). Creation of new colleges – to be based on a study of the district GER correlated with deprivation to allow inclusive growth of Higher Education through large public outlays in eight Government/ private medical colleges, ten Government engineering colleges and ten Government general education degree colleges. The State plans for all Educationally Backward Districts (EBDs) identified by UGC, to have at least one Government general education degree college. The Government considers public funding of education sector essential to benefit the poor and the underprivileged sections.

Centers of Excellence are to be set up for attracting, retaining and nurturing local talent with a fitment to local contextual research, supplemented by industry-academia interface for R&D for local industries to gain and the livelihood needs of the people of the State be addressed. These include a research

Centre at Bhubaneswar on physical and chemical sciences, an Earth System Sciences centre also at Bhubaneswar, an Oceanography Centre at Puri, a Social Sciences Centre at Sambalpur and to leverage knowledge on rich mineral resources of the State a research centre for Minerals and Materials Science at Keonjhar are proposed to be set up.

**Engineering Education:** Orissa plans to revamp the State funded engineering colleges and 5 new State Institutes of Technology are to be created. Over one hundred private engineering colleges operate but are all concentrated in a few locations. Private entrepreneurs will only be allowed to set up new colleges in those areas where engineering education is inadequate.

**Medical Education:** Existing medical colleges are to be upgraded into universities to serve as affiliating universities to other medical colleges and private capital encouraged to set up medical colleges through self-finance or PPP mode. The State has launched a Rural Medical Practitioner (RMP) program to enhance paramedical and nursing programs, with special preference given to rural students.

**Skill Development:** Plans are in place to create a community college system imparting skills in demand, modelled along US community colleges with a Skills University at the apex to oversee all vocational institutes and the ITIs.

Other measures include ensuring employability of students by a focus on imparting job-oriented courses, enactments to set up a State Higher Education Council for autonomous oversight as in Andhra Pradesh, West Bengal, Kerala and Karnataka, a State level financial institution be modelled on the lines of the National Higher Education Finance Corporation (NHEFC) to directly finance creation / infrastructure improvement of any university duly recognized under law, creation of Special Education Hubs or Knowledge Corridors. A significant measure that aims to link inclusive development to private capital profiting from Orissa's mineral resources, is the fund to be created out of an 'Education Levy' on the revenues accruing to investors from mineral resources to finance development in Higher Education.

Orissa is on the road to reforms. In response to our questionnaire, the KIIT University indicates that it is poised to work to develop a human capital base among the local community, create employment for its students who are absorbed by anchor investors in IT / ITeS sectors in the State.

## West Bengal

West Bengal receives a steady influx of students from adjacent States for study and employment. To address the demand

for Higher Education, the State Government has encouraged private engineering and business management colleges. The State has a legacy of India's finest Higher Education system with several centres of excellence. West Bengal also saw great strides in IT and ITeS development – emerging firmly beyond the national borders into the global new economy. As the Dean of Usha Martin School notes: "One of the key concerns about the development of Higher Education in this State is that there is not enough demand, which is mainly due to poor and tardy industrial growth". Therefore, to turn the tide without waiting for industrialization to take off, he suggests that "A more viable route for development of Higher Education in West Bengal is to convert this State into an education hub (possibly a hitherto unknown concept that has not been implemented elsewhere).....". It seems developing a Higher Education "industry" in West Bengal now makes better business sense. He further suggests that the Government should actively consider co-sponsoring high-end research work which will pull in quality professors to join the education hub of the State and chosen fields of research can then attract private funds which may spiral up the growth of industry-academia duo.

## NER

The States that comprise the North Eastern Region (NER), while unique in most respects, have similar economic and geographical attributes binding them into a homogenous region that merits special policy interventions.

The NER is endowed with vast natural resources in terms of forests, biological diversity, hydro-electricity and tourism potential. Despite abundant resources, the region has remained largely under developed. A key constraint to growth has been poor infrastructure and limited connectivity, both within the region and with the rest of the country. Of late, the Government has taken several steps to overcome these infrastructural bottlenecks and to induce sustainable development in the region. The strong focus on roads, airports and hydro power developments are some of the key steps in this direction.

