



Arunachal Pradesh

Human Development Report 2005 Summary



I am alarmed when I see — not only in this country but in other great countries too — how anxious people are to shape others according to their own image or likeness, and to impose on them their particular way of living. We are welcome to our way of living, but why impose it on others? This applies equally to national and international fields. In fact there would be more peace in the world if people would desist from imposing their way of living on other people and countries. I am not at all sure which is the better way of living, the tribal or our own. In some respects I am quite certain theirs is better. Therefore it is grossly presumptuous on our part to approach them with an air of superiority, to tell them how to behave or what to do and what not to do.

— Jawaharlal Nehru

Development in various ways there has to be, such as communications, medical facilities, education and better agriculture. These avenues of development should however be pursued within the broad framework of the following five fundamental principles:

1. People should develop along the lines of their own genius and we should avoid imposing anything on them. We should try to encourage in every way their own traditional arts and culture.
2. Tribal rights in land and forest should be respected.
3. We should try to train and build up a team of their own people to do the work of administration and development. Some technical personnel from outside will no doubt be needed, especially in the beginning. But we should avoid introducing too many outsiders into tribal territory.
4. We should not over administer these areas or overwhelm them with a multiplicity of schemes. We should rather work through and not in rivalry to their own social and cultural institutions.
5. We should judge results not by statistics or by the amount of money spent but by the quality of human character that is evolved.

— Jawaharlal Nehru

Extracted from the Foreword to *A Philosophy for NEFA*, by Verrier Elwin, 2nd Edition, 1959

Arunachal Pradesh

Human Development Report 2005

Summary

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Itanagar

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Arunachal Pradesh

Human Development Report 2005

Summary

Prepared for the
Government of Arunachal Pradesh

by
Rajiv Gandhi University





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January 19, 2006

MESSAGE

We are delighted that this first Human Development Report (HDR) of Arunachal Pradesh, is being published. This State can rejoice in its many unique features. One of these is the large numbers of indigenous groups and tribes that have inhabited the area and have managed to live together in peace and harmony for millennia and centuries. These tribal ethnicities of this State have gradually emerged into the present era of technology and globalization recently, but have embraced the strange, and for them, novel elements of the present era with ease and flexibility. We can congratulate ourselves for this remarkable transition smoothed by the palpable progress our Arunachalee people have made in adapting to the modern idiom of life with such ease and speed.

This HDR indicates how in 1947, when India emerged into Independence, entire State of Arunachal could boast of just three Primary Schools, with a total enrolment of 30 students. We can, therefore, rejoice today at the rise in our State's literacy rate with amazing speed. In the last 58 years Arunachal has managed to attain literacy percentage higher than that in Jammu & Kashmir, Jharkhand or Bihar. In respect of female literacy, it can boast of having left Uttar Pradesh, a State with a literary tradition of many thousand years, far behind it. The results achieved by us could have been significantly higher, had we not been denied connectivity through roads, rail, and airports due to our Himalayan and mountainous geography; 82% forest cover of our area, and our generally unsatisfactory record in road building. These factors have prevented our moving rapidly in several areas of human development. The growth of income achieved by our State has also been higher than the national average. The ST sex ratio here stands at 1003 and is significantly higher than that which exists in the country as a whole. When one realizes the low base from which the State commenced its journey in development, one can see how remarkable our over-all development has been.

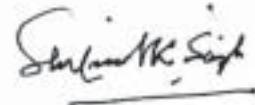
Certain areas of concern do, however, remain, and the community itself needs to attend to these. The natural resources of the State are abundant; its hydel potential spectacular. Until now this potential, however, has remained un-exploited.

Our air is clean, atmosphere pollution-free, the year round climate salubrious. The attractions of this verdant, colourful and beauteous State have created conditions in which it can, should, perhaps must, develop its hospitality industry and tourism including building and providing health resorts. This State has failed to move in this direction partly as we have failed to structure adequate infrastructure for transport, roads and communications and partly by refusing to abolish the Inner Line Permit system which the colonial rulers had built to meet their own compulsions of security and requirements of economy and exclusivity of the last quarter of the 19th century.

Today this State has the potential to become the orchard for the entire North-East, producing and providing flowers, fruits, and vegetables to the region. Our lack of connectivity and communications facilities has also created poor marketing conditions, and acted as a brake on our horticultural expansion. Nature has provided us with abundant resources which are not being exploited due to our geography, topography and the inability to produce for ourselves the infrastructure required for growth.

All these, and several other points and aspects are reflected in this Report, making it a good Guide Book for policy makers, and a valuable document for Administrators in this area. I express our appreciation and gratitude to the Rajiv Gandhi University particularly its Department of Economics for having prepared this comprehensive and objective Report.

The UNDP New Delhi and the Planning Commission, Govt. of India deserve our appreciation and gratitude having provided financial resources that we needed to produce it. We also thank the officials of the Govt. of Arunachal Pradesh, who have helped coordinate this project.



(S. K. SINGH)



GEGONG APANG

CHIEF MINISTER



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18. 1. 2006

MESSAGE

I am glad to learn that the first Human Development Report on Arunachal Pradesh is being published. The report prepared by Rajiv Gandhi University, an academic institution of repute, will, undoubtedly, be an objective analysis of the state of human development in Arunachal Pradesh.

What gives me immense pleasure is the remarkable progress made by the State on human development front. As the report states, the income of the people has gone up, education spread widely and the general health of the people has considerably improved. And the credit for all these achievements goes as much to the proactive policy of the State Government as to the whole-hearted cooperation of the people.

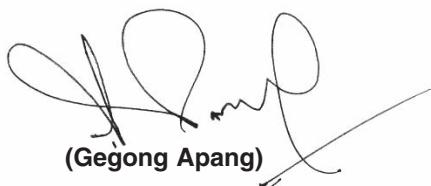
In keeping with its objectivity, the report has listed the downsides also. Arunachal Pradesh is yet to reach the desired level in the areas of life expectancy, literacy and infrastructure.

Another point noted in the report is the rise in the unequal distribution of resources and income. This is indeed a cause for worries. Arunachal Pradesh has traditionally been an egalitarian society where class distinctions did not exist. Now there is a need to revive the traditional values that emphasise the sense of equality among our people.

Arunachal Pradesh is endowed with extraordinary wealth of natural resources. And the State government is trying hard to explore and exploit the abundant resources scientifically and systematically in a planned manner to improve the quality of life of the people. Once the resources are fully tapped, the State will not only be able to remove backwardness, illiteracy and low life expectancy but the evils of inequality also.

I am confident that the wealth of information contained in the report will prove a useful guide to experts, planners, policy-makers and the ordinary citizens. Rajiv Gandhi University, especially the Department of Economics, deserves kudos for taking up this challenging task of preparing such a comprehensive report.

My heartfelt thanks go to the United Nations Development Programme (UNDP) and the Planning Commission, Government of India, for extending financial support and guidance in the preparation of the report. My sincere appreciation also goes to the members of the Steering Committee, the Directorate of Planning, Government of Arunachal Pradesh and members of the Technical Committee for their valuable contribution to the project.



(Gegong Apang)

Chief Minister,
Arunachal Pradesh

TABOM BAM

CHIEF SECRETARY

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**GOVERNMENT OF
ARUNACHAL PRADESH
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Dated 18th January '06

MESSAGE

It is a matter of great joy and satisfaction to see the publication of first '**Human Development Report of Arunachal Pradesh**'. The Government of Arunachal Pradesh had entered into a Memorandum of Understanding with the UNDP, New Delhi and the Planning Commission, Government of India to prepare the HDR of this State. But in the absence of secondary information on some important variables, it was difficult to go ahead with the task.

The Rajiv Gandhi University was entrusted with the responsibility of preparing the report in November 2000 keeping in view the expertise available with them.

The University conducted large-scale survey to generate the highly valuable data.

The Report contains analysis of the profiles of human development and problems encountered for its promotion in the State.

I am grateful to the Rajiv Gandhi University, particularly the Department of Economics for undertaking such a huge research work which contributed to the preparation of the Report. The University deserves high appreciation from us.

I am also grateful to the Members of the Steering Committee who provided active guidance and also to the Members of the Technical Committee who prepared the Report.

It was the Directorate of Planning, Govt of Arunachal Pradesh which coordinated the Project with competence. My thanks are also due to the UNDP, New Delhi and Planning Commission of India for providing funds as well as guidance and advice in preparation of this HDR.

A handwritten signature in black ink, appearing to read "TABOM BAM".

(TABOM BAM)
Chief Secretary
Govt. of Arunachal Pradesh
Itanagar

United Nations Development Programme



India



Planning Commission

Message

We congratulate the Government of Arunachal Pradesh for preparing the first Human Development Report for the State.

There is a dearth of development discourse pertaining to Arunachal Pradesh. We are confident that the Arunachal Pradesh Human Development Report would go a long way in filling this void as it comprehensively analyses human development status within the State.

Given that infrastructure development and human development compete for limited financial resources, it is often believed that the two are at cross purposes. The Arunachal Pradesh Human Development Report establishes linkages between the two and emphasizes the fact that the two complement each other.

It highlights the fact that any developmental gain cannot be sustained at the cost of environmental degradation affecting the rich biodiversity. The developmental strategy adopted by the State has to be in harmony with the fragile ecosystem.

We once again felicitate the Government of Arunachal Pradesh for the preparation of its Human Development Report and are confident that this Report would go a long way in improving the quality of life for the people of Arunachal Pradesh.

A handwritten signature in black ink, appearing to read 'R. Bandyopadhyay'.

R. Bandyopadhyay
Adviser (RD), Planning Commission
Government of India

A handwritten signature in black ink, appearing to read 'Maxine Olson'.

Maxine Olson
UNDP Resident Representative &
UN Resident Coordinator



Prof. ATUL SARMA
VICE-CHANCELLOR

January 19, 2006

FOREWORD

I am very happy that Rajiv Gandhi University has prepared the first Human Development Report (HDR) of Arunachal Pradesh and thus has earned the distinction of being the first ever University in India to prepare the HDR for a State.

Initially, the Government of Arunachal Pradesh undertook the responsibility of preparing the HDR for the State after signing a Memorandum of Understanding (MOU) with UNDP, New Delhi in September 1998. Two years later, the Arunachal Pradesh government requested Rajiv Gandhi University to consider taking over the project. The University accepted formally the challenge of preparing the HDR for Arunachal Pradesh on 16th November 2000.

The preparation of HDR for Arunachal Pradesh is truly a challenging task particularly because of non-availability of data on several crucially important variables such as life expectancy and human poverty. Life tables are, however, available only for 15 major States of the country and no small State in the country has been able to construct one for its population. Despite the non-availability of some basic data, Rajiv Gandhi University was motivated to undertake the responsibility for three prime considerations as follows:

- ❖ Research in Social Sciences in Arunachal Pradesh is seriously handicapped by non-availability of data on a number of very important socio-economic variables. Generation of data for some variables requires conducting a large-scale survey, which is beyond the capacity of individual researchers. The exercise on HDR has given the University an opportunity to undertake such a survey to generate data on some of the important variables that would serve as a benchmark.
- ❖ The conduct of surveys is difficult in Arunachal Pradesh because of its hilly terrain and sparsely settled population. Even so, participant-observation is necessary for collecting household level information – a task that is possible on a big-scale only when a good number of experts are involved in the project. Rajiv Gandhi University has faculty members with extensive research experience. Additionally, the survey conducted for the HDR could engage a good number of researchers, mainly ex-students of Rajiv Gandhi University, who got extensive experience in survey and research. Thus, it could build a database in the University as a by-product of the preparation of HDR.
- ❖ This has also facilitated Rajiv Gandhi University to establish and maintain a liaison as well as close interactions with the Government and the society that help in providing research output useful for policy-making.

Contd....P/2



RAJIV GANDHI UNIVERSITY

(Former Arunachal University)
RONO HILLS, ITANAGAR - 791 111, India

Recognized by the UGC as 'University with Potential for Excellence'

As a first step, Rajiv Gandhi University organised a workshop on 19th February 2001 in Itanagar. Scholars from Arunachal Pradesh and other parts of the country attended the workshop that yielded suggestions and recommendations for preparing the Report. Operationally, the University in consultation with the Government of Arunachal Pradesh set up a Technical Committee of sixteen members – eleven from the former and five from the latter and NGOs.

Since the Report had to be prepared partly on the basis of primary data, a large-scale survey was planned. Suitable survey frame and instruments were designed. Research assistants were recruited and then oriented to survey objectives and design so to ensure efficient conduct of the survey and the quality of data, of course, under the active guidance of technical committee members.

The survey that began in August 2001 and was completed by April 2002 covered 5257 households and a total population of 30,762. The data compilation and processing that began in May 2002, took a year to complete. It has indeed been both exciting and arduous to generate data on a number of very important variables for preparing the first HDR of Arunachal Pradesh. The draft HDR was thoroughly discussed in a Workshop held on 2nd April 2004. All comments and suggestions made in the Workshop were taken into consideration to modify the draft HDR and give it the present shape.

I sincerely congratulate the technical committee members especially, the faculty members of the Department of Economics, Rajiv Gandhi University, research assistants and staff engaged in the project. I am highly thankful to Dr. K. K. Dwivedi, the then Vice-Chancellor of this University, who accepted, on behalf of the University, the responsibility of preparing the HDR for Arunachal Pradesh and also provided support and guidance. Subsequently, Prof. Tamo Mibang who took over the charge of Vice-Chancellor on 16th November 2002 showed absorbing interest in the project and guided the researchers. I express my sincere thanks to him. I sincerely thank Mr. Joram Begi, the then Registrar of this University who played an important role at the initial stage of the project. I also sincerely thank Dr. Tai Nyori, Registrar, Rajiv Gandhi University for being very supportive of the endeavour. My sincere thanks are due to all the Steering Committee members of the HDR Project, the faculty members and staff of Rajiv Gandhi University, concerned Government officials and the public, more particularly the respondent households who extended whole-hearted co-operation during the survey. I am especially thankful to all those experts who participated in the Workshop held on 2nd April 2004, and provided invaluable suggestions for the modification of the draft HDR.

The Planning Commission was a source of continuous support during the preparation of the Report. I am grateful to Dr. Rohini Nayyar, former Adviser (RD), Planning Commission, for the special interest that she took in the Report during its preparation.

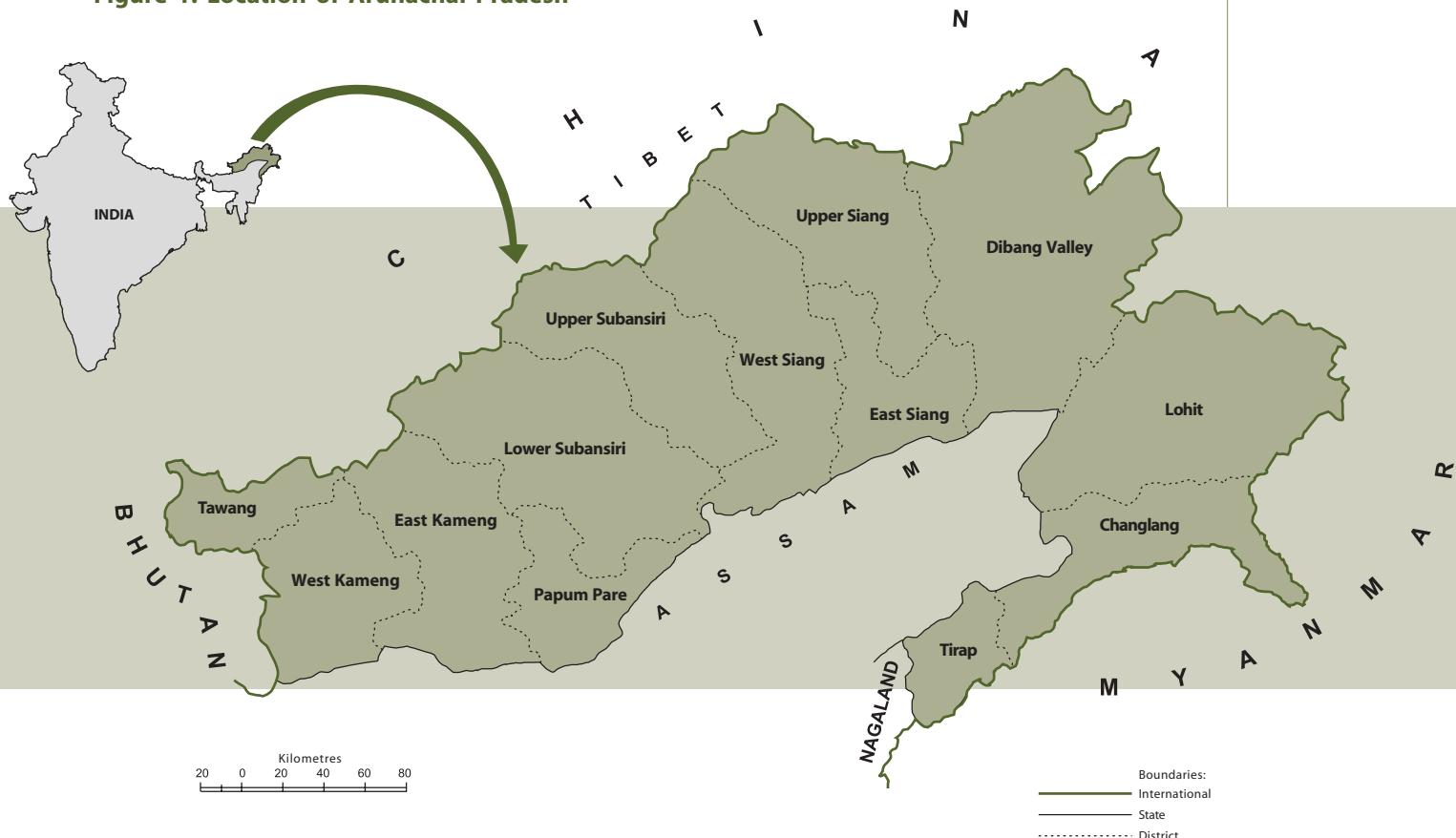
I am thankful to UNDP India, particularly Dr. Maxine Olson, the Resident Representative, UNDP, India, for the support provided for the preparation of the HDR. The Human Development Resource Centre (HDRC), UNDP, India provided guidance during its preparation. Dr. K. Seeta Prabhu, Dr. Suraj Kumar and Mrs. Ritu Mathur helped us refine the drafts of HDR. We are thankful to Mrs. Nandini Oberoi for adding interesting insights and meticulously editing the HDR. Mr. Bhaskar Khulbe provided valuable comments to strengthen this Report.

