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BAECO 304 ECONOMY OF ARUNACHAL PRADESH



BA (ECONOMICS)
6th SEMESTER

Rajiv Gandhi University

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ECONOMY OF ARUNACHAL PRADESH

BA [Economics]

Sixth Semester

BAECO-304



RAJIV GANDHI UNIVERSITY

Arunachal Pradesh, INDIA - 791 112

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About the University

Rajiv Gandhi University (formerly Arunachal University) is a premier institution for higher education in the state of Arunachal Pradesh and has completed twenty-five years of its existence. Late Smt. Indira Gandhi, the then Prime Minister of India, laid the foundation stone of the university on 4th February, 1984 at Rono Hills, where the present campus is located.

Ever since its inception, the university has been trying to achieve excellence and fulfill the objectives envisaged in the University Act. The university received academic recognition under Section 2(f) from the University Grants Commission on 28th March, 1985 and started functioning from 1st April, 1985. It got financial recognition under section 12-B of the UGC on 25th March, 1994. Since then Rajiv Gandhi University, (then Arunachal University) has carved a niche for itself in the educational scenario of the country following its selection as a University with potential for excellence by a high-level expert committee of the University Grants Commission from among universities in India.

The University was converted into a Central University with effect from 9th April, 2007 as per notification of the Ministry of Human Resource Development, Government of India.

The University is located atop Rono Hills on a picturesque tableland of 302 acres overlooking the river Dikrong. It is 6.5 km from the National Highway 52-A and 25 km from Itanagar, the State capital. The campus is linked with the National Highway by the Dikrong bridge.

The teaching and research programmes of the University are designed with a view to play a positive role in the socio-economic and cultural development of the State. The University offers Undergraduate, Post-graduate, M.Phil and Ph.D. programmes. The Department of Education also offers the B.Ed. programme.

There are fifteen colleges affiliated to the University. The University has been extending educational facilities to students from the neighbouring states, particularly Assam. The strength of students in different departments of the University and in affiliated colleges has been steadily increasing.

The faculty members have been actively engaged in research activities with financial support from UGC and other funding agencies. Since inception, a number of proposals on research projects have been sanctioned by various funding agencies to the University. Various departments have organized numerous seminars, workshops and conferences. Many faculty members have participated in national and international conferences and seminars held within the country and abroad. Eminent scholars and distinguished personalities have visited the University and delivered lectures on various disciplines.

The academic year 2000-2001 was a year of consolidation for the University. The switch over from the annual to the semester system took off smoothly and the performance of the students registered a marked improvement. Various syllabi designed by Boards of Post-graduate Studies (BPGS) have been implemented. VSAT facility installed by the ERNET India, New Delhi under the UGC-Infonet program, provides Internet access.

In spite of infrastructural constraints, the University has been maintaining its academic excellence. The University has strictly adhered to the academic calendar, conducted the examinations and declared the results on time. The students from the University have found placements not only in State and Central Government Services, but also in various institutions, industries and organizations. Many students have emerged successful in the National Eligibility Test (NET).

Since inception, the University has made significant progress in teaching, research, innovations in curriculum development and developing infrastructure.

SYLLABI-BOOK MAPPING TABLE

Economy of Arunachal Pradesh

Syllabi	Mapping in Book
Unit I: Arunachal Economy Features of Arunachal economy - level and growth of State Domestic Product (SDP) and per capita SOP, changing sectoral composition of SOP.	
Unit II: Population Population: trends and features, literacy, causes of its rapid growth, workforce structure.	
Unit III: Agriculture Agricultural practices in Arunachal Pradesh: Jhum and permanent cultivation, land tenure and land use pattern.	
Unit IV: Industry Causes of low rate of industrialization and measures for rapid industrialization in the state.	

INTRODUCTION

Generally, an economy reflects the way of organizing and performing economic activities such as production, consumption and distribution. The differences in organization and operation of these activities give us different economic systems. Accordingly, we have national economy, regional economy or state economy if we consider the economic activities on the basis of a geographical or political boundary. Similarly, we have capitalist, socialist, and mixed economy on the basis of the significance of ownership of means of production while organising these activities. These economies also differ in their peculiarities from one nation to the other. For example the socialist economy of China is different from the socialist economy of the former Soviet Union. While the economy of China has agricultural base, the economy of Soviet Union had industrial base. An understanding of, say a socialist economy, may not capture the ground realities which exist in different countries. It is therefore necessary to discuss the economy of a nation or a region for a meaningful understanding. It is in this context that the course entitled, Indian Economy and the Economy of Arunachal Pradesh bear significance. The course has two sections, namely Indian economy consisting of six units and the economy of Arunachal Pradesh consisting of two units.

Unit-I discusses the nature and structure of Indian economy. Besides, it includes discussion on National Income and contribution of different sectors to its growth over the years.

In the process of development of a nation its population has a greater bearing. Development is meant for the people and people are the agents of development. That is why the study of population with its associated components such as literacy, sex ratio, occupational distribution are very important. This is the subject matter of Unit-II which also discusses the population policy adopted in India over the years.

India is an agricultural country; agriculture share in National Income is quite sizable. Hence the role of agriculture in Indian economy is very important. Unit-III discusses the nature and status of Indian agriculture and measures like land reforms and green revolution to raise agricultural productivity and thereby developing agriculture.

In the process of transformation of economy, Industries follow agriculture and foreign trade follows industries. Unit-IV discusses the industrial development of India after independence. It has described the pattern of industrialization as a result of different industrial policies. Besides, it has specially focused on the cottage and small scale industries in the economic development of India.

Unit-V discusses the foreign trade, its composition and nature. An important instrument in foreign trade, that is Balance of Payments has also been discussed in details. As international trade is directed by World Trade Organisation, the unit also discusses India's emerging role as a member country in World Trade Organisation.

India has adopted planned approach to development. As a matter of fact, India formulates plans for economic growth and social justice. Unit-VI discusses various five year plans and critically evaluates its performance. Consequent upon globalisation, India has also embarked upon economic reforms. The unit has made an appraisal of economic reforms in the process of economic development in India.

Unit-VII and Unit-VIII discuss the economy of Arunachal Pradesh with reference to the State Domestic Product, population, agriculture and industry. Unit-VII discusses domestic product, contribution of different sectors to it and the population along with its characteristic. Unit-VIII has discusses development of agriculture and industry with reference to traditional practices in these two sectors.

The course explains the economic behaviour of a nation and a state. In the process of explanation both theoretical and empirical explanations have been blend to present the systems objectively.

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Unit II: Population

Unit III: Agriculture

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Unit I: Arunachal Economy

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7.0 Objectives

After reading this unit you will be able to know:

- salient features of the Arunachal economy;
- relative economic position of the state in the country;
- changes in the state's economic position over time;
- structural transformation of the Arunachal economy;
- size, distribution and composition of the population in the state;
- population growth and its causes;
- spread of education; and
- changing structure of the work force in the state.

7.1 Introduction

The emergence of a large number of structurally similar but semi-insular traditional economies into a single economic system, the Arunachal economy, is the economic manifestation of a political process.

This political process, evolutionary in nature and democratic in operation, integrated a large number of tribes and sub-tribes living in the vast expanse of hilly terrains measuring 83743 sq km into a single political entity, Arunachal Pradesh. As a State economy, Arunachal economy has existed since 1987 but as a separate economic entity it is older. It came into being in 1972 when North East Frontier Agency (NEFA) which was Constitutionally a part of Assam became a Union Territory and took on the appellation, Arunachal Pradesh.

Prior to their integration, different areas now forming Arunachal Pradesh did not have a high level of economic interaction among themselves. In fact a single economic system did not operate in this area. As you all know, Arunachal Pradesh has many tribes and sub-tribes. Each of the major tribes had its own economy operated on the basis of its own laws, rules and judicial practices. The set of rules and regulations governing an economy is called its institutional structure. The production structure or the sectoral composition of output of these economies was to a great extent similar: overwhelming dependence on the primary activities, absence of modern secondary and tertiary sectors, etc. But the institutional structure of these economies varied, though the amount of variation might not always be high.

There is no standard method of classifying these economies. Not only that, but there is also no standard name for them. The commonest, but at the same time, the vaguest name is 'traditional' economy. Less commonly used term is 'primitive' economy. These names do not reveal any fundamental characteristics of these economies. The more specific name is 'tribal' or 'communal' economy. In Marxian language it is 'primitive communist' economy. It is difficult to exhaust the nomenclature. However, names highlighting some fundamental characteristics of these economies may be useful to us. One characteristic common to all these economies is bartering. To stress this point, these economies are often called barter economies. Another common characteristic of these economies is the absence of any modern industry. To highlight it, they are also called pre-industrial economies. Industrialisation is often called modernization and from this comes the appellation 'pre-modern' economy. To stress their physical locations, they can be regarded as hill economies. They are basically agricultural economies, but if the operational aspect of the dominant activity, the agricultural practice, is to be highlighted, then they can be called swidden or jhum economies, the name frequently heard. The slash-and-burn method is also called shifting cultivation. This is all about nomenclature, but we must have a proper understanding of the traditional economies, especially their institutional structure and technology because Arunachal economy has retained some characteristics of these economies. To press this point home, some basic characteristics of the Arunachal economy are, in essence, the derivatives of those subsisting in the traditional economies. In what follows the basic characteristics of a typical traditional economy in Arunachal Pradesh are discussed.