Key thrust areas that evolve from the unique resources and challenges in the region are -

- The forest plays a major part in the economies of these States. Sadly, the NER forest resources are facing degradation and deforestation. Large investment outlays for capacity building of knowledge and skills centers aimed at preserving the ecology are required. The States are unable to address such resource needs. What is required are planned outlays in training and awareness for imparting correct skills set to the community for the States to preserve the biomass.

Institutions of Higher Education focusing on environment sciences (viz. forest sciences, social forestry, botany, environment and ecology sciences, etc.) need to come up for building local community awareness to ensure conservation of NER's forest resources.

- Agricultural growth has been uneven across NER, which comprises 8% of India's total geographical area but produces only 1.5% of the nation's food grains. The NER has not been able to benefit from the Green Revolution as much as the rest of the country. Agriculture, horticulture, animal husbandry and fisheries are important livelihoods but have low levels of productivity. Poor connectivity has compounded the constraints of logistics, preservation and distribution of the perishable produce. This makes farm prices unremunerative, deters the growth of food processing industries, cultivation of vegetables and commercialisation of fruits & spices, even with investments in marketing and storage facilities.

Agricultural Universities need to come up to encourage research in improved cropping and agricultural productivity that will address food stockpiling needs for meeting local demand. Equally important are training institutes in food processing.

**Oil & Gas** – Given the huge reservoirs of these hydrocarbons, there is an opportunity to train the local population in trades relating to exploration and production of oil and gas.

**Hydroelectric power** – The entire region has tremendous potential for generating hydro-electric power and there will always be demand for engineers and technicians in generation, transmission and distribution of electricity.

**Handicraft** – Prospects for this sector's development is common place in almost the entire NER. Therefore there is a need to build up skills set and human capital in the areas of

vocational and technical training, sericulture, use of modern tools and implements to help provide a scientific basis to further enrich traditional skills that help produce handloom and handicrafts having unique geographical origin.

**Tourism and Hospitality** – The rich cultural canvas, the flora and fauna of the region calls for a measured policy intervention that should aim at preserving and economically exploiting the cultural heritage. A growth in tourism will be followed by the hospitality sector. With a dearth of quality hotels in NER in general, but with connectivity and law and order situation improving, a planned expansion of the tourism industry may witness growth of the hospitality sector with inflow of private capital and management skills.

This region has a large English speaking population that finds employment in the hospitality industry across India and outside. There are thus opportunities for leveraging the local talent by setting up training institutes in hospitality and hotel management.

**Call Centers** – Good English language skills also can find employment in call centers and the Government can create the environment by improving connectivity and adding courses in its ITIs for this trade.

By way of illustration, we conclude with the following sample mapping of resources with training and education. While this is by no means exhaustive, we present it as a suggestion for systematic planning of capacity creation instead of simply adding conventional colleges and training institutions that offer routine courses with limited relevance to local industry. And while we recommend that creating the education and training infrastructure should be led by the Government, wherever possible, the private sector must be involved – in financing, running and operating as well as creating courses and their content to ensure relevance to local industry.