Atul Sarma
Vice-Chancellor

Chapter 1

Arunachal: the land and its people

Figure 1: Location of Arunachal Pradesh



Arunachal Pradesh map based on Survey of India map with due permission from the Surveyor General of India

The interstate boundaries between Arunachal Pradesh and Assam shown on the map are as interpreted from the North-Eastern Areas (Reorganisation) Act 1971, but have yet to be verified.

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Arunachal (the Land of Dawn) located in the extreme north-eastern corner of India, is the largest State in the region, with an area of 83,743 square kilometres. The numerous rivers that flow through Arunachal have carved out distinctive valleys that form the natural divisions that make up the State. Arunachal is 96 per cent hill terrain and the hills have acted as the natural boundaries for the many different communities that inhabit

Arunachal. It has a low density of population. In 2001, there were 13-people per square kilometre, as compared to the country's population density of 324-people per square kilometre.

The State is unparalleled in the world for the concentration, isolation and diversity of tribal cultures it contains. The indigenous people of Arunachal belong to different communities;

as many as 26 major tribes and 110 sub-tribes and minor tribes live here and 42 languages are spoken in the State. Rich in a variety of flora and fauna, the people of Arunachal have an innate knowledge of the environment. The cultural practices passed down from generation to generation, have helped to protect the rich biodiversity of the region. To illustrate, local medicine relies on a variety of plants and insects, each armed with its own specific healing properties. Traditional architecture and construction also require detailed knowledge of the available materials.

The Arunachal Pradesh Human Development Report will assist the State in evaluating the progress it has made since Independence, in

a variety of spheres, especially in achieving human development goals. It will also help the State to outline a model of development that is suitable for its special requirements.

History

The area now known as Arunachal Pradesh, was known as the North East Frontier Agency (NEFA)² from 1956-1972. It then also included the hill areas of the northern districts of Assam. Before Independence, NEFA was not directly administered by the Government, and the area remained largely cut off from the mainstream. There was very little communication between the Government administration, located outside the State, and the villages and isolated hamlets in NEFA. The British enacted the Inner Line Act in 1873, which ruled that people from other parts of the country cannot enter the State without the permission of the Government, adding to the State's isolation from the rest of India. After Independence, in order to intensify developmental efforts in this region, NEFA was made a Union Territory in 1972 and renamed Arunachal Pradesh. The Union Territory became the 24th State of India, in 1987.

The traditional economies of Arunachal Pradesh

Till recent times, the overwhelming majority of people in Arunachal depended on agriculture, which was based mainly on swidden cultivation, the slash-and-burn method that is known in North-East India as *jhum*. Only a small minority of people (the Apatanis, the Singphos and the Khamptis), who were settled in river valleys and plateaus, practised permanent cultivation. Agriculture was mainly limited to the production of paddy, the staple food of the

Table 1

Districts	Headquarters	The Main Tribes that Inhabit the Districts
Tawang West Kameng	Tawang Bomdila	Monpa Monpa, Sherdukpen, Lishpa, Chugppa, Aka, Miji
East Kameng Papum Pare Lower Subansiri Upper Subansiri West Siang East Siang Upper Siang Dibang Valley (New) Lohit Changlang Tirap Kurung Kumey Lower Dibang Valley Anjaw	Seppa Yupia Ziro Daporijo Along Pasighat Yingkiong Anini Tezu Changlang Khonsa Koloriang Roing Hawai	Nyishi, Sulung Nyishi Apatani, Nyishi Adi, Tagin Adi, Memba Adi, Mishing Adi Idu Mishmi Mishmi, Khampti, Singpho, Meyor Tangsa, Singpho Nocte, Wangcho Nyishi, Sulung, Tagin Mishmi, Adi (Padam) Mishmi

Source: Compiled from different sources.

¹ There are 16 districts in Arunachal Pradesh. However, the analysis in this Report is confined to 15 districts and sometimes refers to the 13 'old' districts, because data for the newer districts is not available. Kurung Kumey, Dibang Valley (New) and Anjaw are the three new districts, constituted after June 2000. Anjaw, created in December 2003, from the Lohit district, is the newest district.

² Before the name NEFA was given to this area in 1956, it was known as North East Frontier Tracts (NEFT).

people, and agricultural land was held by the community (with a few exceptions). The productivity of *jhum*-based agriculture is low, the resulting low level of marketable surplus prevented the emergence of monetised transactions. Agricultural production was aimed at meeting the immediate needs of the family and clan. Thus, barter was the usual form of exchange and it is only in the last few decades that the economy has started becoming monetised. The economy was characterised by an overriding community spirit, which allowed for security and support systems to different groups of people. One such institution is mutual insurance or reciprocity, whereby community members come to the aid of a family that suffers a failure of crop.

Initiation of the development process

In other parts of the country, the process of modernisation began largely in the 19th century. In Arunachal, however, modernisation is largely a post-Independence phenomenon. It began with the establishment of a direct administrative structure for NEFA, which was initially governed by the Governor of Assam,

dynamics, disturbing the way of life that many communities have followed for generations. The biggest change has been in the institution of ownership, especially land ownership. With the shift in ownership from the community to individuals, community-level institutions such as mutual insurance have become weaker.

At Independence, the North East Frontier Tracts had a primitive economy, with a low level of development (when evaluated by conventional indicators, like Life Expectancy at Birth (LEB) and education levels). The absence of modern health services, low literacy and fluctuating and low levels of income, kept the mortality rate high. In spite of a high birth rate, the high mortality rate kept the rate of growth of population low, in the pre-Independence period. However, the people had enormous traditional skills and knowledge, including life-skills and healing techniques, which have been passed down from generation to generation.

While the process of development in Arunachal is recent, progress has been encouraging. Income per head has increased in the State and the rate of growth of income is higher than the national average.



as a direct representative of the President of India. Development efforts intensified once NEFA became a Union Territory (1972), and the pace of development has increased even more after Arunachal became a State (1987). The establishment of institutional infrastructure in a hilly and sparsely populated land is a monumental task. The differences in terrain, culture, language, means of financial exchange, and institutions make the task even more challenging. For example, the transition from a barter economy to a cash economy has brought with it its own

While the process of development in Arunachal is recent, progress has been encouraging. Income per head has increased in the State and the rate of growth of income is higher than the national average. The literacy rate has increased, although it remains lower than the national average. The health status of the people has improved in the

State, but again, the improvement in health has not been able to keep pace with the spread of education or with the growth of income.

The rate of growth of population in Arunachal has been higher than that of the country. From 1961 to 2001, Arunachal's population grew, on average, at a rate of 2.98 per cent per annum, against a 2.13 per cent growth rate for the country. Increasing in-migration has added to the rising local population and has led to an unprecedented growth of the population. By 2001, the population of Arunachal was four times what it was in 1947.

The idea of human development: opportunities and challenges for Arunachal

This is a unique time for Arunachal. It has seen more change in the last 25 years than

it has seen for centuries. Arunachal is poised at a critical juncture and is in a position to make a crucial choice, regarding the development path it wants to pursue. In keeping with Arunachal's unique cultural ethos and the aspirations of its people, the development path will need to be sustainable and holistic in nature. Arunachal needs to plan its development in a considered and phased manner, ensuring that the development is people-centred yet decentralised, community-based, but with the Government as a facilitator, using its resources in a measured and sustainable manner.

Some areas in which Arunachal has substantial comparative advantage and development potential are the hydroelectric power sector, horticulture, agro-forestry and floriculture, organic farming and food processing, ecotourism, small-scale industries based on renewable non-timber forest produce, and plantation crops like tea and coffee, as well as in medicinal plants and herbs.



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Chapter 2

Education and literacy

Education in Arunachal has made rapid progress in the last 50 years. The State has advanced from extremely low literacy levels at the time of Independence, to about half the population being literate in 2001.

To obtain a better picture of the progress of education in Arunachal, the spread of the school system, growth of literacy and the enrolment, and availability of schools are examined.

Setting up the school system

Arunachal had almost no schools at the start of the 20th century and at the time of Independence there were only three schools in the entire State (but all three schools were only up to the primary level). Most languages did not have a written script; knowledge was passed down through oral histories and learning by doing, from one generation to the next.

Newer systems of learning and knowledge have now emerged in Arunachal, and the domain of knowledge of people has broadened. Although the old systems based on clans and communities have weakened, they are still very important here.

Literacy in Arunachal

Literacy levels in the State were extremely low to begin with. In 1981, the State had an overall literacy rate of 25.55 per cent where the literacy rate for men was 35.12 per cent while for women it was only 14.02 per cent. Among the districts, the literacy rate varied from a high of 34.94 per cent in Lohit to a low of 9.39 per cent in East Kameng.

From a low literacy rate of 25.55 per cent as late as 1981, the literacy rate in the State increased to 41.59 per cent in 1991, and further to 54.34 per cent in 2001. The literacy rate for men increased from 35.12 per cent in 1981 to 51.45 per cent in 1991 and the literacy rate for women increased from 14.02 per cent to a still low rate of 29.69 per cent. By 2001, the literacy rate in Arunachal climbed to 63.83 per cent for men, 43.53 per cent for women and 54.34 per cent for the entire population. The gap between the literacy rate for India and the State is now 11.40 percentage points for men, 10.20 percentage points for women and 10.50 percentage points for the total population.

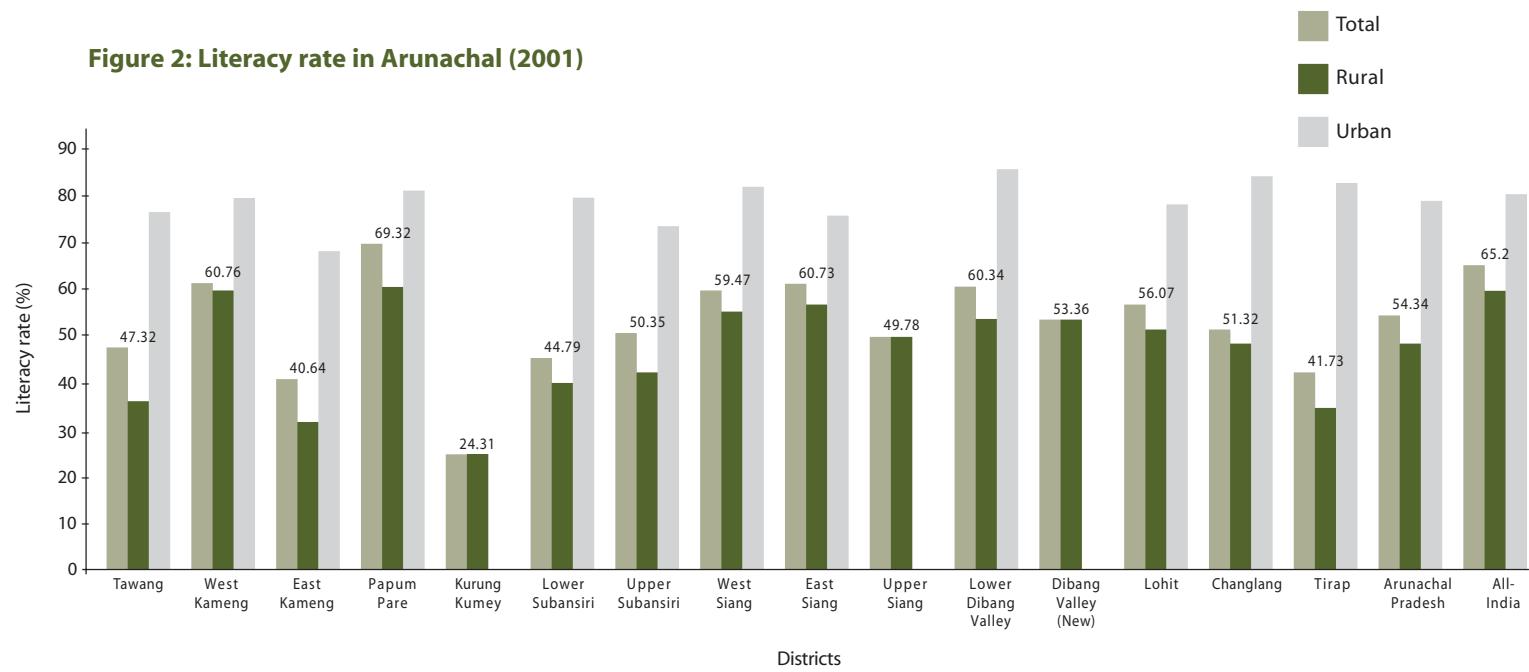
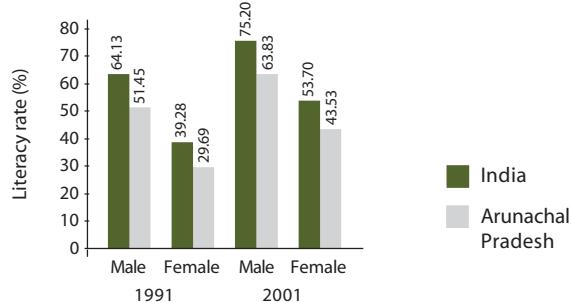
Gender gap in literacy

Across all the districts and the State, there exists a gender gap in literacy. As late as 2001, there was still a difference of more than 20 percentage points between male and female literacy rates in some districts. However, in 2001, the gender gap of 20.3 percentage points in Arunachal is still less than that at the national level (21.50 percentage points).

Urban-rural gap in the literacy rate

As in the rest of India, there exists a wide gap between the urban-rural literacy rates in Arunachal too. Literacy rate data over 1981-2001 shows that the urban-rural gap continues to be large, reinforcing the view that India's development is concentrated in the urban areas. The urban-rural gap in literacy in 2001 was 30.5 percentage points compared to the gap at national level of 20.85 percentage points. What is of even

Education in Arunachal has made rapid progress in the last 50 years. The State has advanced from extremely low literacy levels at the time of Independence, to about half the population being literate in 2001.

Figure 2: Literacy rate in Arunachal (2001)**Figure 3: Gender gap in literacy rates, Arunachal and India****Table 2**

Urban-rural gap in literacy rates in Arunachal, 1981-2001			
	1981	1991	2001
Urban-rural gap in male literacy rate (% age points)	38.30	30.99	27.5
Urban-rural gap in female literacy rate (%age points)	40.05	36.92	32.60
Urban-rural gap in total literacy rate (% age points)	41.94	34.57	30.5

greater concern is the fact that the urban-rural gap for women is closing slower than that for men. This reflects the fact that education opportunities for women and the girl child in the rural areas continue to be limited.

Literacy in the 7-14 year age group

This age group is studied to get an indication of how recent developments have affected literacy levels. Between 1981 and 1991, there was substantial improvement in the literacy levels of children, but there were still large urban-rural differentials in children's literacy (but this gap may also be closing rapidly). For all children, the urban-rural gap in literacy decreased from 39.12 percentage points to 27.31 percentage points in the 1981-1991 period.

Education: enrolment, access and performance

Gross Enrolment Ratio (GER)³

In 2001, the GER at the primary level in Arunachal was 104.66 per cent⁴ compared to the all-India GER of 95.66 per cent. The GER at the upper primary level for the same year was 79.05 per cent in Arunachal, which is higher than the national average (58.64 per cent), but substantially lower than the GER at the primary level. The low GER at the upper primary level in the six districts of Tawang, West Kameng, Lohit, Changlang, Tirap, and Upper Subansiri, may be due to either large-scale dropouts or never-enrolled children or both.

Age-Specific Enrolment Ratio (ASER)⁵

An examination of the data for age-specific enrolment shows that Arunachal's performance in both 1981 and 1991 is lower than the average for the country, but, the enrolment figures have improved over the period. In 1981, the ASER of Arunachal for the 6-10 year age group at 31.9 per cent was much below the national average of 47.2 per cent and in 1991, the ASER for this age group was 38.1 per cent, again below the national

61.5 per cent, while the figure for India was 62.10 per cent.