7.2 Characteristics of Traditional Economy

i. Community Ownership of Land

Land, the most important factor in jhum cultivation was the property of the community. A family could use it, and during its use it could enjoy some rights on that land. This type of right is called usufructuary right. It is temporary, operational right, not the full ownership right.

ii. Low Level of Technology

Associated with community-ownership of land was the low level of technology. Jhum cultivation

does not use any machinery, nor does it use chemical fertilizer. Types of tools used in production are very simple. Spade, hoe, scythe, bill hook (dao), etc. are extensively used.

iii. Lack of Monetisation and Absence of Market

Jhum-based agriculture produced very little surplus. Moreover, Jhuming is a mixed farming, not a single-crop farming. Low surplus could not bring into operation market. Bartering was the usual practice and the economy remained non-monetised and insular.

iv. Mutual Insurance

Agricultural activities are risky. There is no guarantee that good weather would always prevail and desired output would be obtained. In the absence of market insurance, a cultivating family would face starvation in the absence of social protection. In the traditional economy there was an in-built risk-coping mechanism in the form of mutual insurance. Mutual insurance had various forms. One form is social mobilisation of labour and the other is meeting the needs of a family suffering a crop-failure. Meeting needs of other families is not a unilateral action; mutualism is involved. This is often called reciprocity specially by anthropologists. Economists call it mutual insurance.

v. Viable Economy

The traditional economies are often subsistence economies, because these economies could not produce much surplus. An economy capable of producing a surplus is called a productive economy by Sraffa (1960). A surplus producing economy is a growing economy. Higher the net surplus, higher will be the growth of the economy. A traditional economy in Arunachal Pradesh could not produce high surplus, but it was producing enough surplus to keep its capital resources intact and maintain the growing population. True that the rate of growth of population in the traditional society was very small, but whatever be its size the growth is growth. The additional population even if it is small, must be fed, clothed and housed. Unless the economy produces a net surplus, the additional population cannot be maintained. Since the populations of different tribal communities were growing, albeit very slowly, we can assert that the traditional economies were not, in general, subsistence economies, they were producing some surplus to maintain additional population.

7.3 Features of Arunachal Economy

We have equipped ourselves with ideas of traditional economies and we can now have a glimpse of the basic characteristics of the Arunachal economy. The process of development began in Arunachal Pradesh with the launch of the development programme by the Government of India in the days following the independence of the country. The initial thrust of the development programme was to create the infrastructural facilities. We all know about the scarcity of different public goods and service in Arunachal Pradesh before independence. There was no modern hospital, the length of jeepable road was small and there were only three primary schools. Moreover, the Government offices were not located in Arunachal Pradesh. Without these basic facilities, development is unthinkable. The creation of different infrastructural facilities, though not in sufficient quantities, lifted the traditional economies out of their static equilibrium, removed their insularity and placed them on a growth-path. Two modern sectors, secondary and tertiary came into being. With this background, we can summarise the basic features of Arunachal economy.

i. High stock of natural resources but low level of income

Arunachal Pradesh is rich in natural resources. It is one of the bio-diversity hotspots. It has also some mineral resources. But the rate of resource exploitation is low. One reason, among others, is the high

cost of exploitation of these resources. Take, for example the cutting of trees. The forests seem to be full of valuable trees but many of the trees are on the hill slopes. If these are cut, there may be landslides. This can inflict a huge environmental cost. The trees are also there in the remote areas; cutting and transporting them are highly costly. If total cost including environmental cost is taken out from the total revenue that the sale of these trees generates, we get net revenue or profit which is income. If we want to get our natural capital (trees) back, we must use part or whole of this income to make the replanting. In case of physical capital we keep provisions for its depreciation. For natural capital such as trees or some minerals, similar provisions must be kept. Replanting trees on the hill slopes prone to soil erosion is expensive. Considering all these factors, we can say with a good measure of certainty that the net value of some of the natural resources may not be high given our present technology of exploitation. Even though there are limitations on the use of some of the resources, yet given the low density of population in the State, one is forced to conclude that per capita income is low relative to the natural resources available.

ii. Absence of strong property rights

In the traditional society, land, the main factor of production, was community owned. Not that in all communities, the cultivable land was under community ownership. Take, for example, Ziro valley where land has since long been individual property. With a few exceptions, cultivable land was community property. The onset of development brought in the technology of permanent cultivation. Bullock-driven plough was introduced in the plains and river valleys. The technological change in cultivation along with the appearance of market caused the changes in the institution of property rights. The community-ownership gave way to individual ownership. This is called individualization of cultivable land. The individual ownership spread to permanently-cultivated land first, later on jhum land also came under individual ownership in many areas.

The shift of ownership from community to individual has been aided, of course indirectly, by the operation of the Government-sponsored development programme, but the Government has not yet been able to formalize the new ownership. In order to do it, the Government will have to survey all cultivable land. The survey of land by the Government to record rights of ownership and fix revenue is called cadastral survey. The Government of Arunachal Pradesh has not yet made the cadastral survey of agricultural land. In the absence of such a survey the Government is not in a position to control the transfer of land and its tenancy, a subject which we would treat in the next unit. Government's law enforcement ability has kept property rights weak in the State.

iii. Large Government and Low Individual Initiative

The Government in Arunachal Pradesh is large relative to the economy. The size of the Government is usually measured by the expenditure incurred by it. However, if we consider the area of the State, then the size of the Government is not large. Table 7.1 shows the Government expenditure as the percentage of Net State Domestic Product (NSDP) of Arunachal Pradesh. In some years the Government expenditure has exceeded NSDP by a wide margin. In 1989-90 the Government expenditure was 30.02 per cent higher than the NSDP. In all years of table 7.1, the lowest expenditure incurred by the Government was 80.28 per cent of the NSDP. The Government has been the prime-mover, but the people have not taken much initiative especially in the industrial activities.

Table-7.1

Size of the Arunachal Government and Inflow of Funds from the Centre

Year	Govt. expender as % of NSDP	Central funds as % Arunachal Govt. Receipts	Per capital		Central of NSDP
			Central funds	NSDP funds as %	
1986-87	118.43	87.21	4433	5593	79.26
1989-90	130.02	87.50	4663	6020	77.46
1994-95	80.28	79.77	4991	8342	59.83
1999-2000	84.96	77.95	5540	8890	62.32
2000-01	81.51	90.63	5104	9135	55.87
2001-02	86.23	84.23	5136	8654	59.35
2002-03	80.75	75.71	5102	8958	56.95

Note: (i) Estimated from the Budgets of the Governments of Arunachal Pradesh and Estimates of State Domestic Product, Directorate of Economics and Statistics, Government of Arunachal Pradesh, Itanagar.

(ii) Per capita central funds and NSDP are at constant prices of 1993-94. Central funds include grants-in-aid, Arunachal Government's share of Central taxes and loans from the Centre.

iv. Dependence on the Central Funds

The Government of Arunachal Pradesh depends heavily on the Central Government for its finance. In 1986-87, as high as 87.21 per cent of the State's finances came from the Centre in the form of grants-in-aid, the share of central taxes and loans (table 7.1). The State Government has tried to find out avenues for generation of revenue, but its success is yet to come. Still today the Government's dependence on the Centre for financial support remains high. For example, in 2002-03, the Central funds constituted 75.71 per cent of the State's finances.

That the inflow of funds from the Centre is high relative to the size of the economy is shown by the proportion of these funds in NSDP. The last column of table 7.1 shows the central funds as the percentage of the NSDP. In 1986-87, the central funds were 79.26 per cent of the NSDP. In subsequent years, the proportion of Central Funds was falling, but the fall is not very high.

v. Lack of Industrialisation

In Arunachal Pradesh there is no large-scale industry. A number of medium-scale industries were established by the Government. Most of them were suffering from losses and they were closed down. The private sector took initiative in the establishment of a few wood-based industries, but the Supreme Court's ban on the felling of trees led to the closure of these industries. So, industrialization in the State could not take off. In 2001, the Government formulated a new industrial policy which seeks to encourage private initiative.

vi. Lack of Operation of Multiplier

The Government expenditure does not create much multiplier effect in the absence of industries

in the State. Money is spent on the goods produced in the rest of the country. So the expenditure, both public and private, tends to set the multiplier in operation in the rest of the country. This condition cannot change unless industrialization is sped up.

vii. Limited Monetization and Lack of Market

Lack of market and inaccessibility go together. In many areas of Arunachal Pradesh, large amounts of fruits are grown, but the lack of transport facilities stands in the way of marketing the products. The growers do not get the remunerative price for their output.