## Orissa

### Matrix Mapping Resource Occurrences, Economic Potential and Higher and Vocational Education Opportunities

Natural Resources	Human Capital Resources	Economic Potential	Industrial Potential	Vocational Education Possibilities	Higher Education Possibilities
Mineral Ores	Social issues of large tribal population likely displacement to be addressed	Metal - extractive and downstream; Relief and Rehabilitation measures for displaced communities	Aluminium - extraction to extrusions; Creation of social infrastructure for displaced communities	ITIs, VE and TE schools, Nursing and paramedic schools - for employment, including livelihood transformation for displaced communities	Engineering - all streams, physical sciences, materials and metallurgical sciences, Management Institutes, Law and Medical Colleges, Education services
	Buying power of middle income bracket of society	Consumer markets	Automobile, Railway bogies, industrial transmission wires / equipment	ITIs, VE and TE schools, Nursing and paramedic schools - for employment, including livelihood transformation for displaced communities	Engineering - all streams, physical sciences, materials and metallurgical sciences, Management Institutes, Law and Medical Colleges, Education services
Coal	Diligent labour	Mining	Power generation for industrial consumption	ITIs VE schools for plant maintainance, technicians	Engineering - civil, mechanical, electrical
Farm and livestock	Animal husbandry knowledge and processes	Contract farming and animal husbandry	Food processing and distribution, Retail	ITI, veterinary colleges, Private Management schools, VE schools	Biological sciences, bio technology, Management, Law
Flora and fauna - terrestrial and marine: Fisheries	Tribal and rural artistic / asthetic craftsmanship skills	Eco -toursim, wild life tourism, Handlooms and handicrafts	Cottage industries, micro finance, self help groups, fishermen cooperatives	Tribal arts, craft schools, ITI, VE schools, Training for fishermen	Management sciences, Social sciences - Anthrophology, Sociology, Marine engineering
		Environment protection	Carbon trading, green technology		Environmental engineering, sciences and biological sciences
Archaeological sites, historical places of worship		Tourism, including religious tourism	Hospitality, Real Estates	Hotel Management schools, VE schools - plumbing, electricians, draftsmen, etc	
	Consumerist society	Large domestic markets	Deep service sectors - telecom, government revenue services, FMCG and white goods trading, legal and medical services	Para accounting, IT finishing schools, VE schools, fashion design, para medical schools	Telecom engineering, Management, Public administration, Law and Medical colleges
Favourable climate and physical infrastructure	Educated and enlightened work force	Supply of educated human resources	IT and ITeS, Knowledge based industries, Real Estate	IT finishing schools, Language schools, VE schools, Artisans, plumbing, electricians, estate management	Engineering, Computer science and applications, Architects, Management sciences
Frequent climatic disasters	Frequent displacement of large rural segment, depressed classes of society to be managed	Disaster management meaures, Relief & Rehabilitation	Civil engineering structurals, afforestation		Disaster Management, Centre of Excellence on Climactic and Earth Sciences

VE - Vocational Education TE - Technical Education



## Matrix Mapping Resource Occurrences, Economic Potential and Higher and Vocational Education Opportunities

Natural Resources	Human Capital Resources	Economic Potential	Industrial Potential	Vocational Education Possibilities	Higher Education Possibilities
Iron and Steel	Tribal population likely to be displaced in districts of Purulia, Birbhum, Bankura, West and East Midnapore	Metal - extractive and downstream; Relief and Rehabilitation measures for displaced communities	Steel - smelting to flats, pipes, bars; Creation of social infrastructure for displaced communities	ITI s,VE and TE schools, Nursing and paramedic schools - for employment, including livelihood transformation for displaced communities	Engineering - all streams, physical sciences, materials and metallurgical sciences, Management Institutes, Law and Medical Colleges, Education services
			Automobile, Railway bogies, industrial transmission	ITI s,VE and TE schools, Nursing and paramedic schools - for employment, including livelihood transformation for displaced communities	Engineering - all streams, physical sciences, materials and metallurgical sciences, Management Institutes, Law and Medical Colleges, Education services
Coal	Cheap labour	Mining	Power generation for industrial consumption	ITI s VE schools for plant maintenance, technicians	Engineering - civil, mechanical, electrical
Farm and livestock	Animal husbandry knowledge and processes	Contract farming and animal husbandry	Food (fish and meat) processing and distribution, Retail	ITI, veterinary colleges, Private Management schools, VE schools - food processing technology, nutrition sciences, material management and packaging technology	Biological sciences, bio technology, Management, Law, Material Management, Supply Chain Management
	Animal husbandry knowledge and processes	Leather & Leather products	Leather manufacturing; export oriented units	ITI, Leather Technology VE schools, Management schools - export management, finance	Biological sciences, environment engineering, chemical engineering, bio technology, Management sciences, Finance, Accounting and Law
Flora and fauna - terrestrial and marine; Fisheries	Tribal and rural artistic / asthetic craftsmanship skills	Eco -tourism, wild life tourism, Handlooms and handicrafts, Floriculture	Cottage industries, micro finance, self help groups, floriculture start ups; Fishermen Cooperatives	Tribal arts, craft schools, ITI, VE schools, Management schools; Training for Fishermen	Management sciences, Social sciences - Anthrophology, Sociology, Bio technology for improved floriculture products; Marine engineering
	Tribal / rural culture and life revolves around farmland / forest lands	Environment protection measures	Carbon trading, green technology	VE schools. ITIs	Environmental engineering, sciences and biological sciences
	Local communities (viz. Darjeeling, parts of East Midnapore dependent on tourism)	Eco -tourism, wild life tourism, beach and hill resorts	Hospitality	Hotel Management schools, VE schools - plumbing, electricians, etc	Management Sciences
	Ethnicity, multicultural society, literature and arts	Art, culture content - and intangible capital	Entertainment & Media	VE schools - TV anchoring, studio technicians, Acting and modeling schools	Centres of Excellence on culture, arts, letters, painting, Telecommunication engineering
Agro based resources	Advanced agro farming developed during Green Revolution	Diverse and high yielding varieties of fruits and vegetables; cold chains, warehouses, logistics, distribution, farm produce trading	Food processing units; large format whole sale retail ("cash and carry"); warehousing, logistics / distribution businesses	Training in food processing	
	Consumerist society	Large domestic markets	Deep service sectors - telecom, government revenue services, FMCG and white goods trading, legal and medical services	Para accounting, IT finishing schools, VE schools, fashion design, para medical schools	Telecom engineering, Management, Public administration, Law and Medical colleges
Favourable climate and physical infrastructure	Educated and enlightened work force	Supply of educated human resources	IT and ITeS (BPOs - voice and data), Knowledge based industries, Real Estate	IT finishing schools, Language schools, VE schools, Artisans, plumbing, electricians, estate management, logistics management, catering and hoteling services, hotel management	Engineering, Computer science and applications, nano technology, Architects, Management sciences
A traditional market in Gems & Jewellery	Traditional craftsmen; conservative small scale business community	Developed markets in trading and processing bullions, financial and money markets, preserving and developing age old cratmanship (IP)	Gems and Jewellery producing start ups; large Gems & Jewellery SEZ, large retail format show-rooms	Craftsmen guilds - unorganised VE imparting bodies, real estate management, retail - shopboys and shoppirls	Finance Management, Gemology
Superior port logistics	Technical manpower, consumer markets	Large scale petrochemical and downstream units	Chemical hub	ITI, VE and TE on plant operation and maintenance	Chemical engineering, polymer sciences, environmental engineering and sciences