Out-of-school children

The preceding analysis shows that the Age-Specific Enrolment Ratio in the 11-13 year age group is higher than that of the 6 -10 year age group. However, the incidence of child workers among the out-of-school children in the age group 11-13 years is consistently higher. In 1981, almost 45 per cent of children and in 1991 close to 30 per cent children in the age group 11-13 were working. These figures are substantially higher than those of the age group 6-10 in 1981 (approximately 5 per cent) and 1991 (approximately 3 per cent).

Pupil-teacher ratio

There is considerable inequality in the pupil-teacher ratio across the State and at different stages of education, reflecting the changing access and enrolment of students, especially at the high school level. Between 1991 and

The incidence of child workers among the out-of-school children in the age group 11-13 years is consistently higher. In 1981, almost 45 per cent of children and in 1991 close to 30 per cent children in the age group 11-13 were working.



average of 51.2 per cent. In 1981, the age-specific enrolment in the 11-13 year age group (42.8 per cent against the national average of 50 per cent) was substantially higher than in the 6-10 age group (31.9 per cent). This is a trend common to many States in India and to the country as well. In 1991, the Age-Specific Enrolment Ratio for Arunachal for the 11-13 year age group was

2001, the pupil-teacher ratio improved in Arunachal, at the pre-primary/primary level from 50:1 to 34:1. At the middle school level, the ratio of pupils per teacher rose marginally from 20:1 in 1991 to 27:1 in 2001. At the secondary level, the ratio rose from

³ The GER is computed as ratio of total enrolment at a particular level, irrespective of age of children, to the total population in the age group expected to be at that level of schooling.

⁴ The GER exceeds 100 per cent due to the enrolment of overaged and under aged children at the primary level.

⁵ Defined as number of children enrolled in school in a particular age group (regardless of grade level) to the total number of children in the age group.



15:1 to 24:1 and at the higher secondary level, the ratio rose from 10:1 to 30:1.

Availability of schools, attendance and performance

Since the population of Arunachal is dispersed, the standard norms of population followed elsewhere in the country for the establishment of schools are not relevant. According to the All-India Seventh Educational Survey, 2002, about 48 per cent of habitations did not have a primary school within a one kilometre distance. At the upper primary stage, 68.83 per cent of all habitations did not have school facilities within three kilometres. Thus, the absence of adequate schooling facilities both at the primary and upper primary levels results in large-scale prevalence of dropouts and non-enrolment.

Dropout rates at the primary and upper primary level in Arunachal in 2003 were 20 per cent and 36 per cent, respectively. The main reason that students gave for non-enrolment in the age group 6-17 as given by NFHS-2, were: that the school is too far away, that they are required for housework, they are not interested in studies, that the cost was too high. More boys than girls said that the main cause of non-enrolment was that the school is too far away whereas more girls said that they were required for housework.

An analysis of the performance of students at different levels of schooling demonstrates that while educational facilities have increased substantially in Arunachal, the teaching

methodology itself need strengthening; so that the quality of education and the performance of students improve. To illustrate, the pass percentage in the year 2003 was 43.58 per cent in Class XII and only 27.43 per cent in Class X. This also suggests the need to set up vocational training and technical institutes to provide employment-based training.

There are now seven Government Colleges and three private colleges (in 1964, there was only one college). Rajiv Gandhi University (established in 1984) is the only University and there is a technical education institution (North Eastern Regional Institute of Science and Technology, started in 1984) and two Industrial Training Institutes, in the State. However, the State does not have a Medical College or an Engineering College, and students who wish to pursue these subjects have to go outside the State for their studies.

The way forward

To improve the educational facilities in the State, the following policy changes are recommended:

- Access to education needs to be improved in some districts.
- Specific strategies need to be devised to engage with local communities to ensure that education becomes universal, especially at the primary and elementary levels. To illustrate, the problems that are commonly encountered vary from the construction of school buildings, to the

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non-availability of educated persons (in some localities) to serve as teachers, the unwillingness of teachers from other areas to serve in remote areas and the difficulties in retention of children in the hostels.

- The State may consider taking external assistance under the District Primary Education Programme (aided by the World Bank and the European Union) aimed at operationalising strategies for achieving Universal Primary Education and Universal Elementary Education, through district-specific planning and disaggregated target-setting, especially for districts with low literacy rates for women.
- The State will also need to tackle the issues of retention and efficiency, by imposing minimum instructional parameters at various stages of the education process, and making significant investments in inputs that enhance learning at the primary level. These are essential to keep students interested.
- The State must introduce measures to mitigate the costs of school attendance. However, it must be recognised that even the implementation of such measures may not be enough to overcome the high-perceived opportunity costs of sending children (especially girls) to school.
- The school curriculum should have a component on innovative and sustainable use of natural resources, combined with

crafts, etc., in the local context so that they find education relevant and employment-oriented. Thus, higher education is pursued by only those who have the capacity and interest to do so.

- The quality of teaching must be improved. The training of teachers is important for quality teaching. A major initiative by the Education Department is required in this direction, since the number of untrained teachers in the State is high (59 per cent of teachers at the primary level were untrained in March 2004).
- The problem of teacher absenteeism is largely due to the lack of suitable residential accommodation, the non-availability of food that they are used to (the teachers are usually from outside the State) and their unfamiliarity with the conditions prevalent in many of the remote areas. These problems need to be addressed. The recruitment of teachers from the villages nearby is an option which can be exercised once local people are available for employment.
- The education of physically challenged children must be addressed, either by providing special facilities in the existing schools or by setting up special schools for physically and mentally challenged children.

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practical learning to make education more relevant to the daily lives of students.

- After primary school, vocational streams should be available to train boys and girls in modern agriculture, horticulture, dairy



Chapter 3

Health and well-being

The people of Arunachal Pradesh have always valued good health. They strive to remain healthy by following an appropriate diet and maintaining a regulated lifestyle. Despite this, however, the health status of the people of Arunachal is not commendable when measured by conventional indicators, in absolute terms, and in comparison with other States and regions of India.

In the last few decades, the State has made significant progress in moving from no health infrastructure (no hospitals, dispensaries, diagnostic facilities) to a relatively wide network of healthcare facilities. However, the increase in health coverage and services has been at a slower pace than the expansion of educational facilities and the growth of the economy for several reasons outlined below. Moreover, as the people are exposed to new ways of life and new influences (including new illnesses and diseases), their old traditional ways and cures are likely to prove increasingly inadequate and they will need improved access and provisioning of healthcare.

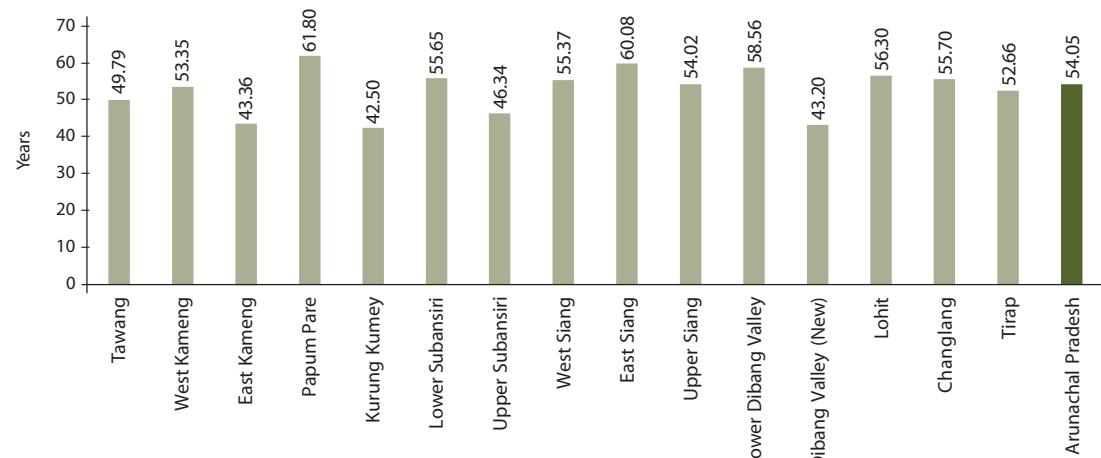
To obtain a clearer assessment of the health conditions of the people of the State, health indicators such as Life Expectancy at Birth (LEB), Infant Mortality Rates (IMR) and fertility rates are examined.

Life Expectancy at Birth

Although there is little statistical evidence to support this contention, yet it is likely that during the period when India attained Independence, the health status of the people of Arunachal was poor. The health of the people has improved gradually. At 54.05 years in 200-2001, LEB in Arunachal was among the lowest in the country.

Figure 4 illustrates that there is a high degree of inter-district variation in life expectancy. An analysis of the factors responsible for this large variation shows that the extent of access to medical facilities enjoyed by the rural population is the prime determinant of life expectancy. The other important variable is the literacy rate. This explains why the districts located in the upper hill ranges,

Figure 4: Life Expectancy at Birth in Arunachal (2000-2001)



which have less access to medical facilities, have lower life expectancies than the districts located in the plains and plateaus.

Infant Mortality Rate

Arunachal has an Infant Mortality Rate (IMR) of 77 per 1,000 live births (this means that out of 1,000 children born, 77 will not survive till their next birthday). Among the 15 big States, Orissa has the highest IMR of 95 and Kerala has the lowest IMR of 14, in the country.

Arunachal is relatively free from the problem of discrimination against girl children that many other Indian States face. While the people of Arunachal have some son-preference, it is not as deep-rooted as in other parts of India. This is partly responsible for the relatively better IMR in Arunachal than in many other parts of the country.

Again, the IMR in Arunachal varies among districts significantly with access. In general, it is higher in the districts located in the hill regions than in the plains. Among the 13 'old' districts, IMR varies from 57 per 1,000 live births in East Siang to 98 per 1,000 live births in Tawang. The immunisation of children is the single most important determinant of the IMR.

Two other important variables that have a high correlation with IMR are literacy rate and road connectivity.

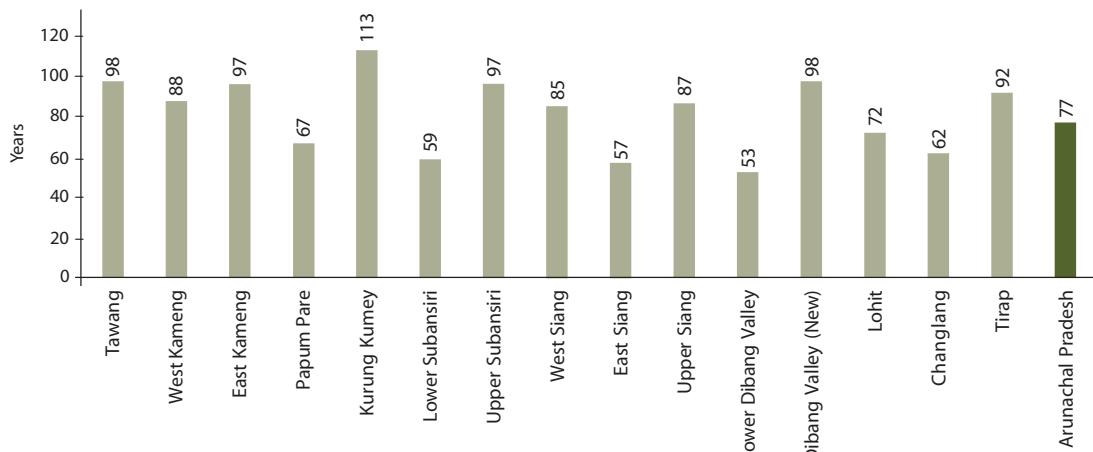
Arunachal is yet to experience what is referred to as an 'epidemiological transition' – a situation of a steadily improving health regime experiencing substantial changes in the cause-composition of death. Thus, in Arunachal malaria (a disease that has been successfully controlled in many parts of the world) is endemic and takes a high toll of lives during the monsoon, especially among people who live in remote villages.

Health services in Arunachal Pradesh

Like the growth of educational institutions, the expansion of health services in Arunachal is a post-Independence development. Before Independence, there were only 13 medical units (located primarily in areas that are now in Assam) but since then the Government has steadily increased the network of health services. While the availability of hospital beds is twice the average for the country, the same cannot be said about the availability of doctors. However, in Arunachal, the doctor-population ratio is not a very reliable indicator, because of the scattered settlements.

In the last few decades, the State has made significant progress in moving from no health infrastructure (no hospitals, dispensaries, diagnostic facilities) to a relatively wide network of healthcare facilities.

Figure 5: Infant Mortality Rate (IMR) in Arunachal and its districts (2000)



From a total dependence on traditional medical practice, rural Arunachal is gradually moving towards modern medical services provided mainly by the Government. During the last 50 years, the Government has

established a structure of medical services in different districts of the State. In spite of its relative newness, rural people depend on the health services provided in different hospitals, mainly Primary Health Centres (PHCs) and sub-centres.

Table 3

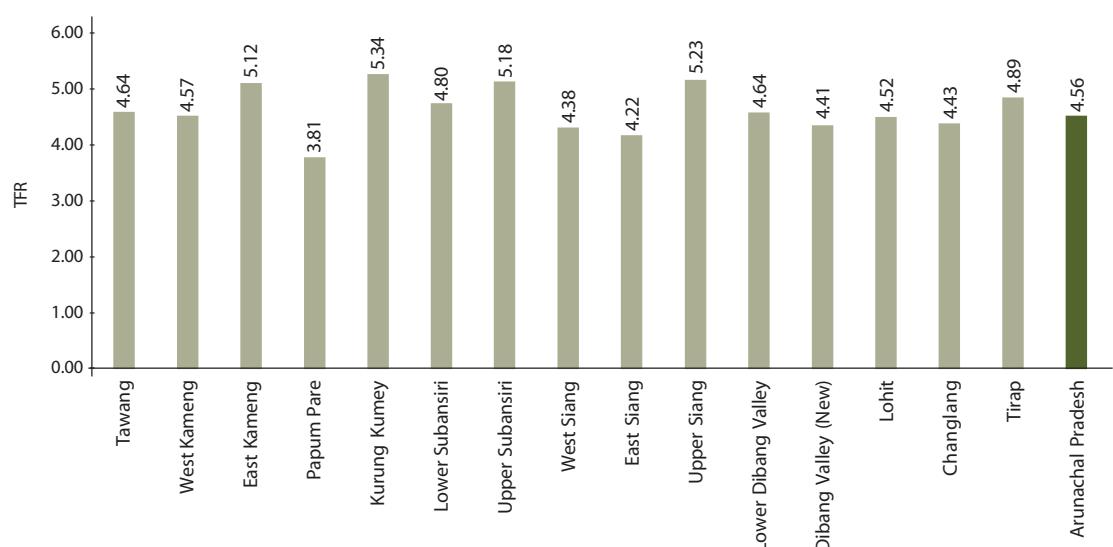
Growth of health services in Arunachal Pradesh and in India					
Year	Hospital Beds per 10,000 Persons		Doctors per 10,000 Persons		
	Arunachal Pradesh	India	Arunachal Pradesh	India	
1950-51	-	3.2	1.6	1.7	
1960-61	11.0	5.7	2.1	1.9	
1970-71	25.4	6.4	3.3	2.8	
1980-81	23.3	8.3	4.1	3.9	
1990-91	26.4	9.5	3.1	4.7	
1991-92	25.5	9.7	3.1	4.8	
1995-96	-	9.4 p	-	5.1 p	
1997-98	-	9.3 p	-	5.3 p	
2000-01	20.3	-	4.3	-	

Note: Dash means data not available. 'p' means the figure is provisional.
Sources: Economic Survey, 2002-2003, Government of India.
Statistical Abstracts of Arunachal Pradesh, Government of Arunachal Pradesh.

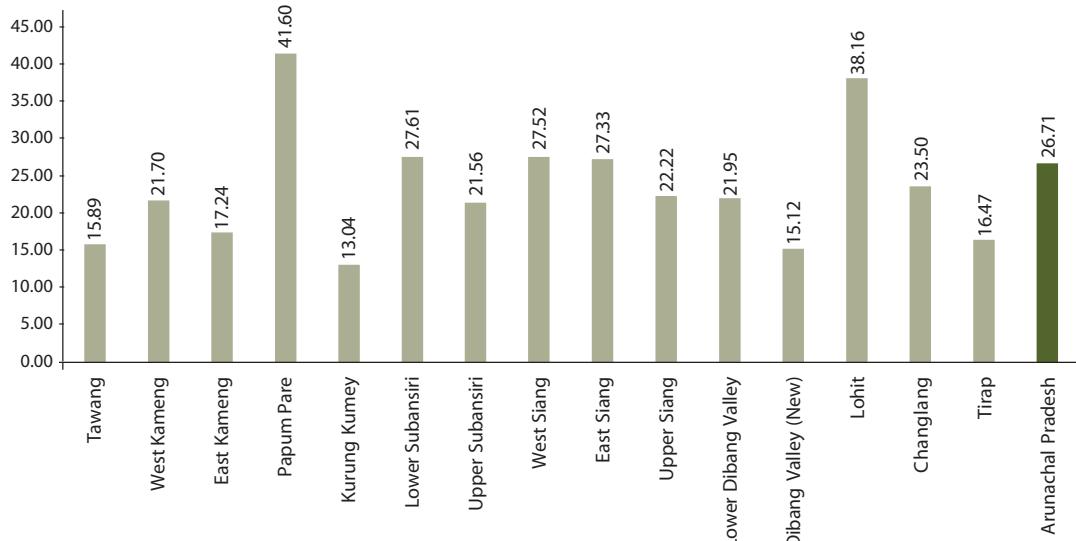
Fertility rate and contraception

In Arunachal, while the mortality rate has fallen, it is still high and the high mortality rate is associated with a high fertility rate, leading to a high natural growth rate of population. Both the fertility and mortality rates are much higher in Arunachal than in the country. In 2000-2001, Arunachal's estimated Crude Birth Rate⁶ (CBR) of 34.62 was considerably higher than the national CBR of 25.8 and its Crude Death Rate (CDR) of 11.57 was higher than the national CDR of 8.5. The range of variation among the 13 'old' districts was also significant.