Some of these characteristics highlighting the weaknesses of the Arunachal economy will be dealt with in the next unit.

viii. Dependence on Jhum Cultivation

Traditionally known as the land of jhum cultivation, Arunachal Pradesh has significantly reduced its dependence on this low-productive agricultural practice. But even today many people in the state depend on it for their livelihoods.

ix. Dependence on Common Property Resources

A feature which distinguishes the Arunachal economy from many others is its dependence on the common property resources (CPR), mainly forests. The dependence was very high in the past but in recent years it has declined owing to the shrinking of the CPR. Two factors have caused the shrinkage of the CPR: One is the establishment of individual property rights in land and the other is the deforestation. The decline in dependence on the CPR is however, uneven, high in the urban and semi-urban areas and low in the interior areas where the jhum cultivators' livelihood is sustained to a significant extent, by forest.

Check Your Progress-I

1. Who owned land in the traditional economics?
2. How did the process of development begin in Arunachal Pradesh?
3. Are property rights strong in Arunachal Pradesh?
4. How much does the state budget depend on the centre?

7.4. Level of Net State Domestic Product (NSDP) in Arunachal Pradesh

7.4.1. Concepts of Income and Domestic Product

In macro-economics you have studied different concepts of national income: Gross Domestic Product (GDP), Gross National Product (GNP), Net National Product (NNP), etc. Consider GDP and GNP and recapitulate their difference. You have learnt that GDP is the estimate of the gross value of final output and GNP is the measure of the gross income of a country and their difference equals the net factor income from abroad. GNP includes, but GDP does not include, the net factor income from abroad. GDP is the output produced within the borders of the country but GNP is not geographically bounded. GDP is thus a measure of the productive capacity of a country and GNP is a measure of the income-earning capacity of the country's factors of production. You know that there are four factors of production: Land, labour, capital and organization or management. Land earns rent, labour earns wages, capital earns interest and organization or management earns profit. Land is immobile; it cannot migrate abroad. So all rent is generated within the country. But capital is mobile, labour is mobile and so is the organizational skill of

the people. These mobile factors can earn income within their country or they can emigrate and earn income abroad.

GDP does not take into account the productive capacity of the emigrant part of the different factors of production. Just as a country's factors of production can migrate to earn abroad, in the same way foreign factors of production can immigrate and earn income within its borders. GDP does not make any distinction between domestic or local and foreign factors of production. But GNP takes into account all these factors.

Beginning of Income Estimation

The estimation of national income began in our country after its independence. The data on GNP, GDP, capital formation, sectoral composition of the GDP, etc. are available for the country since 1950-51. But States lagged behind the country and there was also a difference among the States and Union Territories. Some States mainly the larger ones were statistically advanced; they had a strong administrative infrastructure to collect the data necessary for the estimation of domestic product. The small States and Union Territories lacked this infrastructure. So large States of the country could begin the estimation of their domestic product in the 1960s, and the smaller ones and some Union Territories made their beginnings in the 1970s.

In Arunachal Pradesh the estimation of domestic product began in 1970-71. In order to distinguish it from the domestic product of the country, the word 'State' is always attached to the State-level product. Similarly the word 'district' is attached to the district-level domestic product. Two measures of domestic product are used. One is a gross and the other a net measure. Thus, for a country there is Gross Domestic Product (GDP) or Net Domestic Product (NNP) and for a State there is Gross State Domestic Product (GSDP) or Net State Domestic Product (NSDP).

Domestic Product at Current and Constant Prices

Domestic Product is the value added by an economy during a year. You know that value of any thing is the product of its price and quantity. Thus, the value of output of rice (V) in Arunachal Pradesh during a year is equal to

$$V = p \cdot q,$$

where p is the average price of rice during the year and q is the total output of rice. V can change when p or q both change. V will increase when p increases and q remains fixed or constant. On the other hand, V will increase when p remains fixed but q increases (Of course V increases when both p and q rise). The changes in p and q constitute the subject matter in two distinct areas:

- (i) the study of inflation and changes in cost of living; and
- (ii) the study of growth of income. In the study of inflation we keep q constant so that the change in V reflects only the changes in p , and in the study of growth of income or domestic product we are interested in the changes of q only. When p is kept constant and all variation of q is reflected in the variation of V , we can then call the value of output of rice in Arunachal Pradesh at the constant price. The constant price refers to the price of a particular year, called the base year. In the 1970s Arunachal Pradesh used the prices of 1970-71 in the estimation of her domestic product. In the 1980s the base year was shifted to 1980-81. The latest change in base took place in 1993-94, the year which continues to be the base till today.

State Income and State Domestic Product

For a country GNP is the gross income and NNP is the net income. NNP is usually called the national income. When NNP is divided by the total population of the country, it becomes the per capita income. Can the domestic product of a state be called its income? Since domestic product is the only available measure, we are forced to use domestic product as income. In doing so, do we commit any mistake? What is the amount of mistake? The last question is irrelevant, because when we do not know the value of state income with a good measure of certainty, it is not possible to quantify the difference between a State's income and its NSDP. We can only talk about of the sign of this error. That is, the error may be positive or negative. If the actual income of a State is higher than its estimated net domestic product, then our error is negative. The use of domestic product as income underestimates it. On the other hand, we overestimate the income of a State when its income falls short of its net domestic product.

Sources of the Difference

The difference between a State's income and net domestic product depends on a number of factors, the most important of which is its relative economic position among States. Suppose that a State has an endowment of capital which is higher than others and its workforce is also relatively skilled. Some firms of this rich State will invest in the poor ones and some of its skilled workers will migrate to find jobs in the states which may be deficient in skills. Both capital and labour then remit part of their earnings from the poor host State to the state of their origins. The poor State's NSDP falls short of the income because of these remittances. On the other hand, these remittances make income higher than NSDP in the State sending capital and skilled labour.

Check your understanding of the difference between income of a State and its NSDP.

Take two States: Kerala and Arunachal Pradesh. Kerala has a high rate of literacy and a healthy population. The life expectancy is higher in Kerala than in other major States of the country. So, one can say that Kerala has a high endowment of human capital. You must keep in mind that education and health are two important components of human capital. Many workers from Kerala have migrated to different parts of the world. From abroad especially from oil-rich West Asia the workers from Kerala repatriate a huge amount of money. On the other hand Arunachal Pradesh has a low literacy rate and the life expectancy of its people is one of the lowest in the country. In short, Arunachal Pradesh has a low level of human capital and it is a net importer of skilled, semi-skilled and even unskilled workers from the rest of the country. Can you tell in which State, Kerala or Arunachal Pradesh, income will be higher than its NSDP? Next, consider the traditional economies of Arunachal Pradesh. These economies were communal in nature and the people of one community did not normally work in the fields of other communities. These economies were closed or insular. Was income different from net domestic product in these economies?

Lastly, think of the economies of all the countries as one economy. It is the world economy. The world economy as a single unit is closed, because the earth has no economic transactions with any other planets. Is there any difference between income and domestic product in the world economy?

Things to Remember

- (i) In a closed economy income is the same as domestic product.
- (ii) There is hardly any closed economy in the modern world. All countries have open economies, but the degree of their openness varies. Some economies are more open than others.
- (iii) In any modern economy the possibility of income being equal to domestic product is extremely low.

7.4.2 NSDP of Arunachal Pradesh

NSDP is a summary measure of the economic condition of a state. A state with a high NSDP is considered rich and if the level of NSDP is low in a state, we say that it is economically poor. But how can we say that the NDP of a State is high or low? The idea of highness or lowness comes in two ways: one is the comparison of NSDP of a State with those of other States, and the other is the comparison of the present NSDP of a State with its past NSDP. The first comparison uses cross-section data, and any analysis based on such data is often called cross-section analysis. The method or approach of such a study is called comparative method. In some branches of social science it is also called synchronic method. The second comparison uses time-series data. An analysis based on such data is called time-series analysis and the method employed is called historical method. It is also called diachronic method. In the next section we would study how Arunachal's NSDP has behaved over time. Before proceeding further we must understand the meaning of the level of NSDP.

By the level of NSDP if we mean the aggregate NSDP of a State, then we cannot compare it with the NSDP of other states, because different states have different sizes of population. Take NSDP of Arunachal Pradesh and Sikkim. Arunachal's NSDP at current prices was Rs. 1730.21 crores in 2001-02 and Sikkim's Rs. 1192.73 crores. Arunachal's NSDP is 45.06 per cent higher than Sikkim's. Can we say that Arunachal Pradesh is richer than Sikkim? No, we cannot, because Arunachal's population is much

Larger than Sikkim's. According to 2001 census, Arunachal's population is 10.98 lakh and Sikkim's only 5.40 lakh. This means Arunachal's high NSDP is distributed among a population which is 2.03 times the population of Sikkim. So an individual in Arunachal Pradesh receives, on average, a share of NSDP which is smaller than what an individual in Sikkim receives. It is this average personal share of NSDP which is comparable among states. By the level of NSDP we normally mean the average share of a person in the NSDP. This is called NSDP per head or NSDP per capita. When we classify the States as high income and low income, its basis is per capita NSDP, not the aggregate NSDP of a State. (Capita is a Latin word, the plural of caput meaning 'a head'. Literally NSDP per capita means NSDP per head which is grammatically wrong. But usage has overruled grammar and it is very common to write 'per capita NSDP or income' which grammarians hesitate to accept.)