VE - Vocational Education TE - Technical Education

## Jharkhand

### Matrix Mapping Resource Occurrences, Economic Potential and Higher and Vocational Education Opportunities

Natural Resources	Human Capital Resources	Economic Potential	Industrial Potential	Vocational Education Possibilities	Higher Education Possibilities
Mineral Ores	Large tribal population likely to be displaced	Metal - extractive and downstream; Relief and Rehabilitation measures for displaced communities	Steel - smelting to flats, pipes, bars; Creation of social infrastructure for displaced communities	ITI s,VE and TE schools, Nursing and paramedic schools - for employment, including livelihood transformation for displaced communities	Engineering - all streams, physical sciences, materials and metallurgical sciences, Management Institutes, Law and Medical Colleges, Education services
	Buying power of middle income bracket of society	Consumer markets and proximity to raw material sources	Automobile	ITI s,VE and TE schools, Nursing and paramedic schools - for employment, including livelihood transformation for displaced communities	Engineering - all streams, physical sciences, materials and metallurgical sciences, Management Institutes, Law and Medical Colleges, Education services
Coal	Diligent, efficient labour	Mining	Power generation for industrial / mining consumption	ITI s VE schools for plant maintainance, technicians	Engineering - civil, mechanical, electrical
Flora and fauna - terrestrial	Tribal and rural artistic / asthetic craftsmanship skills	Eco -tourism, wild life tourism,Handlooms and handicrafts	Cottage industries, micro finance, self help groups	Tribal arts, craft schools, ITI, VE schools, Management schools	Management sciences, Social sciences - Anthrophology, Sociology
	Tribal culture and life revolves around forest lands	Environment protection	Carbon trading, green technology	VE schools. ITIs	Environmental engineering, sciences and biological sciences, anthropological research
			Hospitality	Hotel Management schools, VE schools - plumbing, electricians,etc	Management Sciences
	Ethnicity, multicultural society, literature and arts	Tribal art, culture content - and intangible capital	Entertainment & Media	VE schools - TV anchoring, studio technicians, Acting and modeling schools	Centres of Excellence on tribal culture, arts, Telecommunication engineering
	Consumerist society	Large domestic markets	Deep service sectors - telecom, government revenue services, FMCG and white goods trading, legal and medical services	Para accounting, IT finishing schools, VE schools, fashion design, para medical schools	Telecom engineering, Management, Public administration, Law and Medical colleges
Mining and Metal manufacturing industrial base	Educated and enlightened work force	Supply of technical human resources	IT and ITeS, Knowledge based industries, Real Estate	IT finishing schools, Language schools, VE schools, Artisans, plumbing, electricians, estate management	Engineering, Computer science and applications, Architects, Management sciences