In Arunachal, fertility remains high in the remote areas while in the urban and semi-urban areas, fertility is declining rapidly. The variable most closely associated with the

Figure 6: Total Fertility Rate (TFR) in Arunachal and its districts (2000-2001)

⁶ The CBR and CDR were estimated using the SHDR Survey data.

Figure 7: Contraceptive use in Arunachal and its districts (2000-2001)

A holistic approach that leads to a reduction in the incidence of disease, combined with health consciousness and awareness generation, improvement in the nutritional levels of disadvantaged groups, and better access to healthcare is called for.

fertility rate is the literacy rate. Other significant variables correlated with fertility are: the use of contraceptives and the IMR. Regarding contraceptives, the prevalence rate



in 2000-2001 was only 26.71 per cent in Arunachal, and here too there was considerable inter-district variation. The districts with a low rate of contraceptive prevalence had low literacy rates and low levels of development. Contraceptive use was the least in districts without urban centres (for example Kurung Kumey and Dibang Valley (New)). Another contributing factor to low contraception use is that many of the smaller tribes are not in favour of family planning, given the small number of people in some of the tribes/sub-tribes.

The way forward

A holistic approach that leads to a reduction in the incidence of disease, combined with

health consciousness and awareness generation, improvement in the nutritional levels of disadvantaged groups, and better access to healthcare is called for.

Some of the actionable areas where interventions are required are:

- More focus should be given on districts with low Life Expectancy at Birth and high Infant Mortality Rates.
- The Government, along with village communities, should intervene in the



areas of public sanitation and the provision of safe drinking water.

- The Government needs to tackle the issue of absenteeism and inefficiency in the delivery of public services. Many PHCs in the remote areas of the State are non-functional due to absenteeism of doctors, compounders and nurses. Another problem commonly referred to by the people in these areas is the distance to the nearest medical centre.
- The Government should ensure that the limited available resources are distributed equitably to the remote areas. Currently, the inequitable delivery systems are biased in favour of accessible urban areas.
- Improved public delivery of foodgrains in the remote rural areas should be undertaken to provide food security to people who require it. In the monsoon, many areas are completely cut off and access to Common Pool Resources (CPRs) such as roots and tubers ,which provide sustenance, becomes difficult.
- Awareness creation and health education should be a major part of the Government's healthcare programme.
- The disease-surveillance system should be strengthened to control diseases like jaundice, malaria, dysentery and diarrhoea.
- The private sector should be encouraged in the provisioning of health services, given the limited resources of the Government. Joint initiatives are being encouraged especially in the urban areas and scarce resources are being directed to the more inaccessible regions.
- Investigation facilities, machines and specialist services need to be built up simultaneously along with primary healthcare services, at least in some areas, so that patients are not forced to travel long distances (usually to neighbouring Assam and sometimes to Kolkata and even Delhi) for treatment.
- Mobile clinics and a chain of village health workers should be considered to expand coverage of health care.

Chapter 4

Income: command over resources

A steady growth of income is essential for development, and critical to the issues of nutrition, shelter, health and education, all key variables in human development. Arunachal is ranked in the mid-range in a ranking of the States of India, on the basis of their per capita income. Arunachal's rank is 18 out of 31 States and its income index is 0.493. With the country's index at 0.530, the people of Arunachal have a command over resources, which is slightly below the national average.

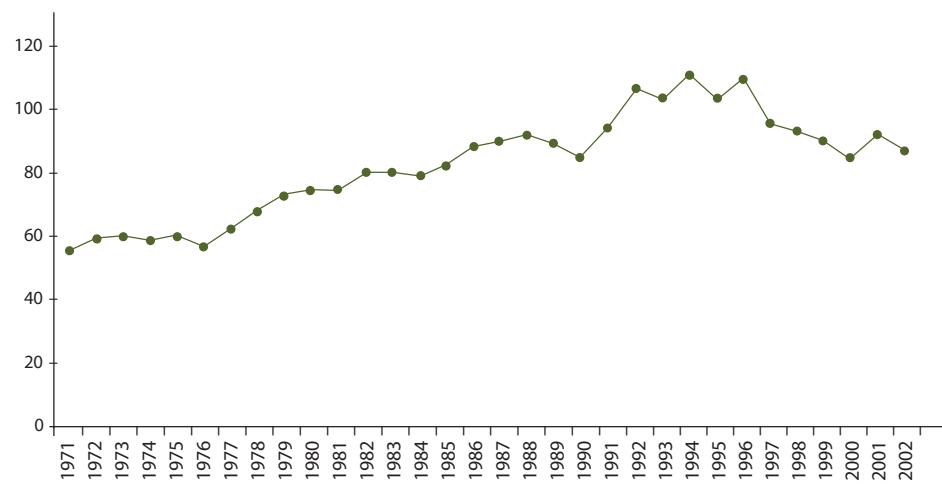
Per capita income and growth of income in Arunachal and in the rest of India

Economic data for Arunachal is not available until 1970 but since Arunachal was primarily an agricultural economy, its income level was probably low. In the 1970s, industrial activity started with the key role being played by the Government.

The economy of Arunachal grew rapidly during the 1970s and 1980s. The 1980s saw the setting up of a number of industries in the State, from sawmills to paper mills, but many of these soon started to incur losses. Therefore, in the 1990s, the economy of Arunachal lost some of its initial momentum and deindustrialisation caused a slowing down of the process of economic growth. Arunachal's per capita income as a percentage of the national per capita income was 56.14 per cent in 1971, and it surpassed the national average by the beginning of the 1990s. However, from 1995-96, the growth of income in Arunachal has slowed down relative to that of national income and in 1999-2000, the per capita income of Arunachal was 84.64 per cent of the national average. (See Figure 8).

Arunachal's rank is 18 out of 31 States and its income index is 0.493. With the country's index at 0.530, the people of Arunachal have a command over resources, which is slightly below the national average.

Figure 8: Arunachal's per capita income as a percentage of per capita national income



Note: The Y-axis measures Arunachal's per capita income as a percentage of per capita national income, and the X-axis represents the fiscal years; 1971 indicates 1970-71, 1972 indicates 1971-72, and so on.



Reasons for growth

The main cause of much of the initial growth in Arunachal in the 1970s and 1980s was the inflow of funds from the Central Government. As a strategically located special category State, Arunachal receives a steady flow of funds from the Centre. This provided the initial impulse to growth in the State. The overwhelming role of the Government in the economy is reflected in the high share of Government expenditure as a proportion of State income. Another factor for this growth is the high growth of labour (due largely to the in-migration of workers from other States of the country).

In recent years, the importance of the inflow of funds from the Centre has declined somewhat, yet, it still accounts for about 70 per cent of the State's revenue and more than 50 per cent of the State's net domestic product. As a proportion of the State income, the inflow from the Centre has been declining, but, as the absolute value of the inflow in real terms, it is not falling – in fact, it is increasing. However, the resulting Government expenditure does not appear to have transformed into high productive social overhead capital in Arunachal.

Sectoral composition of income in Arunachal

The sectoral composition of income in Arunachal over the period 1970-71 to 2001-

2002 shows a steep decline in the share of the primary sector and a big leap in the share of the services sector. In recent years, the services sector has come to occupy a dominant position in the State's net domestic product, a position that is higher than agriculture, the traditional occupation of the people. The Arunachal economy was historically based predominantly on *jhum* cultivation and has gradually undergone a huge structural transformation, reducing significantly the relative importance of traditional economic activities. Interestingly enough, an important aspect of change in the sectoral composition of the State Domestic Product is that in the last 32 years, the contribution from manufacturing activities (secondary sector) has never been more than 6 to 7 per cent of the State income.

Changes in the occupational structure

With the change in the structure of production, the occupational structure of the people has changed. Though the primary sector remains the largest employer even today, its relative importance has fallen substantially. To illustrate, according to the 1971 Census, 80.44 per cent of the workers were engaged in the primary sector, 19.12 per cent in the tertiary sector and only 0.44 per cent in the secondary sector. In 1991, 67.44 per cent were working in the primary sector, 23.9 per cent were working in the tertiary sector and 8.66 per cent in the

Table 4

Changes in sectoral composition of income in Arunachal

Sector	1970-71	1980-81	1990-91	2000-01
Primary	59.19	47.28	46.19	34.67
Secondary	20.33	22.21	21.56	23.65
Tertiary	20.48	30.51	32.25	41.68

Source: Extracted from Estimates of Domestic Product, Arunachal Pradesh, Directorate of Economics and Statistics, Itanagar, 2002.

secondary sector. The decline in the share of the primary sector came mainly from a fall in the share of employment in cultivation.

Sectoral contribution to the growth of income

An important characteristic of the Arunachal economy is the rapid growth of the services sector; which along with the manufacturing sector, did not exist prior to 1947. Agriculture also played an important role in the growth of the Arunachal economy. Forestry and logging is another important sector. There is significant decadal variation of the relative contributions to the growth of the Net State Domestic Product (NSDP) in Arunachal Pradesh, whereby different sectors have risen and then diminished in importance. To illustrate, in the 1970s, agriculture contributed 35.56 per cent to the State's economic growth, its contribution increased to 41.95 per cent in the 1980s, but fell steeply to a modest 19.89 per cent in the 1990-91 to 2001-02 period. The tertiary sector's contribution was 39.29 per cent in the 1970s and this increased to 64.30 per cent in the 1990-91 to 2001-02 period.

Structure of the District Domestic Product

The sectoral composition of the District Domestic Product (DDP) shows that in Arunachal, a State considered largely agricultural, some districts are not as dependent on agriculture as a source of income. Likewise, although forestry and logging is an important sector in the State, the importance of this sector varies substantially in the districts. The industrial sector is still largely undeveloped in Arunachal and in more than half of the districts, the manufacturing industries account for less than 2 per cent of the domestic product. In the secondary sector, the share of construction activity is larger than that of manufacturing. Finally, the tertiary sector has emerged as an important sector of the economy – in some

Table 5**Real per capita Net District Domestic Product: 1993-94 to 2000-2001**

Districts	N	Mean	Rank	Minimum	Maximum
Tawang	8	10,541	4	9,287	12,082
West Kameng	8	12,391	2	10,698	14,740
East Kameng	8	7,237	11	6,703	8,035
Papum Pare	8	9,334	6	7,848	10,582
Lower Subansiri	8	6,179	13	5,811	6,899
Upper Subansiri	8	7,268	10	6,075	8,438
West Siang	8	8,595	7	7,842	9,465
East Siang	8	10,719	3	8,223	12,203
Upper Siang	6	9,878	5	9,337	10,374
Dibang Valley	8	13,328	1	12,652	13,890
Lohit	8	8,450	8	7,655	9,275
Changlang	8	7,167	12	6,364	7,846
Tirap	8	7,602	9	7,166	8,256
Arunachal Pradesh 8	8,760			8,401	9,424
(Per capita NSDP)					

Note: N is the number of years; unit of Minimum, Maximum, and Mean is Rupee. Number of districts is 13, before June 2000. (The Minimum is the lowest and Maximum is the highest level of real per capita Net District Domestic Product during the period).

Source: Computed from Estimates of District Domestic Product, Arunachal Pradesh, 1993-94 to 2000-01, Directorate of Economics and Statistics, Government of Arunachal Pradesh, Itanagar.

districts tertiary activities account for a major share of the domestic product.

Per capita Net District Domestic Product (NDDP) in the districts

As evident from Table 5, substantial variation in income exists across different districts. The period of analysis of district income relates to only eight years (due to non-availability of data), a period that is too short to study the changes in the structure of the domestic product. Like the State economy and the national economy, the economies of different districts of Arunachal have also undergone some transformation, though the magnitude of transformation in the eight-year period is comparatively limited. What is unusual is the stagnation of the secondary sector along with the decline of the primary sector in most districts. The districts like the State seem to have moved from primary sector-dominated economies to economies where the tertiary sector has expanded rapidly, without passing



through a growth phase in the secondary sector (a rather uncommon phenomenon). Furthermore, the negative growth of forestry and logging and the limited growth in the agriculture sector have meant that the growth of the tertiary sector has led to the positive growth of the domestic product, in all the districts.

The way forward

The challenge is to ensure that the industrial development in this fragile hill State is sustainable, non-polluting and environmentally sound. It is important that the industries that are set up are those that are best-suited to the State, its resources and its people. Due to the uninspiring experience of the State, with Government-managed medium-scale industries, these should be largely in the private sector. However, the Government will need to play an active role both as a facilitator (to lead the State on this path) and as a regulator.

The following directional changes are recommended, so that Arunachal can maximise its income potential:

- Since agriculture continues to be a significant contributor to the State's income, increasing productivity in agriculture by using modern cultivation techniques, such as double cropping and increased irrigation, is a priority. The Government must facilitate a change from the largely subsistence mode of production to the market mode by providing finance, negotiating 'contract agreements' and buy-backs by corporate houses that require agricultural produce. In addition, the private sector should be persuaded to set up agricultural processing plants in Arunachal. Cold storage facilities, transportation and marketing assistance, are the other areas

that require attention for the development of this sector.

- After agriculture, the three most promising sectors where Arunachal has enormous potential are: horticulture-floriculture, plantation and tourism. The Government should provide insurance cover to the farmers, so that they can undertake ventures with high returns. Useful technological interventions, like biotechnology, are also desirable for certain cash crops like ginger.
- Local entrepreneurs should be encouraged to establish fruit and flower-processing industries.
- The tourism potential of Arunachal's beautiful valleys, verdant forests, spectacular rivers and fascinating people can provide employment and income to local people. However, tourism requires that complementary infrastructure be adequately developed.
- Financial support to local entrepreneurs to set up forest-based industries such as furniture, medicinal plants, extraction of citronella oil, etc., is needed.
- Bank finance is a major constraint, compounded by the prevailing institution of property rights whereby right to tribal land is inalienable. Banks need to devise special and flexible schemes that are suitable for the region, keeping in mind the specificities that prevail here. They need to adopt an innovative approach rather than insist on meeting conditions, which require changes in the customary community property rights.
- The development of the financial market requires strengthening (which also entails the strengthening of contract-enforcing mechanisms).

Chapter 5

Human development in Arunachal

The human development model enacts a radical shift from the basket of commodities and services approach to human beings and their choice sets, their freedoms and their action spaces in shaping their capabilities and well-being.

The Human Development Index (HDI), which incorporates three components – health, education and income — has been calculated to measure human development in Arunachal Pradesh. The HDI for Arunachal for the year 2001 (constructed for the 13 'old' districts) is estimated to be 0.515.

Of the three components, the value of the education index is 0.566, the health index has a value of 0.484 and the income index has a value of 0.495.

As can be seen from Table 6, there is considerable inter-district variation in the level of human development. East Siang has the highest HDI value of 0.660 whereas East Kameng has the lowest HDI value of 0.362. Few districts show consistent performance across indicators, these are East Siang, Upper Siang and perhaps West Kameng. Tawang, for

example, is ranked at number 12 and 11 in education and health, but is ranked at number 6 in terms of the HDI due to its relatively high income index. Tirap and East Kameng have low education, health and income indices and low HDI ranks.

While the overall value of Arunachal's HDI is 0.515, a comparative analysis across States is problematic because it does not take into consideration the contextual factors, nor does it capture the specific historical circumstances that shape the process of human development in the State. It is, therefore, important to consider the context of human development in Arunachal so that the process can be placed in its proper perspective.

Human development – the challenge ahead

Given the relatively low level of different indicators of human development in Arunachal Pradesh, finance is likely to be a crucial issue. The Government has been the catalyst for the development process in Arunachal and continues to be the prime mover even today. Public expenditure on

The overall value of Arunachal's HDI is 0.515, a comparative analysis across States is problematic because it does not take into consideration the contextual factors, nor does it capture the specific historical circumstances that shape the process of human development in the State.