7.4.3 How to calculate Per Capita NSDP?

Per capita NSDP of a State is defined as

$$\text{Per capita NSDP} = \frac{\text{NSDP of the State}}{\text{Population of the State}}$$

NSDP is a flow variable and its value refers to a year but population is a stock variable which is estimated with reference to a particular point in time. For example, the census population of our country refers to the sun-rise of the census day, the first March of the census year (The exception is 1971 census which was conducted on the first April because of national election.). Given the population size of a particular day, how can we get its yearly size? The yearly population is the average population of the year. This is called person years lived in that year. We would illustrate the concept of person years below but before that we should know how the population of a year is estimated. It is assumed that population is increasing linearly, when something is linear, its midpoint is its average. So the mid-year (1st October) population is taken to be the average population of a financial year in our country.

Illustration

A. Can you answer the question: how many students were there in a year in your class (say XII class)? You know how many students were admitted, how many students passed. But the number of students during the year is somewhat difficult to calculate because it requires information on the number students leaving the school, the number of students joining your class from other schools, etc. All this information must be given date-wise and only then it would be possible to calculate the number of students during the year.

B. How many people worked in a factory? This question is similar to the one asked before. Some workers might be part-time, some full-time. We are interested to know about the duration of work - the amount of time spent working. We assume that all workers spent working. We assume that all workers are homogeneous. Each worker does the same amount of work per unit of time. The basic unit of measurement of labour is hour. This is called labour hour or person hour. Previously, it was called man-hour, but women opposed it because of its being gender-biased. If the number of labour hours is kept fixed. If the number of Labour Day or person day (previously called man-day). By keeping the working days fixed, we can then get labour month and from labour month can be obtained labour year or person-year.

C. In a country the yearly average population is the person-years lived in it. Similarly, the number of members in a household is the person-years lived in the household during the year. We next see how the person-years lived is calculated and used in the derivation of per capita income. Suppose that in the financial year 2006-07, the income of a household is Rs. 80,000 and the year begins with 4 members in the household: parents, a daughter and a son. Then on 15th April 2006, the daughter leaves home for higher education in Chennai. The son's marriage takes place on 15th March, 2007. His wife joins the household on the same day and lives there in the rest of the month. The daughter comes home from Chennai on the day of marriage and stays at home in the rest of the month. The financial year begins with 4 members and ends with five members. How many person-years lived in the household?

Three members (parents and the son) lived the whole year in the household. The daughter lived only one month (1-14 April 2006 + 14 -31 March 2007) and the daughter-in-law lived only half

month (15-31 March 2007). So the daughter lived $\frac{1}{12}$ year and the daughter-in-law lived $\frac{1}{12} / 2$ year in the household. The total person-years lived in the household is $3 \frac{1}{12} + \frac{1}{14} = 3.12$. The average

household income or the per capita income in the household is $\frac{\text{Rs. } 80,000}{3.12} = \text{Rs. } 25641.03$. You

see that the person-years lived is not very difficult to calculate. But more difficult is the calculation of person-years worked. In calculating the person-years lived we do not make any distinction between man and woman, adult and child, etc. But if we want to find out the person-years worked we are to make a distinction among the workers. An hour worked by an engineer is not the same as the hour worked by an unskilled labourer. So we cannot add the hour worked by an engineer to the hour worked by an unskilled labourer. This non-homogenous nature of labour makes it difficult to find out the average productivity of labour. However, there is a solution to this problem: to find out a standard unit of measurement of labour. One standard unit which is used frequently is called efficiency hour.

Having equipped with the basic ideas, we can now turn to the discussion of level of NSDP in Arunachal Pradesh. Table 7.2 shows us the position of Arunachal Pradesh in the country. The first column of the table is the time-column showing the different years. The initial year is 1970-71 which witnessed the inception of the NSDP accounting in Arunachal Pradesh. The column ends with 2003-04, the latest year for which the data is available. The second column of the table shows the NSDP of Arunachal Pradesh and the third column shows the Net National Product (NNP) of India. You know that NSDP and NNP are not comparable. The appropriate one for India would have been Net Domestic Product (NDP), but that data was not readily available. This forced us to tolerate this little amount of inappropriability. The last column shows the relative position of Arunachal Pradesh in the country: it is the per capita NSDP of Arunachal Pradesh as the percentage of the NNP. Both NSDP and NNP are real, being at the constant prices of 1993-94.

Table-7.2
Comparison of Arunachal's per capita NSDP with per capita NNP
(at constant prices of 1993-94).

Year	Per capita NSDP	Per capita NNP	Per capita NSDP as % of per capita NNP
1970-71	2843	5002	56.9
1974-75	3012	4830	62.4
1980-81	4014	5352	-
1984-85	4955	5956	83.2
1990-91	6939	7321	94.8
1993-94	8866	7690	115.3
1994-95	8483	8070	105.1
2000-01	9171	10308	89.0
2002-03	8952	11013	81.3
203-04	9427	11799	79.9

Source: Calculated on the data from Economic Survey 2004-05, Government of India and Estimates of State Domestic Product of Arunachal Pradesh, different years, Directorate of Economics and Statistics, Government of Arunachal Pradesh, Itanagar.

We see in table 7.2 that Arunachal's NSDP per capita in 1970-71, was only 56.9 per cent of the per capita national income. It was almost half. After four years Arunachal's relative position improved; its NSDP per capita became 62.4 per cent of the per capita national income. (Perhaps you have not forgotten that NNP is also called national income). Arunachal Pradesh moved faster in the subsequent period ending in 1993-94, the year which saw Arunachal's per capita being 15.3 per cent higher than the per capita national income. After 1993-94 the Arunachal economy slowed down relative to the national economy and this reflected in the declining relative position of Arunachal's NSDP. In 1994-95, per capita NSDP in Arunachal Pradesh was only 5.1 per cent higher than the national income per head. Arunachal economy could not match with the faster movement of the national economy. In 2000-01, Arunachal's NSDP per head was 11.0 per cent lower than the per capita national income and in 2003-04 Arunachal's economic position fell behind the national average by as high as 20.1 percent.

If we now look at the entire period, we see that Arunachal's economic position improved relative to national average during the period from 1970-71 to 1993-94. This is the golden period in the economic history of Arunachal Pradesh. It is in this period that the Arunachal economy had been moving faster than the national economy. The last decade of our study period (1994-95 to 2003-04) saw a depressive condition in the Arunachal economy. Arunachal was walking haltingly while the rest of the country was running ceaselessly. By looking at these two periods together can we make any statement as to whether Arunachal's economic position improved or deteriorated relative to the national average? Since Arunachal economy had been moving faster in the first 20 years and slower in the next 10 years than the national economy, its overall movement was faster than the national economy. So we can conclude that during the period 1970-71 to 2003-04 the level of NSDP in Arunachal Pradesh increased at a rate higher than the national income.

Check your progress-II

1. Distinguish between GNP and GDP.
2. Is there any difference between the sum of GNP of all the countries and the world's GDP?
3. Is per capita income lower than per capita GDP in Arunachal Pradesh?

7.5 Growth of NSDP and Per Capita NSDP

When we want to compare the economic position of one State with those of others, NSDP is useless, but when we want to compare the economic position between two or more years, NSDP appears very important. However, NSDP alone is not sufficient, we must take also NSDP per capita. The performance of an economy is shown by the growth of NSDP. In calculating growth, we normally take real NSDP, the NSDP which is at constant prices. Therefore, the growth of NSDP in real terms measures the growth of output. When the real NSDP of a State is growing in a sustained manner we say that the economy is expanding. If per capita NSDP also grows, there is economic growth. You already know what is per capita NSDP. Now you must learn the relationship between the growth of NSDP, per capita NSDP and population. Per capita NSDP is defined as $YP = Y/P$,

Where YP is per capita NSDP, Y is NSDP and P is population.

If we take the growth, then relationship stands as

$$\text{Growth rate of } YP = \text{Growth rate of } Y - \text{Growth rate of } P$$

(If you want to derive the growth equation above you must have knowledge of Differential Calculus, a branch of mathematics. You take the logarithm of YP and then differentiate $\log YP$ with respect to time.)

You see that the growth rate of per capita NSDP is the difference between the rate of growth of NSDP and the rate of growth of population. Table 7.3 shows the rate of growth of NSDP and of per capita NSDP. In order to compare the economic performance of Arunachal Pradesh with the national average, we also present in table 7.3 the rate of growth of NNP and the per capita NNP. The first three rows of the table show the decadal growth, the 4th row shows the growth rate of the period 2000-01 to 2003-04 and the last row covers the entire period, a total of 34 years.