VE - Vocational Education TE - Technical Education

## Bihar

### Matrix Mapping Resource Occurrences, Economic Potential and Higher and Vocational Education Opportunities

Natural Resources	Human Capital Resources	Economic Potential	Industrial Potential	Vocational Education Possibilities	Higher Education Possibilities
Coal	Abundant low cost labour	Mining	Power generation for industrial consumption	ITIs VE schools for plant maintainance, technicians	Engineering - civil, mechanical, electrical
Farm and livestock		Contract farming and animal husbandry	Food (fish and meat) processing and distribution, Retail	ITI, veterinary colleges, Private Management schools, VE schools - food processing technology, nutrition sciences, material management and packaging technology	Biological sciences, bio technology, Management, Law, Material Management, Supply Chain Management
Archaeological sites, historical places of worship		Tourism, including religious tourism	Hospitality, Real Estates	Hotel Management schools, VE schools - plumbing, electricians, draftsmen, etc	Centres of Excellence on Social sciences, Architecture, Civil Engineering, Law, Finance & banking
	Ethnicity, multicultural society, literature and arts	Art, culture content - and intangible capital	Entertainment & Media	VE schools - TV anchoring, studio technicians, Acting and modeling schools	Centres of Excellence on culture, arts, letters, painting, Telecommunication engineering
Agro based resources	Advanced agro farming developed during Green Revolution	Diverse and high yielding varieties of fruits and vegetables; cold chains, warehouses, logistics, distribution, farm produce trading	Food processing units; large format whole sale retail ("cash and carry"); warehousing, logistics / distribution businesses		
	Consumerist society	Large domestic markets	Deep service sectors - telecom, government revenue services, FMCG and white goods trading, legal and medical services	Para accounting, IT finishing schools, VE schools, fashion design, para medical schools	Telecom engineering, Management, Public administration, Law and Medical colleges