Figure 9: HDI of Arunachal Pradesh and its districts (2001)

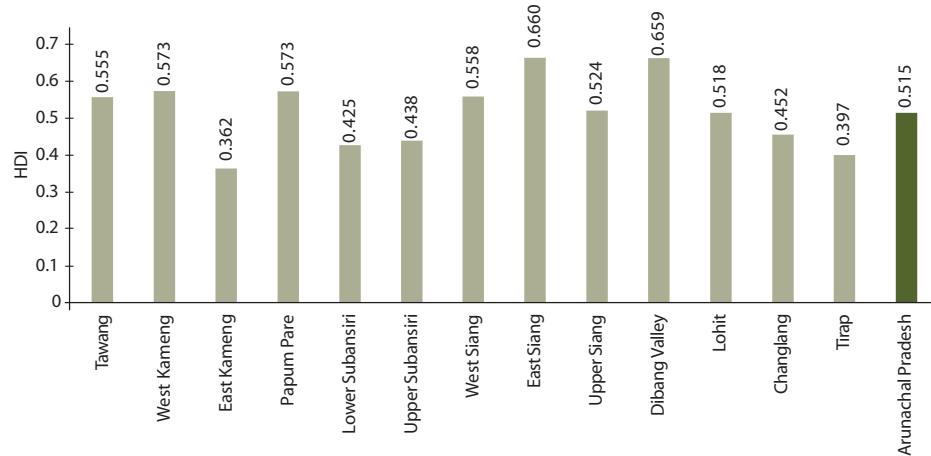


Table 6

Districts/State	Education Index	Education Index Rank	Health Index	Health Index Rank	Income Index	Income Index Rank	HDI Value	HDI Rank
Tawang	0.472	12	0.413	11	0.780	2	0.555	6
West Kameng	0.566	6	0.473	7	0.680	4	0.573	3
East Kameng	0.489	10	0.306	13	0.291	12	0.362	13
Papum Pare	0.729	1	0.613	1	0.376	9	0.573	3
Lower Subansiri	0.626	4	0.457	10	0.191	13	0.425	11
Upper Subansiri	0.552	7	0.356	12	0.408	8	0.438	10
West Siang	0.701	2	0.506	5	0.467	7	0.558	5
East Siang	0.666	3	0.585	2	0.729	3	0.660	1
Upper Siang	0.532	8	0.484	6	0.557	5	0.524	7
Dibang Valley	0.572	5	0.465	8	0.942	1	0.659	2
Lohit	0.503	9	0.522	3	0.530	6	0.518	8
Changlang	0.473	11	0.512	4	0.371	10	0.452	9
Tirap	0.428	13	0.461	9	0.301	11	0.397	12
Arunachal Pradesh	0.566	0.484			0.495		0.515	

In Arunachal, as high as 78.6 per cent of the population is reported to have access to 'safe drinking water', however the quality of water is suspect because water supplied through pipes in rural areas is not usually treated.

social priority sectors such as health, education, water and nutrition is high in Arunachal. The high expenditures in education, health and water are reflected in the dramatic improvements in the literacy rate and the school participation rates in the last three decades. However, a high growth of the State income is the only way that the Government's expenditure in these areas can continue.

Caveats

Some contextual factors in Arunachal restrict the use of the standard methodology used in the estimation of a number of variables such as income, consumption and poverty. These are:

- Although the problem of estimating income and consumption is ubiquitous, the magnitude of this problem is relatively high in an economy where production is meant mainly for home consumption and the level of monetisation is low. In rural Arunachal, the *jhum* cultivators (who outnumber sedentary cultivators) depend on CPRs for their sustenance and it is difficult to calculate the imputed values, in these cases.

- The measurement of literacy is another problem in Arunachal Pradesh, since many school dropouts claim to be literate by virtue of having attended school for a brief period, despite actually being functionally illiterate. This results in the literacy rate being overreported.
- In Arunachal, as high as 78.6 per cent of the population is reported to have access to 'safe drinking water', however the quality of water is suspect because water supplied through pipes in rural areas is not usually treated. Piped water is considered safe, but this may not be the case. This tends to underestimate the measure of human poverty.
- The behaviour of certain variables in Arunachal is difficult to explain. For example, the decline in the sex ratio during the 1961-91 period may be explained in terms of the gender gaps in education and income, which may lead to a decline in the sex ratio. Nevertheless, these factors cannot explain the low Child Sex Ratio (CSR), in the tribal population. The only explanation can be discrimination against the girl child, but there are no reports of such practices.

Chapter 6

Women: less than equal

The understanding of the degree and nature of disparities that exist between the genders, as well as the conditions in which such disparities are created and sustained, helps to correct underlying inequalities and create a more free and emancipated society.

Gender-related Development Index (GDI)

The GDI for Arunachal, which is based on the same three indicators as the HDI, is estimated to be 0.529. The GDI ranking of the districts follows a similar ranking pattern as the HDI, suggesting that districts that have relatively better HDI indicators are also doing better in GDI, and the districts with relatively lower HDI values have higher gender inequality. (See Table 7) West Kameng alone has a substantially lower GDI rank than its HDI rank.

Well-being and survival: Life Expectancy at Birth, sex ratio and nutritional status

LEB for women in Arunachal is estimated to be 54.51 years, which is marginally higher than the LEB for men at 53.66 years.

The sex ratio in Arunachal declined from 862 women per 1,000 men in 1981 to 859 women per 1,000 men in 1991. More recently, however, it has increased to 893 per 1,000 men, in 2001. Among the districts, West Kameng has the lowest and East Kameng and Lower Subansiri have the highest sex ratios. The overall sex ratio in Arunachal however, is skewed due to in-migration. The sex ratio among the Scheduled Tribe population, shows a steady decline during the 1961- 1991 period (from 1,013 to 998, per 1,000 males),

Table 7

HDI and GDI ranks for districts of Arunachal Pradesh, 2001

Districts	GDI		HDI	
	Value	Rank	HDI Value	Rank
Tawang	0.538	6	0.555	6
West Kameng	0.424	12	0.573	3
East Kameng	0.400	13	0.362	13
Papum Pare	0.611	3	0.573	3
Lower Subansiri	0.483	9	0.425	11
Upper Subansiri	0.471	10	0.438	10
West Siang	0.585	4	0.558	5
East Siang	0.654	1	0.660	1
Upper Siang	0.539	5	0.524	7
Dibang Valley	0.627	2	0.659	2
Lohit	0.538	6	0.518	8
Changlang	0.490	8	0.452	9
Tirap	0.432	11	0.397	12
Arunachal Pradesh	0.529		0.515	

although it registered an increase in the 2001 Census and is now 1,003 (per 1,000 males).

According to the India Nutrition Profile Survey conducted in 1998, the percentage of severely undernourished children was found to be marginally higher among girls than among boys, but the percentage of moderately malnourished children was higher in the case of boys. Thus, so far as the overall nutritional status is concerned, no serious discrimination was found.

Gender gaps in education – women's literacy and educational attainment levels

There has been a significant growth of educational opportunities in Arunachal during

the post-Independence period, particularly since the 1980s, but crucial gender gaps in different dimensions of educational attainment continue to persist. Although the literacy rate for women in Arunachal in 2001 was 43.5 per cent, the State has made significant strides in women's literacy, which has increased from 14.02 per cent in 1981 to 43.5 per cent in 2001. The gender gap in literacy has been narrowing in the urban areas but it has remained at around 20 percentage points in the rural areas. Given the inaccessibility and inadequacy in the provisioning of social infrastructure, there is a huge gap in the opportunities available to women in urban areas as compared to women in rural areas. Furthermore, the data demonstrates that there exists a patterned concentration of districts having high gender gaps in literacy rates – which implies the importance of a shared social attitude in determining gender difference in access to education.

Among literate females, a substantial proportion has studied only up to the primary level. In 1991, of the total female literates in Arunachal, 36.4 per cent had studied up to the below primary level, while in the rural areas, 40.9 per cent of the literate females had studied up to that level. In some districts

like East Kameng, 48 per cent of female literates had not studied beyond the primary level. In 1998-99, the median years of schooling among males in Arunachal were 4.4 years, while that for females was only 2.1 years.

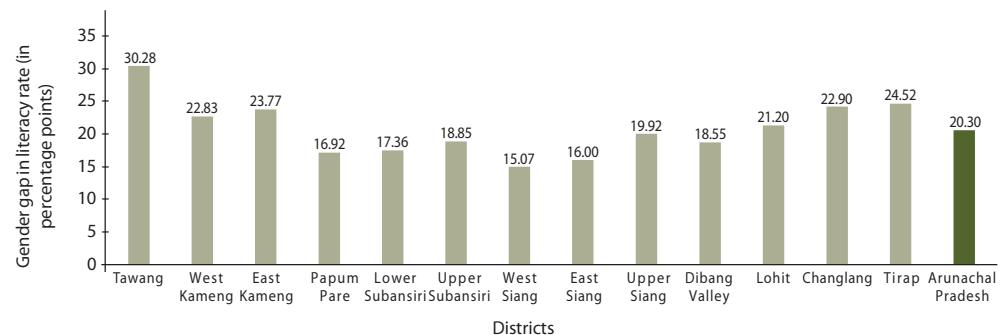
The girl child: more hurdles than opportunities?

The gender bias in educational attainment results from the discriminatory attitude towards the girl child and her education. Among the boys who have never attended school, the school being too far away was the most important reason, followed by 'not having an interest in studies'. Among the girls, the most important reasons were requirements for household work (30.8 per cent), the school being too far away (16.1 per cent) and the high cost of education (10.5 per cent).

Women and work

There is a limited degree of diversification of occupations among female workers and they typically secure jobs in the low-skilled, low-earning end of the spectrum. In Arunachal, a substantial proportion of women are engaged in agriculture. In 2001, 76.6 per cent of

Figure 10: Gender gap in literacy rate, Arunachal (2001)



female workers were working as cultivators and 4.49 per cent worked as agricultural labourers. The economic contribution of women remains systematically under-reported in the official data systems, since the overwhelming majority of female workers in the State work in the unorganised sector. Even when women are employed in non-agricultural occupations, particularly in Government services, a higher proportion of women workers are found in the lowest ranks of the job hierarchy.

In 2001, the Female Work Participation Rate⁷ (FWPR) of the State was 36.45 per cent as compared to the national average of 25.68 per cent. The Male Work Participation Rate (MWPR) of the State was 50.69 per cent in 2001. However, the gap between male and female work participation rates in the State was lower than that at the national level. This is largely due to the relatively high percentage of Scheduled Tribe (ST) population and low level of development in the State. In general, the gender gap in work participation is considerably lower in the rural areas than in the urban areas.

Women in decision-making

Generalisations about gender differences in intra-family decision-making processes cannot be made for the State, given the degree of inter-community heterogeneity. However, the inheritance laws of most communities in Arunachal do not allow women to inherit land or property. Women have no right to movable or immovable property, except to a share of their mothers' ornaments. It is interesting that educated women, and those with a high standard of living, have less freedom of mobility, although they have a comparatively higher access to money than the illiterate and sometimes poorer women.

Gender and governance

In terms of representation in the formal structures of political power, women in Arunachal remain completely marginalised. The share of women members in the State

Table 8

Work Participation Rates in Arunachal Pradesh, 1971-2001

		1971	1981	1991	2001	(Percentage figures)
All Population	Male	63.14	58.63	53.76	50.69	
	Female	51.28	45.67	37.49	36.45	
	Total	57.65	52.63	46.24	43.97	
Rural	Male	62.78	58.50	53.69	51.13	
	Female	52.27	47.64	40.86	41.33	
	Total	57.88	53.42	47.69	46.47	
Urban	Male	70.32	60.24	54.18	48.99	
	Female	10.58	11.62	11.95	16.69	
	Total	51.57	41.47	36.39	34.19	

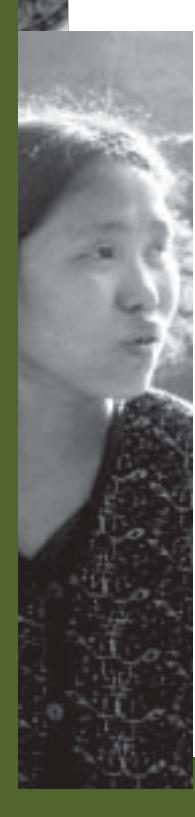
Note: (i) Work Participation Rates = {Total Workers (Main + Marginal) / Total Population} × 100.
(ii) Figures for 2001 are based on provisional population totals.

Source: Census of India, 2001, Series-13, Arunachal Pradesh, Provisional Population Totals, Paper-3 of 2001.

Legislative has never exceeded 5 per cent and in the last 25 years, there has only been one woman MP from the State. The traditional village chief and the village councils, dominated by men, continue to remain the key political institutions at the grass roots level. Women are rarely allowed to take part in these traditional institutions and the women of all tribes have little say in community affairs.

The relatively large share of the unorganised sector and women's high participation in this sector, the discrepancy between women's earnings and their control over income, and

⁷Defined as the proportion of total workers to total population involved in various economically productive activities.



the terms of political discourse make these variables inadequate for judging the real empowerment of women in India (HDR-Karnataka, 1999). The Gender Empowerment Measure (GEM) indicator has not been estimated for the State for these reasons.

Crime against women

Although the degree and nature of violence directed against women varies across regions, classes and cultures, often women feel more insecure in the most developed and well-connected regions, particularly in the cities. The question of violence against women in Arunachal is extremely complex because the police and legal infrastructure is less developed in the State than in the rest of the country. Traditional community laws and institutions continue to play a vital role in conflict resolution and administration of justice.

The challenge before the Government and the civil society in Arunachal is two-fold: on the one hand, steps have to be taken to prevent crime against women and on the other, there is an urgent need for awareness and gender sensitisation campaigns, both within the law-enforcing agencies and among the general public, so as to ensure better reporting of crimes against women.

The way forward

There is a clear need to mainstream gender concerns in the overall policy-making and implementation of various Government-sponsored programmes, as enormous challenges lie before Arunachal in achieving gender equality in access to health, education and earnings. The success of programmes will remain limited unless there is a transformation of the overall framework of governance and decision-making to make it more inclusive and participatory.

The following policy changes are recommended for Arunachal if it is to achieve this objective:

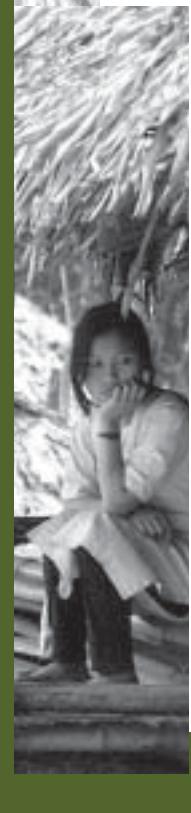
- Implement a gender-budgeting initiative (which has already been adopted by the Government of India) and include the following measures:
 - A mechanism to collate gender disaggregated data from relevant departments should be developed to obtain the gender-wise relevant statistical database, targets and indicators.
 - A gender audit of plans, policies and programmes of various Ministries with pro-women allocations should be conducted.
 - Provisions for women in composite programmes under education, health and rural development sectors, should be segregated to protect the provisions, by placing restrictions on their use for other purposes.
- Enhance women's capacities (especially access to education and health).
- Expand opportunities for women to earn income and participate in decision-making forums.
- Ensure legal justice for women.
- Realise the goal of universal high quality primary education for women, by implementing area-specific targeted programmes.
- Provide women with easily accessible and cost-effective facilities for higher education and distance education.

- Take steps to reduce infant and maternal mortality rates through a phased, time-bound programme.
- Improve the quantity and quality of access to health services in rural areas.
- Expand employment opportunities for women, particularly in the public sector.
- Enforce the legally prescribed minimum and equal wages for women and men both in the formal and informal sectors.
- Encourage women entrepreneurs, particularly in micro-enterprises, through effective credit support, skill enhancement and other measures.
- Prepare and maintain a gender-disaggregated and accurate database for effective policy formulation.
- Representation and participation of women in the legislative, judiciary and executive bodies should be made mandatory.
- Legally bind political parties to reserve a minimum quota for women in party decision-making bodies and in the distribution of party tickets for elections.
- Provide gender-sensitisation training for male members of the legislature, civil servants, and other members of the Government to achieve gender equality in governance.
- Strengthen the State Commission for Women, so that it can better address the problems faced by women in Arunachal.

These measures call for a more gender-centric paradigm of development, and the courage to promote a more equitable society.

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Chapter 7

Deprivation and inequality

Prior to the launch of the new development programme in the post-Independence period, the degree of inequality in the distribution of resources in Arunachal was limited. However, shaped by the new property rights regime characterising the development programme, in recent years, the inequalities have risen to unprecedented proportions in communities, which not so long ago, were quite egalitarian and had strong social protective mechanisms in place. The community spirit also meant that the individual incentive for savings and accumulation of capital was low, which resulted in a very low rate of capital accumulation. However, although the community was poor, the individual did not feel poor in the absence of high inequalities in resource distribution.

The property rights regime that evolved with the growth of the non-agricultural sectors has become instrumental in driving the profit motive, and in generating incentives for savings, investment and accumulation of capital. This has weakened the traditional institutions, and new institutions have not emerged as viable alternatives to the old and tested institutions. Measured by the Gini-Coefficients, inequality is found to be higher in assets and land, and lower in income and consumption. The relatively lower inequality in income and more particularly, in consumption, is due to the high proportion of consumable items including food and fuel wood, which the poor collect from the forests and other Common Pool Resources. Thus, the traditional redistributive mechanisms have not yet vanished completely in the rural areas.

Inequality in land holdings

There is considerable inequity in the operation of land holdings, and small and marginal holders operate only a small proportion of the land⁸. According to a study conducted in 1995-96, 19.24 per cent of the people were marginal landholders and operated only 3.03 per cent of the land. Similarly, 7.64 per cent of the land was under the operation of small farmers who constituted 19.33 per cent of the farming households. Thus, only about 10 per cent of the land is operated by close to 40 per cent of the farming households. In contrast, large land operators, who constituted 5.75 per cent of the total number of farmers, had as high as 23.65 per cent of the land under their operation.