In the 1970s the Arunachal economy performed very efficiently; its growth rate was above the national average. NSDP grew at the rate of 7.07 per cent per annum during this period against the growth of national income at 3.36 per cent,

Table-7.3

**Arunachal's Growth of NSDP: A Comparison with the National Economic Growth
(Percent of annum)**

Period	Arunachal Pradesh		India	
	NSDP	Per Capita NSDP	NNP	Per Capita NNP
1971-1980	7.07	4.14	3.36	1.10
1981-1990	7.81	4.69	4.99	2.83
1991-2000	4.81	2.40	5.93	3.95
2001-2004	2.79	0.40	6.01	4.29
1971-2004	7.09	4.22	4.83	2.74

Data Sources: Estimated on the data from the (i) Estimates of State Domestic Product of Arunachal Pradesh, different years, Directorate of Economics and Statistics, Government of Arunachal Pradesh, Itanagar, and (ii) Economic Survey 2004-05, Government of India, New Delhi.

Note: Growth rate is the estimated value of b in $\log Y = a + bt$, expressed in their percentage. Y is NSDP or NNP and per capita values and t is time measured in years. That is, the unit of t is the year. It may be noted that b is also called average exponential growth rate in percentage per annum.

Because of high growth of population per capita NSDP grew only at 4.14 per cent against the 1.10 per cent growth of per capita national income. In the next decade, both the Arunachal and national economy moved forward but the Arunachal economy was ahead of the national: NSDP grew at 7.81 per cent against NNP's growth of 4.99 per cent. The 1980s was the decade when both NSDP and per capita NSDP recorded the highest growth rates. The situation is totally different in the national economy: the growth rate was increasing in each successive period. During the last period of our sample Arunachal's growth was 2.79 per cent, a rate which was only marginally higher than the growth rate of population so that the per capita NSDP grew only at the rate of 0.40 per cent per annum. The national picture is diametrically opposite. The growth rates in both national income and per capita national income were higher in this period than in any previous ones. During the entire period of our sample, the average yearly growth rate of the Arunachal economy was higher than that of the national economy: NSDP's growth was 7.09 per cent against the NNP's growth of 4.83 per cent.

Check your progress-III

1. If the NSDP growth rate is 7.07% and population is growing at 2.93%, at what rate per capita NSDP is increasing?
2. From table-7.3 find out the rate of growth of population in Arunachal Pradesh during 1971-2004.
3. During 2001-2004, which grew faster, the Arunachal economy or the national? Refer Table 7.3.

7.6 Composition of NSDP in Arunachal Pradesh

We can see in table 7.4 the changing sectoral composition of NSDP. The table shows three broad sectors: primary, secondary and tertiary, and a number of sub-sectors under each of these broad sectors. The primary sector has four sub-sectors: agriculture, forestry and logging, fishing, and mining and quarrying. It may be noted that hunting can be added to fishing in order to make a complete sub-sector. Manufacturing and construction are secondary activities. The tertiary sector includes different services.

In Table-7.4 we can see that in 2003-04 the tertiary sector was the most important contributor of income in Arunachal Pradesh; as high as 46.22 per cent of NSDP came from this sector. The secondary sector's contribution to the NSDP was 20.14 per cent and 33.64 per cent of the NSDP came from the primary sector.

Table -7.4
Changes in Sectoral Composition of Net State Domestic Product in
Arunachal Pradesh: 1970-71 to 2003-04

Sl. No.	Sub-sectors and Sectors	1970-71	1980-81	1990-91	2003-04	Changes during 1970-2004
1.	Agriculture and Sectors	38.33	36.91	35.09	27.43	-10.90
2.	Forestry and logging	20.72	10.23	9.59	3.73	-16.99
3.	Fishing	0.04	0.08	0.72	1.07	1.03
4.	Mining and Quarrying	0.10	0.06	0.79	1.41	1.31
	Primary Sector	59.19	47.28	46.19	33.64	-25.55
5.	Manufacturing	0.85	6.51	6.04	2.49	1.64
6.	Construction	19.58	18.69	17.98	17.90	-1.68
7.	Electricity, gas and Water	-0.10	-2.99	-2.46	-0.25	-0.15
	Secondary Sector	20.33	22.21	21.56	20.14	-0.19
8.	Transport, Storage and Communication	1.55	0.36	0.65	7.16	5.61
9.	Trade, hotel & Restaurant	1.96	4.42	4.95	4.82	2.86
10.	Banking & Insurance	0.10	0.60	1.49	2.93	2.83
11.	Real Estate, Ownership of Dwelling & Business Services	0.79	7.79	5.29	2.31	1.52
12.	Public Administration	9.98	10.36	8.16	17.79	7.81
13.	Other Sector	6.10	6.98	11.71	11.21	5.11
	Tertiary Sector	20.48	30.51	32.25	46.22	25.74
	Net State Domestic Product	100.00	100.00	100.00	100.00	0.0

Data Source: Calculated on the data from Estimates of State Domestic Product of Arunachal Pradesh, different years, Directorate of Economic and Statistics, Government of Arunachal Pradesh, Itanagar.

In the primary sector agriculture is the most important sub-sector contributing 27.43 per cent of the NSDP. Fishing is the least important primary activity with only a 1.07 per cent contribution to the NSDP. In the secondary sector construction activity with a contribution of 17.90 per cent to the NSDP is most important. Manufacturing industry is very small, its contribution was only 2.49 per cent to the NSDP in 2003-04. The public administration dominates the tertiary sector, in 2003-04 its contribution was as high as 17.79 per cent of the NSDP. Transport, storage and communication is also an important service contributing 7.16 per cent of the NSDP.

In the course of 34 years Arunachal economy experienced a significant structural transformation. In 1970-71 primary sector was the most important sector in the economy. Its contribution to the NSDP was as high as 59.19 per cent. The primary sector declined in its relative importance to the NSDP. As shown in the last column of table 7.4, during the 34 years from 1970-71 to 2003-04, the contribution of the primary sector declined by 25.55 percentage points. If we divide 25.55 by 34, we can get the yearly decline in contribution, which turns out to be 0.75 percentage points. The decline in the primary sector was not translated into the rise of the secondary sector. Its relative contribution remained almost the same. It was 20.33 per cent in 1970-71 and with a very small decline of 0.19 percentage points it became 20.14 per cent in 2003-04. In fact the tertiary sector rose in importance, from 20.48 per cent in 1970-71 its contribution raised to 46.22 percent of the NSDP in 2003-04, an increase of 25.74 percentage points in 34 years. The yearly increase turns out to be 0.76 percentage points.

Check your progress-IV

1. What are the three broad sectors of an economy?
2. What is the share of agriculture in the Arunachal NSDP?
3. What was the relative contribution of manufacturing in the NSDP of Arunachal Pradesh during 1980-81?
4. Why is tertiary sector more important in Arunachal Pradesh?

Unit II: Population

- 7.7 Characteristics of population in Arunachal Pradesh
 - 7.7.1 Size of Population
 - 7.7.2 Distribution of Population
- 7.8 Population Composition
 - 7.8.1 Sex ratio
 - 7.8.2 Literacy in Arunachal Pradesh
- 7.9 Population Growth in Arunachal Pradesh
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- 7.12 Key Words
- 7.13 Check Your Learning
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- 7.15 Hints/Answers to Questions in Check Your Progress

7.7 Characteristics of Population in Arunachal Pradesh

7.7.1 Size of Population

In terms of area Arunachal Pradesh is a large State, largest in North-East India. Its area, 83,743 sq km is 31.94 per cent of North-East India and 2.55 per cent of the country. In spite of a large area, Arunachal Pradesh has a small population: only 10.98 lakh, according to 2001 census, which is 0.107 per cent of the country's population of 1.03 billion. In North East India (excluding Sikkim which has a population of 5.40 lakh) only Mizoram's population (8.91 lakh) is smaller than Arunachal's. With a hilly and mountainous topography, the state has a very sparse settlement, so sparse that its density of population is lowest in the country. According to 2001 census, the population density in Arunachal Pradesh is 13 against the country's 325. The lowness of Arunachal's density is revealed more clearly when it is compared with the density of West Bengal which has 904 people per sq Km, the highest density among all States.

With a high growth of population, the density has increased in the State over time, as shown in table 7.9, but the expanding population has not spread evenly. It is the river valleys and urban areas which have got the highest concentration of population. Remote areas of the state remain more or less as thinly populated as before. It may be pointed out that the first population census was conducted in the state in 1961. In the rest of the country the first population census took place in 1872. Prior to 1961 the administrative

infrastructure was too inadequate to conduct census in the state most of whose areas was inaccessible. In the absence of census it is not possible to say exactly what the size of the state's population was prior to 1961. However, an idea can be formed through a backward projection. Such a projection gives us a population of 2.68 lakh and a density of 3 people per sq km at the time of independence. Population increased to 3.36 lakh and its density to 4 in 1961. In the subsequent decades population grew rapidly; in each decade 1.90 lakh populations was added to the state and the decadal increase of density was 2 people per sq km.