VE - Vocational Education TE - Technical Education

# North East Region

## Matrix Mapping Resource Occurrences, Economic Potential and Higher and Vocational Education Opportunities

Natural Resources	Human Capital Resources	Economic Potential	Industrial Potential	Vocational Education Possibilities	Higher Education Possibilities
Petroleum and Natural Gas	Largest pool of technical resources	Oil & Gas exploration	Petroleum exploration and downstream refining and cracking for fuel, lubricants and industrial polymers	ITI, VE and TE on oil rigs - drilling and maintenance, plant operation and maintenance	Chemical engineering, polymer sciences, environmental engineering and sciences, geology and petrology
Need to improve connectivity	Sparsely populated areas and low urbanisation allows for quickly ramping up infrastructure; unsatiated demand for telecom services	Growth and development of infrastucture and telecom connectivity	Large scale infrastructure investments and opportunity for several telecom operators	Vocational and Technical education for semi skilled and skilled construction workers	All streams of engineering education, in management, legal education besides material and earth sciences, hydrology and physical sciences
Potential hydel power from riverine resources	Sparsely populated areas allow for new projects to come up without major displacement and related Relief & Rehabilitation Costs	Bridge the national power demand by supplying clean energy	Setting up Hydro Power Generation units across the NER creating employment and critical infrastructure base of national importance	Vocational and Technical education for semi skilled and skilled construction labour supply and for plant operation and maintenance	All streams of engineering education, in management, legal education besides material and earth sciences, environment, hydrology and physical sciences
Abundant and naturally growing tea bushes	Diligent plantation labour with knowledge of harvesting and post harvest processes	Production of world class tea, employment potential and foreign excgange earning for Indian economy	Best of class, productive and well managed tea industry satisfying all stakeholders	ITI, VE and TE on plantation maintenance, upkeep, supervision and tea production	Agricultural University, bio technology, plantation regeneration / management, Finance & Accounting, Tea Research
Farm and livestock	Animal husbandry knowledge and processes	Contract farming and animal husbandry	Food processing and distribution, Retail	ITI, veterinary colleges, Private Management schools, VE schools	Biological sciences, bio technology, Management, Law
Sub optimally utilised Agricultural resource base	Adherence to conservative farming techniques	Raise agriculture, horticulture, animal husbandry and fishery to higher levels of productivity for adequate food buffer stocks	Development of food processing industries, coomercialised cultivation of vegetables, fruits, spices, investment opportunities in marketing and storage facilities	ITI, Panchyati Raj system to popularise improved cultivation techniques among local community	Agricultural Universities for improved cropping practices, bio technology research, molecular biology, veterinary medicine
Flora and fauna - terrestrial and mountain	Tribal and rural artistic / asthetic craftsmanship skills	Eco -tourism, wild life tourism, Handlooms and handicrafts	Cottage industries, micro finance, self help groups	Tribal arts, craft schools, ITI, VE schools, Management schools	Management sciences, Social sciences - Anthrophology, Sociology
		Reap the rich plant bio diversity	Production facilities for drugs and pharmaceuticals from medicinal plants	Training for plant collection, preservation and harvesting techniques	Botany, research on pharmacology and mapping medicinal plant bio diversity for dtermining IPR by geoghraphical identification
		Environment protection	Carbon trading, green technology		Environmental engineering, sciences and biological sciences
	Local communities dependent on tourism and fluent in English	Religious and wild life tourism, hill resorts	Hospitality	Hotel Management schools, VE schools - plumbing, electricians, etc	Management Sciences
	Ethnicity, multicultural society, folklore and arts, fluent in English	Art, culture content and intangible capital	Entertainment & Media	VE schools - TV anchoring, studio technicians, Acting and modeling schools	Centres of Excellence on culture, arts and Telecommunication engineering
Archaeological sites, historical places of worship		Tourism, including religious tourism	Hospitality, Real Estates	Hotel Management schools, VE schools - plumbing, electricians, draftsmen, etc	
	Consumerist society	Large domestic markets	Deep service sectors - telecom, government revenue services, FMCG and white goods trading, legal and medical services	Para accounting, IT finishing schools, VE schools, fashion design, para medical schools	Telecom engineering, Management, Public administration, Law and Medical colleges
Favourable climate and physical infrastructure	Educated and English speaking work force	Supply of educated human capital with good communication skills	IT and ITeS, Knowledge based industries, Real Estate	IT finishing schools, Language schools, VE schools, Artisans, plumbing, electricians, estate management	Engineering, Computer science and applications, Architects, Management sciences
Frequent natural disasters	Challenges of disaster relief for large rural segment, depressed classes of society	Disaster management measures, Relief & Rehabilitation	Civil engineering structurals, afforestation		Disaster Management, Centre of Excellence on Climactic and Earth Sciences
Large tracts of virgin forest resources	Local communities dependent on forests	Arrest degradation and deforestation; developing alternatives to cultivation, preserve bio-diversity	Public investment outlays on environmental engineering, creation of knowledge and skills centre for environmental protection		Higher education Institutions on environment sciences, forest sciences, social forestry, botany, environmental engineering

# 05 Abbreviations

AICTE	All India Council of Technical Education	NE	North East
ASSOCHAM	Associated Chambers of Commerce and Industry of India	NER	North Eastern Region
CAGR	Compounded Annual Growth Rate	NSSO	National Sample Survey Organisation
CMIE	Centre for Monitoring Indian Economy	NIT	National Institute of Technology
EDI	Educational Development Index	PPP	Public Private Partnership
GDP	Gross Domestic Product	RBI	Reserve Bank of India
GSDP	Gross State Domestic Product	SES	Socio-economic Status
GER	Gross Enrolment Ratio	SEZ	Special Economic Zone
HDI	Human Development Index	SDP	State Domestic Product
IT	Information Technology	TE	Technical Education
ITI	Industrial Training Institute	UMPP	Ultra Mega Power Project
ITeS	IT enabled Services	UGC	University Grants Commission
MHRD	Ministry of Human Resource Development	UT	Union Territory
MOU	Memorandum of Understanding	VE	Vocational Education
MFI	Micro Finance Institutions		
NAAC	National Assessment and Accreditation Council		
NABARD	National Bank for Agriculture and Rural Development		

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