The high inequality in landholding is indicative of the fact that some farms are operated on a large scale, especially in the areas where permanent cultivation has been introduced, but in the other areas where the topography is hilly the scale of farm operations is relatively small.

Inequality in asset holdings

Asset distribution among the households also displays a high degree of inequality. According to SHDR Survey data, 10 per cent of the households at the bottom possessed less than 2 per cent of the total assets; while the top 10 per cent households had more than 40 per cent of the share. The bottom 20 per cent of households owned less than 5 per cent of the assets, while the top 20 per cent of

⁸ Since the main occupation of the majority of the people is agriculture, ownership of land is an important indicator of the access to productive assets. In the absence of data on land ownership, data on operational land holdings is used for this analysis.

households owned more than 47 per cent of the assets. The average asset holding of the bottom 10 per cent of households was only Rs.3,240, while that of the top 10 per cent of households was Rs.141,280. These figures show the high inequality in the distribution of wealth. District-level data reveals a high degree of inequality across the districts. For example, in East Siang, the difference between the average value of assets of the top 10 per cent and the bottom 10 per cent of households was even higher (Rs. 206,460).

Inequality in income⁹

There is considerable inequality in income distribution, both at the inter-person as well

as at the inter-district levels. According to the SHDR Survey data, the bottom 10 per cent of the households had less than 3 per cent of the share, while the top 10 per cent of households accounted for more than 30 per cent of the per capita household income. Similarly, the top 20 per cent of people had a share of more than 45 per cent, while the bottom 20 per cent had less than 6 per cent of the income. The difference between the average income of the top 10 per cent and the bottom 10 per cent of households was Rs.28,730 and the district with the highest reported income inequality is East Siang, with a Gini Coefficient value of 47.98. The recent rise of non-agricultural income in this district is one possible explanation for the high inequality.

Table 9

District-wise values of Gini-Coefficients (in %)				
Districts	Consumption	Income	Land	Asset
Tawang	12.61	8.21	15.03	38.18
West Kameng	22.14	29.79	32.83	60.87
East Kameng	12.26	29.69	44.02	40.50
Papum Pare	19.80	41.32	40.98	63.72
Kurung Kumey	11.34	31.43	35.64*	30.27
Lower Subansiri	17.90	35.58	35.64*	52.43
Upper Subansiri	21.66	44.67	49.48	53.24
West Siang	18.04	37.40	44.08	29.78
East Siang	20.58	47.98	28.50	62.48
Upper Siang	19.15	35.54	33.30	53.90
Lower Dibang Valley	20.28	41.75	56.33 [@]	40.98
Dibang Valley (New)	11.26	38.53	56.33 [@]	34.51
Lohit	21.67	42.25	46.17	64.27
Changlang	19.65	32.37	32.09	32.29
Tirap	19.78	38.61	36.64	35.57
Arunachal Pradesh	20.41	40.27	46.55	48.18

*Gini-coefficient is a widely used measure of inequality in income or any other quantitative variable.
Note: * Relates to Lower Subansiri district (1995-96). @ Relates to Dibang Valley (1995-96).*

Source: Income, Consumption and Asset data are from SHDR Survey, and Land data is from Agricultural Census, 1995-96, Arunachal Pradesh.

The property rights regime that evolved with the growth of the non-agricultural sectors has become instrumental in driving the profit motive, and in generating incentives for savings, investment and accumulation of capital. This has weakened the traditional institutions, and new institutions have not emerged as viable alternatives to the old and tested institutions.

⁹ Household income has been estimated by the production method where the imputed value of products collected from Common Pool Resources (for example, fuel wood, fruits, roots and vegetables, fish, animals, etc.) has been added.

In Arunachal, very little research has been done on poverty and the limited information that is available makes it difficult to estimate the extent and intensity of poverty. Some attempts have been made to quantify and assess poverty, but these estimates have various shortcomings.



the extent and intensity of poverty. Some attempts have been made to quantify and assess poverty, but these estimates have various shortcomings.

The Planning Commission estimated that 39.35 per cent of the people of Arunachal were below the poverty line in 1993-94, which decreased to 33.47 per cent in 1999-2000. R. Radhakrishna and others estimated the rural poverty ratio in Arunachal to be

¹⁰ Includes food, housing, clothing, house gas, electricity, fuel, etc., all relating to food expenditure and non-food consumption like tobacco, drinks and education.

Inequality in Consumption¹⁰

Consumption expenditure reveals a moderate degree of inequality. Consumption inequality varies across the districts. According to SHDR Survey data, the Gini Coefficients ranged from 11.26 per cent in Dibang Valley (New) to 22.14 per cent in West Kameng. The difference between the average per capita consumption of the top 10 per cent of households and the bottom 10 per cent of households was the highest in West Kameng (Rs. 9,824) followed by Lower Dibang Valley (Rs. 9,182). In East Siang, too, this difference was very high (Rs. 9,166). However, consumption inequality is less than asset and land inequality in the State.

Poverty

In Arunachal, very little research has been done on poverty and the limited information that is available makes it difficult to estimate

41.4 per cent in 1993-94, declining to 23.4 per cent in 1999-2000. According to this study, urban poverty in Arunachal declined from 5.8 per cent in 1993-94 to 5 per cent in 1999-2000. Since this estimate is based on State-specific samples, it is more acceptable than that of the Planning Commission.

District-level poverty estimation on the basis of National Sample Survey (NSS) data is problematic because of the small size of the sample. To estimate district-wise poverty ratios, the SHDR Survey data of 5,257 households was used, but once again the Assam poverty line was used, in the absence of any other alternative. According to the SHDR estimates, 23.7 per cent of the people of Arunachal were living in poverty in 2000-2001. Rural poverty (26.7 per cent) in the State was higher than urban poverty (12.3 per cent). While the rural poverty of Arunachal was comparable to that in the country as a whole (27.09 per cent), urban poverty in Arunachal at 12.3 per cent is considerably lower than the all-India figure of 23.62 per cent. Poverty varies over the districts, ranging from 30.3 per cent in Changlang to 17.3 per cent in East Siang. Using district-level data, a high negative



correlation is found between poverty and household consumption and between poverty and the per capita household assets.

Human Poverty Index (HPI) of Arunachal

A mono-dimensional measure based on income/consumption fails to capture the hardship and the lack of opportunity for the people of Arunachal. The problems caused by its sparse settlements, hilly topography and inaccessibility will not be recognised by an indicator based solely on consumption and income.

Table 10

Districts/State	Illiteracy Rate (2001)%	Probability at Birth not Surviving to Age 40	Underweight Children Under Age 5	% Population not Using Improved Water Sources	Unweighted Average of Underweight Children and % of Population not Using Improved Water Sources	HPI	HPI Rank
Tawang	52.68	34.890	51.610	25.58	38.595	43.453	10
West Kameng	39.24	28.850	58.910	18	38.455	36.115	4
East Kameng	59.36	43.010	69.770	12.71	41.240	49.270	13
Papum Pare	30.68	22.640	63.730	17.97	40.850	33.085	2
Lower Subansiri	55.21	31.020	62.580	24.93	43.755	45.465	11
Upper Subansiri	49.65	34.350	57.240	21.23	39.235	42.068	8
West Siang	40.53	27.120	54.550	13.14	33.845	34.694	3
East Siang	39.27	21.640	47.060	6.58	26.820	31.069	1
Upper Siang	50.22	33.240	60.710	20.22	40.465	42.460	9
Dibang Valley	41.11	33.690	62.500	18.22	40.360	38.668	6
Lohit	43.93	22.570	57.300	27.06	42.180	38.508	5
Changlang	48.68	24.140	52.630	36.58	44.605	41.739	7
Tirap	58.27	31.640	61.290	28.72	45.005	47.457	12
Arunachal Pradesh	45.66	28.070	58.820	22.46	40.610	39.475	

The HPI¹¹ thus measures the deprivations in health, education and economic provisioning. The HPI for Arunachal is estimated to be 39.47 per cent; a value that is high by any standard and much higher than the national HPI of 33.1 per cent. However, the percentage of people under the poverty line (income poverty alone) in Arunachal is less than the ratio for the country as a whole.

A high HPI and a medium HDI of the State implies that the benefit of human development has not spread sufficiently to impact human poverty. Specifically, it implies that an increase in income has failed to improve the quality of life of the people of Arunachal.

Many districts in Arunachal have high levels of human poverty. The HPI in the districts ranges from 49.27 per cent in East Kameng to 31.06 per cent in East Siang. However, as Table 10 shows, there is no one-to-one relationship between the different dimensions of HPI. For example, Papum Pare is the least deprived in terms of illiteracy, while in percentage of population not using safe drinking water sources, it is in the fourth place and, as for the underweight children under age 5, its rank is at number 12.

Inaccessibility and human poverty

Correlation analysis shows a close association of the different measures of deprivation with

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¹¹ The HPI has been estimated for the 13 'old' districts but the analysis does refer to the 15 districts.

inaccessibility – the people in accessible areas are found to suffer most from the different types of deprivation.

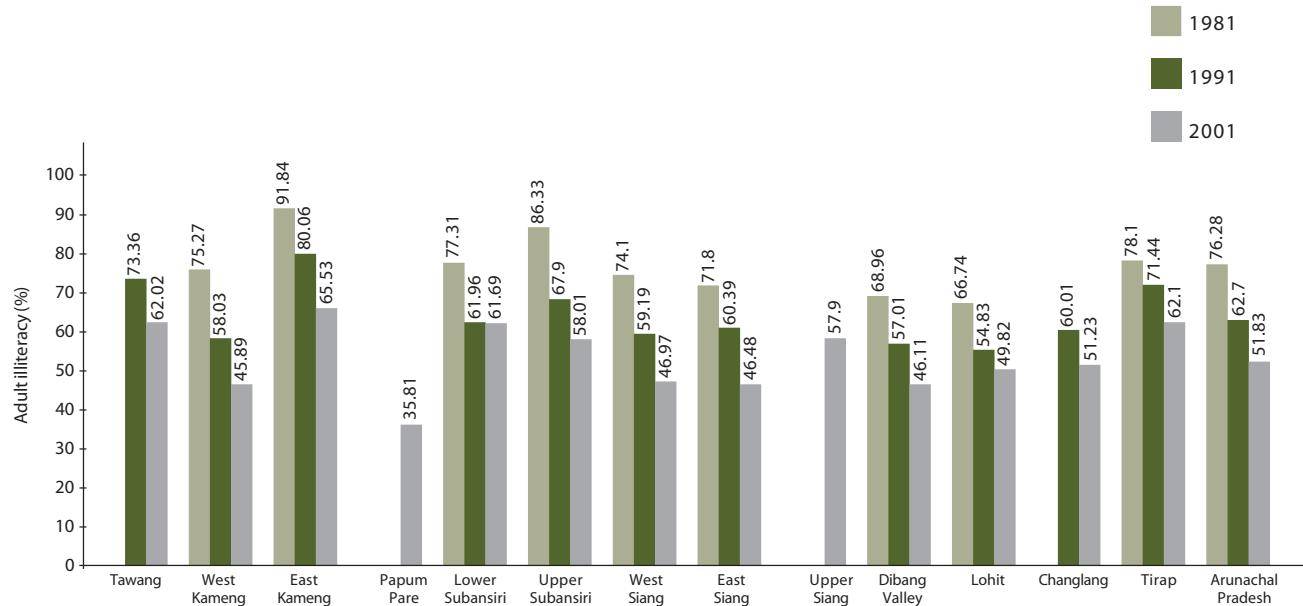
According to the Arunachal Pradesh Public Works Department (1997), 61.47 per cent of the villages in the State had no connectivity. These villages did not have any constructed roads within a radius of one km in the case of hilly terrain and in a radius of 5 km in the plains. In the State, as a whole, 26.56 per cent of the people lived in inaccessible areas. Since both unconnected villages and the percentage of people with no road connectivity show a positive association with HPI, many of the inaccessible districts are districts with high HPI.

Deprivation in health

In Arunachal, the hilly and steep terrain, inaccessibility and scattered habitations result in poor access to medical facilities and consequently to poor health. In the State, 28 per cent of the people are expected not to

survive beyond the age of 40, compared to 16.7 per cent at the national level. Not surprisingly, districts located in high-altitude areas and those less accessible have more premature deaths. In Kurung Kumey, East Kameng and Dibang Valley (New), more than 40 per cent of the population is not expected to survive beyond the age of 40. In contrast, the well-connected districts with more plain areas have substantially higher life expectancies. For example, in Papum Pare, a district with good connectivity and access to healthcare facilities, approximately 23 per cent of people are not expected to live beyond 40 years of age. Surprisingly, in the cases of premature deaths variables such as medical facilities or the distance of the village from the health centres, doctor-population ratio and hospital beds per 1,000 people, did not have any significant bearing on premature deaths. This suggests that the creation of medical facilities alone is not sufficient: awareness, willingness and road connectivity are the more important variables in improving the health status of the population.

Figure 11: Adult illiteracy-1981, 1991, 2001



Deprivation in knowledge and skill

In spite of the substantial progress that Arunachal has made in literacy, adult literacy is still high. More than half of the adults in the State are still illiterate. Starting from an adult illiteracy rate of 88.7 per cent in 1971, Arunachal has succeeded in reducing the rate to 76.28 per cent in 1981 and to 51.83 per cent in 2001.

This substantial achievement is mainly due to the expansion of educational facilities since the 1970s.

Illiteracy rate (7+ population)

Arunachal has the highest illiteracy in the country, except for Jharkhand and Bihar. Illiteracy is highest in East Kameng (59.36 per cent). This is largely due to poor connectivity and limited schooling facilities in the district. Tawang, East Kameng, Lower Subansiri, Upper Siang and Changlang also have high illiteracy. Only in Papum Pare is the illiteracy rate close to the national average, here it is just over 30 per cent.

Never-enrolled children and out-of-school children

Never enrolled children and dropouts constitute out-of-school children. Except for Nagaland (in some years) all the States of

Standard of living

To fully measure the overall economic provisioning for a decent standard of living, private income alone is not an adequate indicator, because it does not include crucial public services such as health care and education. To measure the deprivation in standard of living in Arunachal, the percentage of underweight children (0-4), the percentage of people without a safe source of drinking water and household amenities are analysed. Housing was not considered separately because of special cultural factors, specific to Arunachal¹².

Underweight Children

According to estimates made by the SHDR Survey team, as high 59 per cent of children under five years of age, in Arunachal, were underweight but interestingly the percentage of underweight children is considerably lower, when the children are less than one year of age (46.97 per cent). It increases sharply to 66.33 per cent for children in the 1-2 year age group. After that it declines to 60.09 percent for the 2-4 age group. Contrary to

Arunachal has the highest illiteracy in the country, except for Jharkhand and Bihar. Illiteracy is highest in East Kameng (59.36 per cent). This is largely due to poor connectivity and limited schooling facilities in the district. Tawang, East Kameng, Lower Subansiri, Upper Siang and Changlang also have high illiteracy.



North-East India have higher school dropout rates than the rest of the country. The situation in Arunachal is most disturbing. While there has been some improvement in the last decade or so, the Sarva Shiksha Abhiyan Annual Plan says that 32.67 per cent of habitations do not have school facilities.

what one might expect, intensive field investigations indicate that the low level of income is not the singular cause for children being underweight. Instead, other factors such

¹² In Arunachal, the standard definition of housing and household amenities is inappropriate because much of the rural population continues to live in traditional houses. These are built in different styles, using locally available materials and reflect the unique culture of the people.

as illiteracy, healthcare practices and food habits are important determinants in the percentage of underweight children.

Lack of safe sources of drinking water

The proportion of people that did not have access to safe drinking water in Arunachal was as high as 56.11 per cent in 1981 but this declined sharply to 29.98 per cent in 1991 and fell further to 22.4 per cent in 2001.

The proportion of people that did not have access to safe drinking water in Arunachal was as high as 56.11 per cent in 1981 but this declined sharply to 29.98 per cent in 1991 and fell further to 22.4 per cent in 2001. The State's position vis-à-vis the country with regard to the provision of drinking water was better both in 1981 and 1991, but in 2001 the State slipped marginally below the national average. However, the distance of the source of water from the household must also be taken into consideration. In 2000-2001, more than 7 per cent of the people said the source of safe drinking water was far away from their homes. This percentage should thus be added to the 22.46 per cent, who did not have a safe source of water

households (59.15 per cent) did not have electricity in 1991. There was considerable rural-urban disparity in the provision of these amenities. While the use of toilets was relatively high in Arunachal compared to the other States of India, in East Kameng as high as 77 per cent of the households did not have toilet facilities. As for electricity, districts like East Kameng, Upper Subansiri and Lohit suffer from acute deprivation. More than 85 per cent of the households of East Kameng did not have electricity in 1991 and in Upper Subansiri also this percentage was high (75.48 per cent).

The way forward

Interestingly, the broad social goals embodied in the traditional values of different communities of Arunachal and the prescriptive aspects of the human development approach have many commonalities.