Table-7.5
Size of Population in Arunachal Pradesh

Year	Population	Density of population		Arunachal Population as % of Indian Population
		Arunachal	India	
1961	336558	4	142	0.077
1971	467511	6	177	0.085
1981	631839	8	216	0.092
1991	864558	10	267	0.102
2001	1098968	13	325	0.107

- Note:** (i) Population size refers to 1st March, the day of census in all years except 1971 in which the census was conducted on 1st April.
- (ii) The estimated population of Arunachal Pradesh was 2.68 lakh at the time of independence against the country's 34.54 crores.

7.7.2 Distribution of Population

The distribution of population has always been uneven. Fertile plains and river valleys in temperate climate have since time immemorial experienced a dense settlement; while deserts, hills, mountains and lands in extreme climates have seen either a sparse or no settlement of population. Resourcefulness of a place has acted as a magnet for human settlement and the depletion of resources has been a repulsive force. Industrialisation has created employment opportunities which have attracted job-seeking people. People have settled in the centres of industries and big cities were born in the process. In the developed countries an overwhelming majority of people now live in the urban areas.

Like any state or country, Arunachal Pradesh has a distribution of population which is highly uneven. The urban areas of the state which are relatively new have a dense settlement of population. The rural settlement is less dense and in many areas scattered. We would study two aspects of distribution of population: (i) the geographical distribution and (ii) rural-urban distribution.

Geographical distribution

The basis of enumeration of population in census is a village, a circle, a district etc. These are administration areas. These are not defined in terms of their geographical features. A circle may be partly hilly and partly plains. Even a village may not be a geographically homogeneous unit. So from a census report, it is not possible to know how many people are living in the mountainous areas or in the plains. What we get in a census report is the distribution in different districts, circles, etc. We present in table 7.5 the population of different districts, areas of these districts, their densities, etc.

Some districts of Arunachal Pradesh have large areas. As many as 10 districts of this State are larger in area than Goa, the smallest state in the country and five districts are bigger in area than Sikkim, the smallest State in North-East India. In Arunachal Pradesh, Dibang Valley (old) is the district largest in area and Lower Subansiri (new) is the smallest. In terms of population Lohit (old) is the largest and Upper Siang the smallest, among the 14 districts whose area and population are available and presented in table 7.6. The districts are placed in the ascending order of their density. Dibang Valley (old) has the smallest density of 4 people per sq km. In density Kurung Kumey and Upper Siang are closest to Dibang Valley (old). Both of these districts have a density of 5. There are five districts whose density is lower than the State's density of 13. Lohit's density coincides exactly with the State's. The districts with a lower density than this are thinly populated; they cover 50.73 per cent of the area of the State but only 24.00 per cent of its population. There are eight districts with a density higher than the State's average. These districts cover 35.65 per cent of the State's area but as high as 62.92 per cent of its population.

Table-7.6

Distribution of Population in Arunachal Pradesh: 2001

Districts/ State	Area (sq.km)	Population	Density	Percentage of		Cumulative % of	
				Area	Population	Area	Population
Dibang Valley	13029	57720	4	15.56	5.26	15.56	5.26
Kurung Kumey	8818	42518	5	10.53	3.87	26.09	9.13
Upper Siang	6188	33363	5	7.39	3.04	33.48	12.17
Upper Subansiri	7032	55346	8	8.39	5.04	41.87	17.21
East Kameng	7422	74599	10	8.86	6.79	50.73	24.00
Lohit	11402	143527	13	13.62	13.08	64.35	37.08
West Siang	7643	103918	14	9.13	9.46	73.48	46.54
West Kameng	4134	57179	14	4.94	5.21	78.42	51.75
Tawang	2172	38924	18	2.59	3.55	81.01	55.30
East Siang	4687	87397	19	5.60	7.96	86.61	63.26
Changlang	4662	125422	27	5.57	11.42	92.18	74.68
Lower Subansiri	1317	55726	42	1.57	5.08	93.75	79.76
Papum Pare	2875	122003	42	3.43	11.10	97.18	90.86
Tirap	2362	100326	42	2.82	9.14	100.00	100.00
Arunachal Pradesh	83743	1097968	13	100.00	100.00	100.00	100.00

Source: Population Census of Arunachal Pradesh, 2001.

Rural-Urban Distribution

Urbanization is relatively new in Arunachal Pradesh. Prior to 1971 there was no urban area in the State. In 1971 census, for the first time, four administration centres were counted as urban. The population in these urban areas was 17 thousand forming 3.70 per cent of the State's population of 4.68 lakh. The average population in these urban areas was four thousand, so small that the settlements counted as urban were more like overgrown villages than towns. However, tempo of urbanization increased over time. During the 1970s the urban population grew rapidly: the yearly growth rate as high as 13.96 per cent. By

1981 the level of urbanization in the state reached 6.56 per cent and there were five towns. With the growth of urban population, the number of towns in the State increased rapidly. In 2001 there were 17 towns in the State and 20.75 per cent of its population was urban.

Table-7.7

Rural - Urban Distribution of Population in Arunachal Pradesh: 2001

Sl. No.	Districts/State	Population		Percentage of Population		
		Rural	Urban	Total	Rural	Urban
1	Tawang	30548	8376	38924	78.48	21.52
2	West Kameng	67906	6693	74599	91.03	8.97
3	East Kameng	42177	15002	57179	73.76	26.24
4	Papum Pare	59961	62042	122003	49.15	50.85
5	Lower Subansiri	85860	12384	98244	87.39	12.61
6	Upper Subansiri	39590	15756	55346	71.53	28.47
7	West Siang	82806	21112	103918	79.68	20.32
8	East Siang	65432	21965	87397	74.87	25.13
9	Upper Siang	33363	0	33363	100.00	0
10	Dibang Valley	47613	10107	57720	82.49	17.51
11	Lohit	116765	26762	143527	81.35	18.65
12	Changlang	113034	12388	125422	90.12	9.88
13	Tirap	85032	15294	100326	84.76	15.24
	Arunachal Pradesh	870087	227881	1097968	79.25	20.75

Table 7.7 shows the rural-urban distribution of population in the districts of Arunachal Pradesh. Papum Pare, the district in which the capita of the State is located, has the highest level of urbanization 50.85 per cent, and Upper Siang has no urbanization at all. Upper Subansiri is second in the level of urbanization, 28.47 per cent of its population lives in the urban areas. East Kameng is third in urbanization: 26.24 per cent of its population is urban. It can be noted that East Siang's urbanization level is only fourth; it is somewhat less urbanized than Upper Subansiri and East Kameng though its overall level of development is higher than these districts.

Check your progress-V

1. Which state has the lowest density of population in the country?
2. The area of Arunachal Pradesh is 83743 square kilometers and its estimated population on 1st March 2006 is 12, 37,335. What is the density of population on that day?
3. What is the inter-district range of the density of population in Arunachal Pradesh?
4. Which district is most urban in the state?

7.8 Population Composition

The composition of a population can be studied from different angles: ethnicity, gender, age, literacy, occupation, etc. Though knowledge about all the compositional aspects of a population are very important, we would cover only a few aspects having relevance in economics.

Scheduled Tribes and General Category

The simplest compositional study can be done by making a binary classification of the population (binary means two fold). We can consider people belonging to different tribes as one category and those not as another category. The first category is scheduled tribes (ST) and the second is General and the data are available from different population censuses.

Table-7.8
Changes in Population Composition in Arunachal Pradesh

Year	Population			Percentage of population	
	ST	General	Total	ST	General
1961	298439	38119	336558	88.67	11.33
1971	369408	98103	467511	79.02	20.98
1981	441167	190672	631839	69.82	30.18
1991	550351	314207	864558	63.66	36.34
2001	705158	392810	1097968	64.22	35.78

Data source: Census of India, 1961 through 2001 Arunachal Pradesh.

Table 7.8 shows the changing composition of population. In 1961 ST population formed the overwhelming majority of the total but their proportion went on decreasing till 1991. During the 1990s the proportion of the ST population increased in the State. In 1961 the non-ST population constituted only 11.33 per cent of the total, their absolute and relative size increased in subsequent years. In 1991, the non-ST category was 36.34 per cent of the total: in the 1990s the relative size declined to touch 35.78 per cent of the total. In a subsequent section we would study the growth of the population of both ST and non-ST categories.

7.8.1 Sex-ratio

Sex-ratio also called gender-ratio shows the gender composition of the population. Defined as the number of women per thousand men in the population, sex-ratio represents a good number of variables. These variables show how different socio-economic and political opportunities are distributed between men and women in the society. In a society where different opportunities are distributed equally between men and women, sex ratio will be at least 1000. That is, the number of women will be higher than or equal to the number of men. In all developed countries women outnumber men. But in some countries especially in South Asia men outnumber women. This means there are fewer women than men in these countries, and it is the effect of unequal distribution of different opportunities between males and females. Women share less political power, their economic opportunities are limited, they are less literate, less healthy and so they die more frequently than men. Their higher death rate is reflected in fewer females than males in the society. In some sections of the society the discrimination against women may be highly deep-rooted or infanticide. Some people may not give the same care to their female as they give to their male children. Medical facilities may not be easily accessible to the women, because female doctors are not available or health centres are located far away.

With these preliminary ideas we can proceed to study the sex ratio in Arunachal Pradesh. Table 7.9 shows the sex-ratio of the ST, non-ST (general) and total population of Arunachal. (Sex-ratios of some States and of the country are also presented in the table.) Arunachal's overall sex-ratio was 894 in 1961 fell to 861 in 1971 and through a fluctuation reached 893 in 2001. The overall sex ratio of Arunachal is not comparable with that of other States or of the country. This is because of the large components in Arunachal's population. As we have seen before 35.78 per cent of the population in Arunachal Pradesh belongs to general category most of whom are either migrants from other states or descendants of the migrants. The migrants are no where a random sample of the population, they are a selected group. If the migrants are workers, then they have the age and gender bias. They will be mostly of the working age group and majority of them are likely to be male.

Table-7.9

Sex-ratio in Arunachal Pradesh: A comparison with the selected state and the country's Sex-ratio

Year	Arunachal Pradesh			Kerala	Haryana	Punjab	Assam	India
	ST	General	Total					
1961	1013	296	894	1022	868	854	869	941
1971	1007	461	861	1016	867	865	896	930
1981	1005	599	862	1032	870	872	910	934
1991	998	657	859	1040	874	888	925	929
2001	1003	723	893	1058	861	874	932	933

Note: Sex-ratio is the number of women per 1000 men in the population.

In case of marriage migration, the migrants are largely female in a patriarchal society and male in a matriarchal society.

A look at the sex ratio of the general category in table 7.14 gives us an impression of biasness in the migrant population. In 1961 the migrants are largely males: sex ratio of the general category was only 296. Gradually the sex-bias in migration declined and secondly migrants were in a position to bring their family members because of the development of the accommodation and other facilities. So over time the sex ratio of the general category increased and reached 723 in 2001. It is not the overall sex ratio nor is the sex ratio of the general category that represents properly the true gender composition of the people of Arunachal Pradesh. It is the sex ratio of the ST population which portrays the true picture of the gender situation in the state and this is because the ST population is more or less closed.

The ST sex ratio exhibits an interesting behaviour. It shows a clear declining trend from 1961 to 1991 and a rising trend in the 1990s. The sex ratio of the ST population remained well above 1000 in all censuses except in 1991 when it dropped to 998. Compared with the overall gender composition of the country, Arunachal's is much more favourable to the women. In 1961 the sex ratio of the ST population in the State was 1013 against the country's 941, and Kerala's 1022. Kerala is the only State in the country where the women outnumber men. In 2001 there were in Kerala 1058 women per 1000 men and this type of gender composition is found in the socio-economically and culturally advanced countries in the world.

7.8.2 Literacy in Arunachal Pradesh

In the spread of education Arunachal Pradesh occupies a unique position in the country. At the time of independence in 1947, there were only three primary schools and the number students in these schools were less than one hundred. No data is however, available on how the numbers of students were increasing or how many educated people were there in the State prior to 1947. Based on the circumstantial evidence we can gather that not even one person out of one hundred could read or write in the State in 1947. After 1947 there was a rapid expansion of the educational facilities. In the initial stage primary schools were established. As the students were promoted into higher classes, the primary schools were upgraded into middle and then into high schools, provided there were sufficient number of students. The first college in the State was established in 1964 and after 20 years a university came into being.

Quantification of Education

Education is difficult to quantify. One may be highly, and the other may be barely educated. It is very difficult to ascertain the amount of education they together have this problem is sought to be solved by the years of schooling or by the degrees obtained. But the years of schooling or the formal degrees may not be always an adequate measure. A person, without much formal schooling, may achieve through self-learning a high level of scholarship. You must have heard the name of the famous American inventor, Thomas Alva Edison credited with highest number of inventions. How many years of formal schooling did Edison have? Hardly any. On the other hand a person with many years of education may not be able to make any significant creative contributions. This is the problem of 'depth' measure of education. There is another problem: the problem of spread of education. How many people are educated in a society? One way of knowing this is through the use of formal schooling. But it does not solve the problem. A person with a few years of schooling may take up a job where education has no function. After many years non-practice may drive the person into functional illiteracy. Should this person be regarded as educated? On the other hand a person without any formal schooling may be functionally educated through private or self-learning. So the use of formal schooling narrows the scope of 'being educated'. In order to avoid all these problems the census authority has devised a simple method. The spread of education is measured by literacy rate and a person is considered literate if s/he can write and read with understanding. Literacy so defined divides the population into two classes: Literates and non-literates. While the numbers of literates and non-literates give us an idea about the spread of education, but they can be made more useful by transforming them into rates. If the numbers of literates are divided by the population, we get literacy rate. Literacy rate can be calculated for a sub-population or the whole population. Some definitions of literacy rate are as follows:

$$\text{Crude Literacy Rate} = \frac{\text{Literate Population}}{\text{Total Population}} \times 100$$

This is a crude measure because numerator and denominator do not belong to the same sub-population. Small children having not achieved the school going age are still illiterate and invariably excluded from the numerator, but they are included in the denominator. So numerator will remain always lower than the denominator and crude literacy rate can never be 100. That is the upper limit is not defined. This deficiency is rectified in what is called literacy rate or overall literacy rate.

$$\text{Literacy rate} = \frac{7 + \text{Literate Population}}{7 + \text{Population}} \times 100$$

This is the definition having been followed in our country since the 1991 census. In this calculation the population belonging to the age-group 0 to 6 years is excluded. The numerator and denominator relate

to the population aged 7 years and above. If in the above definition the numerator and denominator relate to the population aged 15 years and above, it becomes adult literacy rate.

Literacy rate is a measure of the spread, but not of the depth, of education. From the measure of spread we also cannot know the quality of education. With this limitation in mind we use the literacy rate as a measure of spread of education in Arunachal Pradesh. Table 7.15 compares the literacy rate in Arunachal Pradesh with that in India. In 2001 Arunachal Pradesh had a literacy rate of 54.74 per cent against the country's 65.38 per cent. So Arunachal Pradesh was 10.64 percentage points below the national average. The male literacy was 64.07 per cent in Arunachal Pradesh and 75.85 per cent in the country and their difference is 11.78 percentage points. In female literacy the difference between Arunachal Pradesh and the country is smaller at 9.92 percentage points. In the growth of literacy, Arunachal Pradesh has performed well. As shown in table 7.15, the literacy rate in Arunachal Pradesh was only 7.13 per cent against the country's 28.31 per cent and their difference was as high as 21.18 percentage points. The difference was 28.16 percentage points in male and 13.92 percentage points in female literacy. The literacy gap between Arunachal Pradesh and the country increased in the 1960s to reach 23.16 percentage points in 1971. In the 1970s and 1980s the literacy gap declined markedly. From 18.32 percentage points in 1981 the gap fell to 10.62 percentage points in 1991. The 1990s however, saw a very marginal widening of the gap.

Table-7.10

Literacy Rate in Arunachal Pradesh: A comparison with the National Rate

Year	Arunachal Pradesh			India		
	Male	Female	Total	Male	Female	Total
1961	12.24	1.42	7.13	40.40	15.34	28.31
1971	17.82	3.71	11.29	45.95	21.97	34.45
1981	35.12	14.02	25.55	56.38	29.76	43.57
1991	51.45	29.69	41.59	64.13	39.29	52.21
2001	64.07	44.24	54.74	75.85	54.16	65.38

Data source: Census of India 2001, Series - I India Provisional Population Totals, Paper-I of 2001 and Bose (1991).

In four decades from 1961 to 2001 literacy gained by 47.61 percentage points in Arunachal Pradesh and 37.07 percentage points in the country as a whole. Thus, Arunachal's performance in the spread of literacy was significantly better than the national average. However, Arunachal's relative performance is better in male than in female literacy. Male literacy gained by 51.83 percentage points in Arunachal Pradesh against 35.45 percentage points in the country during 1961-2001, but in case of female literacy Arunachal's gain of 42.82 percentage points.

Check your progress-VI

1. How is the spread of education measured?
2. What is the literacy rate in Arunachal Pradesh according to 2001 census?
3. What is the male-female gap in literacy in Arunachal Pradesh?

7.9 Population Growth in Arunachal Pradesh

Modern economic growth has been associated with industrialization and structural transformation of the economy entailing the sectoral reallocation of labour from low productive primary to secondary and tertiary activities. Spatially, it has involved the migration of labour from rural to urban areas, the locus of industrialization. Apart from the migration of labour another dimension of population is associated with industrialization and economic expansion. This is the growth of population. Thus, modern economic growth is associated not only with the structural transformation and sectoral reallocation of the labour force but also the population growth. The basic nature of this relationship has been stressed by Kuznets (1973).