The following policy initiatives are suggested:

- Allocations need to be enhanced, so as to expand health and schooling facilities, which will largely benefit the poor.
- In order that the community reclaims the public space, various redistributive mechanisms which are in-built into the traditional socio-economic system can be revived by increasing community participation in the formulation, implementation and monitoring of Government programmes.
- In reducing human poverty, better monitoring of existing Government programmes must be undertaken, since the delivery is inadequate. Secondly, a State-specific design of programmes that factor in the special needs and objectives of the State, is required. These



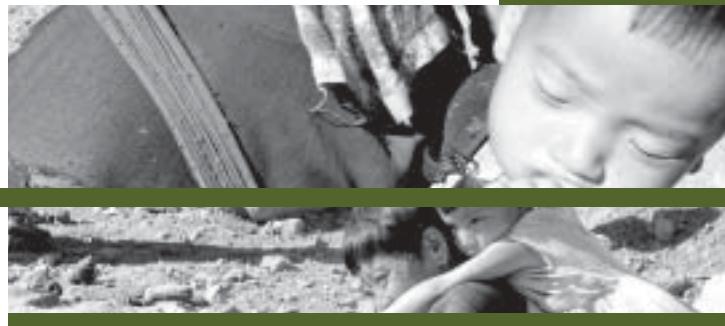
supply, because they are unlikely to be using the distant source. This means that nearly a third of the population does not have access to safe drinking water. Among the districts, Changlang had the highest percentage of people without access to a safe source of drinking water (36.58 per cent).

Household amenities

In Arunachal, more than half of the households (52.58 per cent) did not have sanitary toilets and three out of five

interventions need to be designed appropriately and sensitively and applied in a target-specific manner to be effective.

- In order to reduce educational deprivation, emphasis should be given to the establishment and monitoring of village *Aanganwadis* and *Sarva Shiksha Kendras*, so that children belonging to the interior and inaccessible villages can start going to school at the right age.
- A special effort is required to reduce adult illiteracy. The curriculum of this programme should be designed in such a way as to cater to the day-to-day requirements of the people. An awareness of health and childcare programmes and related precautions can form the backbone of this initiative.
- Sanitation and hygiene measures, childcare practices, how to give supplementary food to young children, and knowledge of locally available nutritious food, can all be imparted through an integrated programme, which has the potential to have a far-reaching impact.
- Steps should be taken to increase access and connectivity of remote villages and settlements.
- A district-wise analysis of priority areas is required, so that each district can focus on the area where its relative deprivation is the highest and move forward from there.



Sanitation and hygiene measures, childcare practices, how to give supplementary food to young children, and knowledge of locally available nutritious food, can all be imparted through an integrated programme, which has the potential to have a far-reaching impact.

Chapter 8

Infrastructure: key to development

The State does not have lateral roads connecting districts, since roads run vertically connecting places in Assam with districts or sub-divisions in Arunachal. This has resulted in a high transportation cost.

At the time of Independence, there were only three main jeepable roads in Arunachal. In the 1950s, the Government concentrated on the expansion of regular administration across the Inner Line (in consonance with the Nehru-Elwin Policy of gradual integration). This gradualist approach to development was followed till 1962, when the reverses faced by India in the military engagement with China, led to a more active integration policy.

On the basis of the findings of a techno-economic survey of NEFA conducted by the National Council of Applied Economic Research (NCAER), the highest priority has



been given to infrastructure development, particularly to transport and communication in subsequent Five-Year Plans. Over 70 per cent of Plan funds have been allocated for the development of infrastructure since the Fifth Five Year Plan. Economic infrastructure like transport and communication, power and irrigation received higher priority than social infrastructure in the allocation of Plan funds.

Transport – road network limited but expanding

The construction of roads really began in the 1960s, and starting from only 500 km, the road length has increased to more than 15,000 km in 2000-2001. However, despite the continuous efforts to extend the road network in the State, the road density was still very low in 2001 (17.36 km per 100 sq km of area as against the national average of 82 km per 100 sq km). The main reasons for this low density are: the difficult topography and undulating terrain, the late start of the development process, and the high cost of construction in the inaccessible and remote areas.

Initially preference was given to defence requirements in the construction of road

infrastructure rather than to the economic development of the State. The emphasis was on constructing roads from Assam to the northern borders owing to strategic reasons. As a result the inter-district communication continues to be difficult even today. The State does not have lateral roads connecting districts, since roads run vertically connecting places in Assam with districts or sub-divisions in Arunachal. This has resulted in a high transportation cost.

While 38.53 per cent of the villages were connected in 1997¹³, the percentage figures for the access enjoyed by the people were

¹³ Source: Arunachal Pradesh Public Works Department, 1997.

better. In rural Arunachal, 46.51 per cent of the people had access to *pucca* roads, 26.93 per cent to *kutcha* roads, and 26.56 per cent had no connectivity at all. Connectivity continues to be a major concern in more than half of the State, and the development of road networks that connect different parts of the State with each other on a lateral axis rather than on a north-south axis, is a critical requirement.

Electricity and power – performance and potential

Arunachal has a huge potential for the development of hydroelectric power because of its many rivers. The State has the potential to supply a third of total hydroelectric requirement of the country. Nevertheless, this potential has so far remained untapped and Arunachal is currently purchasing power and relying on diesel-generating sets to meet its energy requirements.

The per capita consumption of electricity in Arunachal was 86.9 kWh in 2001-2002 against the all-India average of 335 kWh. In recent decades, electrification in rural areas has advanced rapidly; in 1971-72 only 37 villages were electrified. The number of electrified villages rose to 340 by 1980-81 and then to 1,308 by 1990-91 and to 2,506 by March 2001. However, the coverage of rural electrification varies widely among the districts, from 100 per cent in Tawang and Tirap, to 34 per cent in East Kameng. There is a high percentage of transmission and distribution losses and these losses have increased from 30 per cent in 1996-97 to 51 per cent in 2000-2001. This is largely due to mismanagement and inefficiencies in the distribution system.

The total installed capacity of the State has increased from 39.53 MW in 1994-95 to 58.95 MW in 2000-2001. The share of diesel-generating sets, as a power source, has increased over the period, although it declined in 2000-2001. In 2000-2001, 46 per cent of the power requirement was met from diesel-generating sets and the remaining 53.9 per cent was met from hydel projects.

In view of the State's fragile geological composition and the vulnerability of its unique biodiversity (due to submergence by giant hydropower stations), the immense potential for harnessing hydroelectric power must be managed carefully. Tailoring district-specific plans is a feasible arrangement, for example, the improved design of waterwheels in Tawang or the use of impulse turbines using high head in the areas of Upper Siang, West Siang and West Kameng, are options that need to be explored.

Postal and telecommunication services

Telecommunication facilities (including post and telegraph offices) in Arunachal have steadily grown over the years. In 2001, there were 303 post offices in the State. There are seven telephone sub-divisions and 89 telephone exchanges with a total capacity of 51,732 connections. Mobile phones have also been introduced in the State and a large part of Arunachal enjoys cellular connectivity.

Arunachal has a huge potential for the development of hydroelectric power because of its many rivers. The State has the potential to supply a third of total hydroelectric requirement of the country.



Although the health facilities in Arunachal have improved significantly in the last four decades, there is a major disparity between the rural and urban areas as most of the facilities are concentrated in the urban areas. To illustrate, of the 16 General and District Hospitals in 2000-2001, 87.5 per cent were located in the urban areas.

Banking and finance

Banking in Arunachal is comparatively new; the first branch of the State Bank of India was opened in Pasighat (East Siang) as late as 1971. In 2000-2001, there were 99 bank offices with an average of 9.07 offices per 100,000 population. However, the banking sector/availability of finance is not widespread in Arunachal yet. The credit-deposit ratio is only 17.25 per cent, which is the lowest among the States of North-East India, and is considerably lower than ratio at the national level (58.53 per cent). The recovery rate in the industrial sector is only 30 per cent, which is a cause for concern. It appears that most of the loans advanced by the banks are either consumed or invested in unviable projects.

Irrigation and water management

In Arunachal, only minor irrigation systems have been developed through State participation and by providing various incentives to farmers. The minor irrigation systems covered a command area of nearly 1,032 hectares in 1966-67 and this was extended to 24,980 hectares in 2000-2001. According to the Arunachal Pradesh Agricultural Census of 1990-91, only 21.5 per cent of the gross cropped area in the State was irrigated; the highest proportion in East Siang (38.98 per cent) and the lowest in West Kameng (1.96 per cent).

There is a need to develop indigenous irrigation systems which are cost-effective and suitable to specific areas. The water and farm management system of the Apatani Plateau is an example of an indigenous system of resource management, which can be replicated with suitable modifications to increase income and livelihood opportunities across the State.

Educational infrastructure

Educational infrastructure in Arunachal has expanded substantially. Schools at the primary and middle level have increased manifold during the last 40 years, though this increase is greater in the cases of secondary and higher secondary schools.

Education institutions in the State now accommodate nearly 2 lakh students, of which 73.6 per cent belong to the Scheduled Tribes. The data shows that the gender ratio among students at first increases from 787 girls per 1,000 boys at the pre-primary level to 830 girls at the primary level and then to 903 girls at the middle school level. However, after middle school, a rapid drop is observed and the gender ratio at the secondary and tertiary levels falls drastically. There are only 222 girls per 1,000 boys at the University level. There is thus a need to make educational institutions more accessible, particularly for girls at the higher education level, and a need to motivate girls to continue to attend school.

Health infrastructure: large urban-rural gaps

Although the health facilities in Arunachal have improved significantly in the last four decades, there is a major disparity between the rural and urban areas as most of the facilities are concentrated in the urban areas. To illustrate, of the 16 General and District Hospitals in 2000-2001, 87.5 per cent were located in the urban areas. The majority of the rural population is served by the PHCs and sub-centres, which are located in block and circle headquarters.

There is a need to decentralise the medical facilities in the rural areas, minimising the distance between the villages and the PHCs and the sub-centres and raising the standard of these facilities. The effective use and maintenance of expensive equipment, which is lying unutilised in several hospitals are

additional issues that need to be addressed quickly.

Infrastructure facilities in the villages surveyed

Around 31.58 per cent of the villages surveyed by the SHDR team, were connected by *pucca* road and 51.7 per cent by jeepable road. Of all the villages surveyed, 23.31 per cent were situated at a distance of more than 10 km from the *pucca* road and 9.32 per cent are 10 km away from a jeepable road. In most of the surveyed villages (64.8 per cent), there is a primary school within the village. On the other hand, in 4.8 per cent of the villages, children have to walk more than 10 km to a primary school. Health services in rural areas are provided through sub-centres, PHCs, and hospitals. Only 15.38 per cent of the surveyed villages have a primary health sub-centre within the village and in 25.28 per cent of the surveyed villages, users have to walk more than 10 km to avail of the medical services of the primary health sub-centre. About 66.45 per cent of surveyed households had access to electricity. Around 70.47 per cent of the surveyed villages had piped or tap water as the dominant source of drinking water, 12.23 per cent reported using tube-wells, 3 per cent reported using wells, and 14.3 per cent used other sources like springs.

Composite index of infrastructure - an inter-district analysis and its relation to the HDI

To examine the relationship between infrastructure and human development at the district level, a composite index of infrastructure for 2000-2001 is constructed

Table 11

Classification of districts of Arunachal Pradesh by Infrastructure Development Index, 2000-2001

Category	Name of the District
High	1. Papum Pare (4.96) 2. East Siang (4.04)
Medium High	1. Tawang (3.87) 2. Tirap (3.66) 3. Changlang (3.44) 4. West Siang (3.01)
Medium Low	1. West Kameng (2.76) 2. Lower Subansiri (2.56) 3. Lohit (2.17) 4. Upper Subansiri (2.16) 5. Upper Siang (2.10)
Low	1. Dibang Valley (1.69) 2. East Kameng (1.43)

with the help of principal component analysis based on a number of indicators¹⁴. Using this methodology, Papum Pare and East Siang districts are categorised as 'High', which implies that they are relatively developed in terms of infrastructure and two districts, Dibang Valley and East Kameng, were classified as 'Low'. The regional disparity index is estimated at 35.48.

The way forward

Although there has been a significant development of infrastructure facilities during the last 50 years (albeit starting from a very low base), they are still inadequate and the infrastructure in the State is less developed than that of the country as a whole.

Educational infrastructure in Arunachal has expanded substantially. Schools at the primary and middle level have increased manifold during the last 40 years, though this increase is greater in the cases of secondary and higher secondary schools.

¹⁴ Including length of road/100 sq km, surfaced road as a percentage of total road length, percentage of villages having connectivity status of roads, percentage of villages having connectivity status of roads, percentage of gross irrigated area to total cropped area, percentage of electrified villages to total villages, no. of banks/10,000 population, no. of banks/100 sq. km, credit deposit ratio, no. of schools/10,000 population, no. of schools/100 sq km, no. of health centres/hospitals, etc. no. of health centres/hospitals, etc/100 sq km, no. of medical technical personnel/10,000 population, no. of hospital beds/10,000 population, no. of hospital beds/10,000 population, no. of post and telegraph offices/10,000 population, no. of post and telegraph offices/100 sq. km, no. of fair price shops and cooperative societies/10,000 population, no. of fair price shops and cooperative societies/100 sq km, percentage of villages to total villages fully covered by drinking water supply.

State planners should give due attention to transmission and distribution losses of electricity and establish proper institutional facilities which can support and make investment effective. The Government needs to revive the community spirit of the local people and redefine the private sphere in the development process.

According to the 1992-93 Centre for Monitoring the Indian Economy (CMIE) Infrastructure Index, Arunachal scored 44 points with the all-India index at 100.

The following policy changes are recommended for Arunachal:

- There is a wide gap between urban and rural areas and between the larger villages (in terms of population) and smaller villages. The first task of the Government should be to increase the road connectivity of the districts that have a relatively low HDI. The Government of Arunachal will have to continue with high public investment expenditure in the infrastructure sector (particularly in the remote and inaccessible rural regions of the State). At the same time, private investment particularly in the provisioning of education and health infrastructure needs to be encouraged together with community and local enterprise.

facilities which can support and make investment effective. The Government needs to revive the community spirit of the local people and redefine the private sphere in the development process.

- Adequate attention needs to be given to the provision of institutional infrastructure, especially of market institutions.
- On the programme design side, it is imperative to develop a 'feedback loop' in the development strategy so that the appropriateness/relevance of the schemes is continually tested in the field and feedback is generated in a systematic manner, which can then be incorporated back into the scheme/project/programme.
- Given the necessity of continuing Government interventions for the development of the State, convergence between departmental responsibilities has to be emphasised to reduce the truncated functioning at the cutting edge.
- Traditional water harvesting systems should be revived and integrated with piped water supply so that the problem of

drinking water availability is addressed in a sustainable manner.

- A proper strategy of infrastructure development has to be framed, keeping in mind the special circumstances of each district. This strategy should ensure that the allocation of funds is directed towards the creation and maintenance of infrastructure facilities in the hill districts.
- State planners should give due attention to transmission and distribution losses of electricity and establish proper institutional
- In building of public utilities such as schools and hospitals, appropriate technology should be used. The Public Works Department (PWD), along with the North Eastern Regional Institute of Science and Technology (NERIST), should design and develop materials using locally available materials for low-cost construction.
- All developmental work should be subject to a concurrent Government and social audit.

Chapter 9

Biodiversity conservation and sustainable development

Marked by a remarkable range of topography, altitude, soil, rainfall and climate, Arunachal is one of the last bastions of diversity and an exceptional heritage. The remoteness and insularity of this area, till very recently, has been a contributing factor to the preservation of this legacy. Even today, access to larger centres of manufacturing and processing industry, and to other forms of economic activity, is difficult and constrained by an underdeveloped road and transportation system. The links are tenuous and only cover the main administrative centres of the State. A 100 years ago, the nature of the economy and of societal structures created neither the need nor the incentive for large-scale extraction of forest products. The most important factor in the continued survival of the forests, however, has been the strong sense of community, the fact that the environment around the people has been of utmost importance to them in their lives as a source of livelihood. In return, they have protected their environment, using what they need, and ensuring that it is available to them and to future generations.

There is, therefore, a fundamental and strong bond between the people and the environment. However, this relationship has

given way in some areas to more settled forms of cultivation. Road networks have linked the plains with the hills, and opened up impenetrable regions. In the fragile and relatively young geological system of the Eastern Himalayas, these have left scars on the countryside; the roads will take many years to stabilise and the scars even more time to heal. Equally significant, there is traditional knowledge of flora, fauna and the land and forests that is in danger of being lost. It is therefore imperative that this rich storehouse of knowledge and diversity be protected and preserved.

The idea of sustainable development

Arunachal has to work out a strategy which allows it to achieve high levels of human development; good education, access to medical care and adequate income in a holistic and sustainable manner. Development that does not bring into its almost pristine environments its inevitable accompaniments:

Arunachal has to work out a strategy which allows it to achieve high levels of human development; good education, access to medical care and adequate income in a holistic and sustainable manner.



been severely tested in the last few decades. Population pressure has grown; given the welcome fact of better healthcare and a growing economy, these can only be expected to continue to grow in the immediate future. Swidden agriculture has

pollution, slums, congestion and environmental degradation.

The flora and fauna of Arunachal

Arunachal has all the vegetation types: tropical, sub-tropical, temperate and alpine. Arunachal is endowed with about a third of the 15,000 seed plants found in India, thousands of non-flowering plants and about 500 exotic orchids. Many animal species are also found here, including more than a hundred species of mammals in the forests. The forests are also rich in a wide variety of medicinal plants which have been used by the people for centuries to cure various diseases starting from stomach ailments to blood pressure. Plant species (which are used in house-building and in household materials) are abundant in the tropical and sub-tropical zones.

However, much of the forest wealth of the State is undocumented. A comprehensive Biodiversity Action Plan beginning with an

exhaustive listing of the important plant and animal species of economic value, as well as endangered and rare species, is the first step towards the conservation and sustainable use of this priceless heritage. The next stage is the development of appropriate technology, active community participation and an extension of the available livelihood options in a manner that is efficient and sustainable.

Agro-horticultural diversity

The people of Arunachal practise both shifting and settled cultivation, and cultivate mainly rice, maize and millets as major crops. Of the total geographical area of 8.37 million hectares, the cultivated area is about 200,000 hectares. Of this, in 1999-2000, *jhum*/shifting cultivation is practiced in 110,000 hectares and 90,000 hectares is under settled cultivation.

A wide diversity of crops is reflected in the traditional *jhum* fields, where cereal, crops and other food plants are grown. A large number of land races (economically useful plant species confined to a particular geographical area) and wild relatives of cereals, legumes, fruits, oilseeds and other plants are found in Arunachal.



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Indigenous Knowledge Systems (IKS) and Intellectual Property Rights (IPR) regime

The complete dependence of the tribal groups on bioresources for their livelihood has helped them to use such resources more efficiently. In order to enable scientific exploitation of some of this rich biodiversity (which may well be the key to Arunachal's development), it is important to document this ethno-medicinal knowledge base of the ethnic groups. Both the State's biodiversity and its rich IKS are under threat due to the ineffective existing IPR regime. The Government has to ensure adequate

protection to community rights over a wide variety of crops, useful plants and animal species as well as adequate protection for the traditional knowledge base relating to the use of these life forms.

Major threats to the State's biodiversity

In recent years, the State's rich biodiversity has increasingly come under threat. The hastening pace of developmental activities in the last three decades and the improvement in the communication network has meant increased access. Road building has established communication but the blasting process involved has meant the loss of valuable habitat. The rapid monetisation of the barter economies has led to increased trade in timber. A number of hydropower projects, the urbanisation process, and the shortening of the *jhum* cycle have all put pressure on the State's bioresources, as typically occurs during the process of development. Biopiracy is another emerging threat.

Biodiversity conservation and sustainable development

Arunachal has a unique opportunity to map out a development path that is sustainable and ecologically sound, a chance to develop without the accompanying hazards that rapid and unplanned development have caused in many other parts of the country. However, to achieve this, the State Government will have to take the initiative. Keeping in view its rich bioresources, region-specific development plans need to be drawn up to make the best use of local inputs, conditions and expertise.

Some of the areas that can be looked at are:

- Ecotourism, trekking, holidays, and specialist vacations should be encouraged. This can generate employment and income opportunities for Arunachal's people.

- To reduce pressure on the forest cover, more areas of the State should be covered under plantation crops like tea, coffee and rubber. Simultaneously, efforts should be made to establish food-processing facilities in the State; this should be set up on a Public-Private Partnership basis.

- Joint Forest Management, especially in the regeneration of forests on degraded land, should be encouraged with equal distribution of the benefits.

- The experience of the Apatani Valley where the empowerment and involvement of women's bodies as major stakeholders in the management of bioresources has been extremely successful, can be used to initiate programmes which designate women as partners in the development process.

- The establishment of small-scale industries based on minor forest produce (e.g. bamboo) should be encouraged.

- The conservation and sustainable utilisation of medicinal plants and herbs through community participation is another area that deserves attention.

- Resource mapping must constitute an integral part of the biodiversity conservation strategy with a view to identifying widespread species and the threats to biological diversity.

- In view of the real threats to biodiversity by natural disasters, a State-specific Disaster Mitigation and Management Plan is needed where resource planning, forward and backward linkages for prevention and precautions can be detailed and effective forest and water management practices can be dovetailed together.



Technical Notes

Rationale for measurement

One of the objectives of a State HDR is to show the States' achievements in various dimensions of human development.

The estimation of a relative position, based on more than one variable, requires the use of an index. In the measurement of human development, gender disparity, human poverty, and other indices for Arunachal Pradesh and its districts, the United Nations Development Programme (UNDP) methodology has been followed as far as possible.

Human Development Index (HDI)

This index is the arithmetic mean of indices of three variables: Life Expectancy at Birth (LEB), education, and income. A variable is transformed into its index as follows:

$$\text{Index} = \frac{\text{Actual value} - \text{Minimum value}}{\text{Maximum value} - \text{Minimum value}}$$

where 'Actual value' is the value of the variable included in the HDI; Minimum and Maximum values are its global Minimum and Maximum. The distance between the actual value of the variable, and its global minimum, is divided by the global range of the variable yielding the index, whose domain is all rational numbers in the unit interval, [0,1].

Indices of the three variables composing HDI are obtained as follows:

$$(a) \text{Life expectancy index} = \frac{\text{Actual life expectancy} - 25}{85 - 25}$$

The highest Life Expectancy at Birth is taken to be 85, and the lowest, 25.

$$(b) \text{Education index} = \frac{2}{3} (\text{literacy index}) + \frac{1}{3} (\text{Gross Enrolment Index})$$

$$\text{Literacy index} = \frac{\text{Actual literacy rate} - 0}{100 - 0}$$

$$\text{Combined Gross Enrolment Index} = \frac{\text{Actual Gross Enrolment Ratio} - 0}{100 - 0}$$

For Arunachal Pradesh, the Gross Enrolment Ratio (GER) has been calculated for the age group 6-22.

(c) **Income (GDP) index.** For per capita income for a district we take per capita District Domestic Product (DDP). We use the data on DDP estimated by the Directorate of Economics and Statistics, Government of Arunachal Pradesh, Itanagar. The maximum and minimum values are the maximum and minimum observed in the range.

$$\text{Y index} = \frac{\log (\text{Actual value of Y}) - \log (10,000)}{\log (27,000) - \log (10,000)}$$

where Y is DDP

While comparing Arunachal Pradesh with other States of India, the variables used are Life Expectancy at Birth (with maximum value 85 and minimum value 25), adult literacy rate, gross enrolment ratio at primary and upper primary schools (with maximum value 100 and minimum value 0) and per capita Gross State Domestic Product (GSDP) converted into purchasing power parity (ppp) US\$ (with maximum value 40,000 and minimum value 0).

Gender-related Development Index (GDI)

The GDI uses the same measures as the HDI, but, adjusts it downward to reflect the inequalities between men and women. The UNDP methodology for calculating the GDI has been used.

To calculate the equally distributed life expectancy index, we first calculate separate indices for female and male achievements in life expectancy using the formula:

$$\text{Life expectancy index for males} = \frac{\text{Actual value} - 22.5}{82.5 - 22.5}$$

$$\text{Life expectancy index for females} = \frac{\text{Actual value} - 27.5}{87.5 - 27.5}$$

For males, the highest value of Life Expectancy at Birth is taken to be 82.5 years, and lowest 22.5 years. For females, the highest value of Life Expectancy at Birth is taken to be 87.5 years, and lowest 27.5 years. Next, the female and male indices are combined in a way that penalises differences in achievements between men and women. The equally distributed life expectancy index is computed as follows:

$$\text{Equally distributed life expectancy index} = \{\text{Female population share} \times (\text{female life expectancy index})^{-1} + \text{male population share} \times (\text{male life expectancy index})^{-1}\}^{-1}$$

The literacy rate index and the enrolment rate index for males and females is calculated in a similar manner using a minimum value 0 and maximum value of 100. Literacy rate index with two-third weight and enrolment rate index with one-third weight are combined to

calculate the education index for males and females. The equally distributed education index is then computed as follows:

$$\text{The equally distributed education index} = \frac{\{\text{Female population share (female education index)}^{-1} + \text{male population share (male education index)}^{-1}\}^{-1}}{}$$

To calculate the equally distributed income index, male and female-earned income is estimated. The share of female wage bill is estimated using the ratio of female agricultural wage to male agricultural wage, which, according to the SHDR Survey, is 0.70.

$$\text{Female share of wage bill } (S_f) = \frac{(W_f / W_m) EA_f}{[(W_f / W_m) EA_f] + EA_m},$$

where

W_f / W_m = Ratio of female to male agricultural wage

EA_f = Female percentage share of economically active population

EA_m = Male percentage share of economically active population

The female and male-earned incomes are estimated by the following formula:

$$\text{Estimated female-earned income} = \frac{S_f(Y)}{N_f}$$

and

$$\text{Estimated male-earned income} = \frac{Y - S_f(Y)}{N_m}$$

where

Y = Gross Domestic Product;

N_f = Female population and;

N_m = Male population.

The next step is to calculate the income index for males and females separately. This is calculated using the usual formula.

$$\text{Equally distributed income index} = \frac{\{\text{Female population share (female income index)}^{-1} + \text{male population share (male income index)}^{-1}\}^{-1}}{}$$

The GDI is then calculated as the arithmetic mean of the three component indices – the equally distributed life expectancy index, the equally distributed education index, and the equally distributed income index.

Human Poverty Index (HPI)

HPI includes deprivation in health, education, and overall economic provisioning. It is estimated as:

$$\text{HPI} = [1/3 (P_1^3 + P_2^3 + P_3^3)]^{1/3},$$

where

P_1 = Probability at birth of not surviving to age 40 (times 100),

P_2 = Illiteracy rate in percentage,

$P_3 = (P_{31} + P_{32})/2$, and

P_{31} = Percentage of people not using improved water supply,

P_{32} = Percentage of underweight children under five.

Infrastructural Development Index

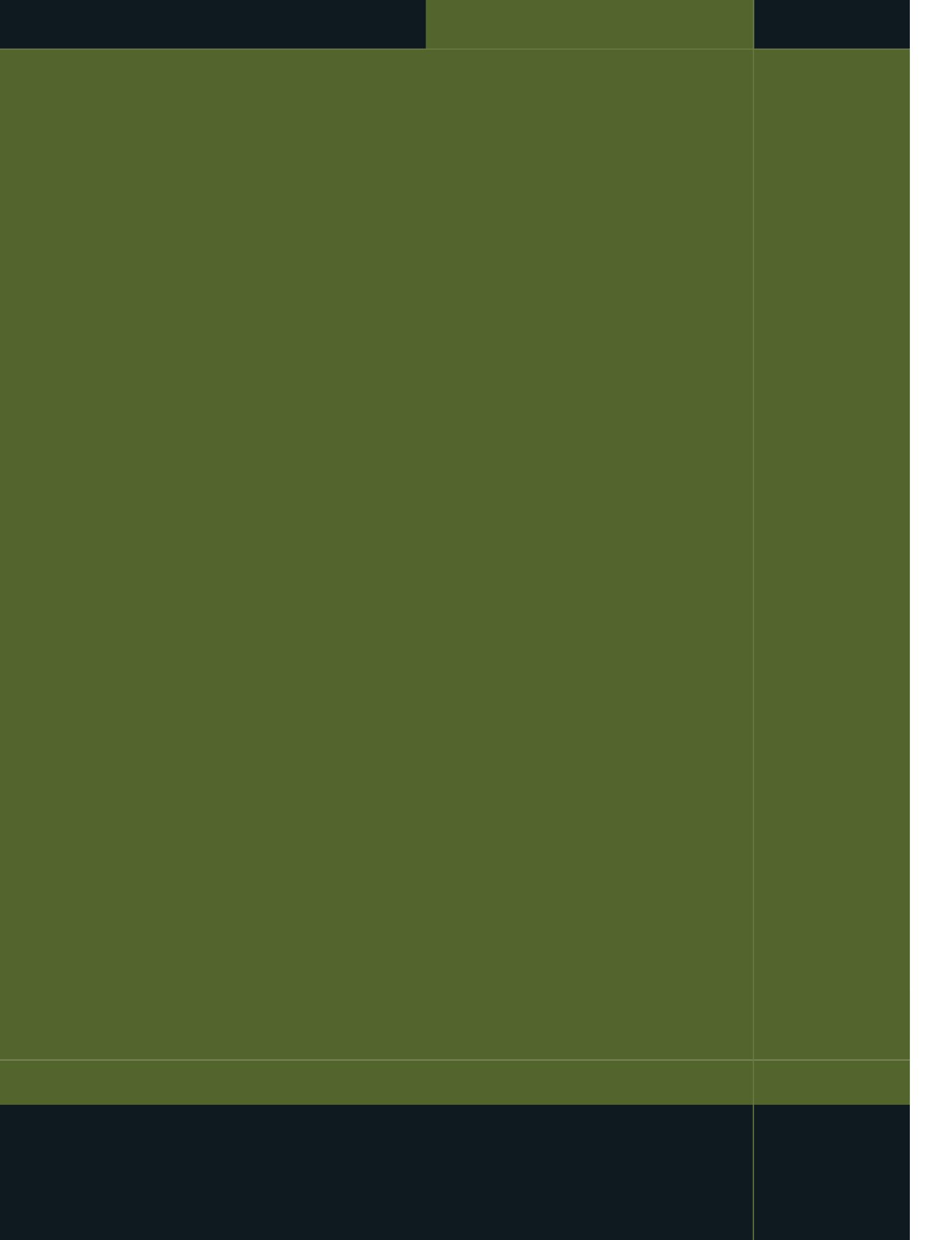
To calculate the infrastructural development index for the districts of Arunachal Pradesh, we have used the Principal Component Method. After arranging the districts in descending order, according to the composite index of infrastructure, the arithmetic mean (X) is taken, thus dividing the districts to above and below the arithmetic mean. Then arithmetic mean (X_i) is taken for the districts falling above the mean. The districts falling within the highest value, and the arithmetic mean (X_i), are classified as 'High' and the districts between two arithmetic means (X and X_i) as 'Medium High'. The same procedure is followed for classifying districts below the arithmetic mean as 'Medium Low' and 'Low' respectively.

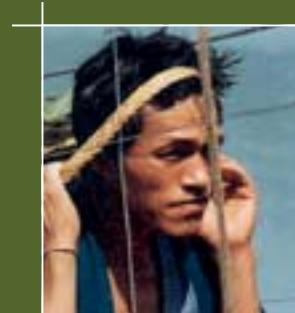
A note on the State Human Development Report (SHDR) Survey

Since secondary data for some variables was not available, a large-scale survey was conducted to meet the data deficiency. A total of 5,257 households with 30,762 people, from the existing 15 districts, were surveyed. The household, the unit of the sample, was defined in such a way that it could capture the condition of the population. In Arunachal Pradesh, migrants from other States of the country constitute around 34.78 per cent of the population. A significant proportion of these migrants, especially those who work in the interior areas, do not bring their families with them. This makes the proportion of the working age population higher in the total population higher than that in the autochthonous (local) population. Since inter-state migrants in Arunachal Pradesh are temporary, and their concentration is in areas with relatively large population sizes, giving equal weight to them in sampling, will make mortality and other measures unrepresentative of Arunachal Pradesh. In order to avoid this bias in the sample, the universe was defined as consisting of those households which are not single-member households. A separate sample was taken from the single-member households in order to study poverty and other characteristics.

The total sample was distributed among the districts according to the size of their population. The district population was then stratified into two categories, urban and rural. The sample was divided between the urban and rural areas in proportion to the distribution of households. The next step was to further divide both the urban and rural areas. The urban areas were divided into rich and poor sections, from each of which households were selected randomly. The distribution of the sample between the rich and poor urban areas was done on the basis of the relative size of the number of households in each category. In the rural areas, all circles were stratified into different categories mainly on the basis of their accessibility. Efforts were made to select the circles from the remote areas so as to get a representative picture of the rural areas. Once the circles were selected, the next step was to select the villages. The selection of the villages was based on accessibility, stressing the need to get proper representation of the inaccessible areas. In Arunachal Pradesh, the size of the village, especially in relatively inaccessible areas, is small – sometimes very small. In case of the small villages, all the households were selected, and, in case of the large villages, the sample was divided between the rich and poor strata based on their relative size, and, from each stratum, 80 per cent was selected.

The field investigators were trained so that they could collect accurate information. Structured questionnaires were constructed for the survey. In case of stock variables, the position on the day of survey was collected, but, in case of flow variables, the information of varying periods was taken. The data on production, income, etc., were collected for the year preceding the day of survey. The mortality data was collected for the last four years, ending on the day of survey. The overall quality of the data was good.





Arunachal Pradesh (Land of Dawn) is the largest State in North-East India. Home to 26 major tribes and 110 sub-tribes and minor tribes, Arunachal harbours a rich diversity of cultures. It is also one of the last reserves of exceptional biodiversity, which has been preserved for centuries by its indigenous communities, aided by its remoteness and relative isolation.

With its abundant forests and rivers, the State has considerable potential for hydroelectricity, horticulture and floriculture, plantation agriculture, organic farming and food processing, medicinal plants and ecotourism. The challenge is to use appropriate technologies and processes that are environmentally sound and in keeping with the aspirations of the people; to create a truly sustainable development model.

The Arunachal Pradesh Human Development Report 2005 evaluates the progress made by the State in recent years and helps to recognise its unique characteristics and special requirements.