We have shown in a previous section that Arunachal Pradesh has in the course of last more than three decades experienced sectoral transformation. The non-primary activities in the State have expanded rapidly. Along with all these changes population growth has taken place. The growth has been quite high, much higher than the national growth. Table 7.9 shows the detailed information on the growth of population in Arunachal Pradesh. It shows the growth of the ST, non-ST (general) and total population. The growth of Indian population and the difference between the State's and national growth rate also appears in the table. During the four decades, 1961-2001, the population grew in the State at the average exponential rate of 2.98 per cent per annum against the national average of 2.14 per cent, the difference between them being 0.84 percentage points. The ST population grew in the State at the rate of 2.12 per cent and the non-ST population at 5.83 per cent. The growth rate of the non-ST population was more than the double of that of the ST.

There was a high decadal variation in the growth rate. In the 1960s population grew in the State at the yearly rate of 3.29 per cent, the highest in all decades.

Table-7.11
Population Growth in Arunachal Pradesh: A Comparison with the National Average
(Per cent per annum)

Year	Arunachal Pradesh			India	Difference
	ST	General	Total		
1961-71	2.13	9.45	3.29	2.22	1.07
1971-81	1.78	6.65	3.01	2.20	0.81
1981-91	2.21	5.00	3.14	2.14	1.00
1991-2001	2.45	2.23	2.39	1.95	0.44
1981-2001	2.35	3.61	2.76	2.05	0.71
1971-2001	2.16	4.66	2.88	2.10	0.78
1961-2001	2.12	5.83	2.98	2.14	0.84

Note: (i) Growth rate is the estimated value of b in $\log p = a + bt$, where p is population and t is time in years; b is expressed in percentage.
(ii) Difference is the rate of growth population in Arunachal Pradesh - the rate of the growth of Indian population.

In the country also the 1960s witnessed the highest growth rate of population, but in subsequent decades, the rate of growth falls. The fall in growth, barely noticeable in the 1970s, became clearly visible in the 1980s and in the 1990s became high. Arunachal Pradesh did not follow the country's pattern exactly. In the 1970s the rate of growth fell markedly but in the 1980s reversal took place. The growth rate rose markedly. However, in the 1990s there was a rapid fall in the growth. In the 1970s the fall in the growth of the population in the State was due to the sharp fall in the growth of the tribal population. In the 1960s the tribal population in the State grew at 2.13 per cent per annum, but in the 1970s the growth rate declined to only 1.78 per cent. In the subsequent decades their rate of growth increased.

7.9.1 Causes of Rapid Growth of Population

The decomposition of the growth of population enables us to identify the growth-causing factors. The major part (54.70 %) of growth came from migration and the natural growth of the migrants. The natural growth of the ST population is responsible for the rest, 45.30 per cent, of the growth. So migration can be considered to be major and the natural growth can be considered to be minor cause of growth. (Note that the natural growth of the migrants is added to migration in order to make this proposition).

Major Cause

We all know that the launch of the development programme by the Government of India inducted a good amount of fund in Arunachal Pradesh but in the absence of market, the fund could not purchase any inputs locally. True, that the heavily wooded state, its stony mountains and sandy river banks could supply timber, stones and sand in enormous quantities only in their raw forms. For construction what is necessary is not raw timber or boulders but boards, stone chips, etc, the material which were not readily available in the years following the independence of the country. Almost all material inputs had to be brought from the rest of the country. Operators are necessary. So workers of various degrees of skills had to be brought along with the material inputs in order to implement the development programme in the State. The rate of migration moved with the rate of inflow of central funds and the inflow of the material inputs. A higher inflow of funds necessitated a higher in-migration of workers and a reduced inflow of funds tended to decrease the necessity of migrant workers.

The rate of migration which was very high in the initial decades, tended to decrease in the 1980s when local skill was increasingly available. The spread of education, medical services, etc. were instrumental in the accumulation of human capital locally. With the expansion of human capital, the need for migrant skill was reduced.

Minor Cause

Our causative analysis is highly contextual. What we call the major cause of population growth in Arunachal Pradesh is not a significant cause in the context of the country. So the major cause is a cause locally generated during a specific period of time. What was true during 1961-2001 and 1971-91 was not true in any other sub-periods. Specially, during 1991-2001 migration including the natural growth of the migrants was not at all important, rather it was the natural growth of the ST population which contributed most of the growth.

In the last two decades the growth of ST population has increased. We must shed light on the factors leading to this situation.

In Arunachal Pradesh both the birth and death rates have fallen, but the fall in the death rate is more than that in the birth rate. Infant Mortality Rate (IMR) has also fallen and the fall in the IMR is not

as pronounced as the fall in the death rate. Table 7.19 shows the vital rates of Arunachal Pradesh from 1972 to 2003. In order to make a comparison Indian data are presented in the table 7.19. The data for Arunachal Pradesh seem to suffer from underestimation because of small-sized sample collected by Sample Registration System (SRS). However, our purpose is not to see the absolute size of birth or death rates but to have an idea of their fall. The death rate in Arunachal Pradesh fell from 20.9 in 1972 to 4.7 in 2003, a drastic fall indeed. The death rate of 2003 is only 22.69 per cent of 1972's. The fall in IMR is also significantly high. However, the fall in birth rate is not very drastic: the birth rate of 2003 is 52.79 per cent of 1972's. In case of the national average the fall in death rate is not as high as it is in Arunachal Pradesh. The fall in birth rate in the country is much smaller than that in Arunachal Pradesh.

Table-7.12
Trend of Birth Rate, Death Rate and Infant Mortality Rate in Arunachal Pradesh: A Comparison with the National Average

Year	Arunachal Pradesh			India		
	Birth Rate	Death Rate	IMR	Birth Rate	Death Rate	IMR
1972	35.8	20.9		36.9	14.9	129
1981	31.1	14.6	107	33.9	12.5	110
1989	35.2	14.1		30.5	10.2	91
1996	21.9	5.5	54	27.5	9.0	72
2000	22.3	6.0	44	25.8	8.5	68
2003	18.9	4.7	34	24.8	8.0	60

- Note:**
- The data for 1996, 2000 and 2003 are from Sample Registration Bulletins and for 1972-1989 from Bose (1991). The Arunachal data for 1972 and 1981 are 3-year moving average centred on these years and the data for 2003 is the average of 2001-03
 - IMR is Infant Mortality Rate defined as the number of deaths in the first year of life per 1000 live births.

We can now put forward the reasons behind lagging fall in fertility (birth rate).

i) Low Literacy Rate

We have seen that literacy rate in Arunachal Pradesh is low. Birth rate depends, to a large extent, on the literacy rate, especially the female literacy. A high female literacy rate tends to reduce the birth rate. Kerala has the lowest birth rate among the major States, and it is Kerala which has the highest literacy rate among all the States and Union Territories of the country. In Arunachal Pradesh a low rate of female literacy (only 44.24 per cent in 2001 against Kerala's 87.86 per cent) is an important factor behind its high birth rate.

ii) Low Level of Industrialisation

Lack of mechanization is an important factor behind a high fertility. Machines tend to replace the human labour. With the advance of industrialization and application of mechanized production techniques, the demand for manual labour falls. In order to get employment in the industrial sector, education is necessary. So both education and expansion of manufacturing industries which tend to reduce fertility are lagging in Arunachal Pradesh.

iii) **Low rate of female employment in the modern sectors**

Women lagged behind men in literacy. They have also lagged behind men in modern sector employment in Arunachal Pradesh. So their position in the society is lower than male's. The women who work in the modern sectors carry a high status and it is this set of women who have lower fertility than those who work in the rural sector and thus have low earning power and low status in the society. In Arunachal Pradesh women have not yet been able to enjoy much political power.

The trend of birth and death rates shows that Arunachal Pradesh has made significant advances in demographic transition. The death rate in the State has fallen drastically, but birth rate has fallen less drastically. In order to reduce the birth rate further, female education must be spread rapidly; manufacturing industries should be encouraged and especially important is empowerment of women. Increasing employment in the modern sectors can act as an instrument in raising the status of women in the society and reducing their fertility.

Check your progress-VII

1. In which decade was the growth of population in Arunachal Pradesh highest?
2. What is the difference between the rates of population growth between Arunachal Pradesh and the country as a whole?
3. Which population grew faster, ST or non-ST in the state?
4. What is the natural growth rate of population?

7.10 Work force Structure

The quality and productivity of the work force is reflected in its distribution among different sectors of the economy. Some activities such as manufacturing research and development, etc. are more learning - intensive than traditional agricultural activities. So if the proportion of workers engaged in manufacturing increases one can say that the quality of the workforce is increasing and a rise in quality is translated in the rise of productivity. With the structural transformation of the economy, the sectoral distribution of the workforce changes this is called structural change of the workforce. In a traditional economy, most of the workers are engaged in the primary activities. With industrialization, a shift of worker from the low productive agriculture to high - productive industry takes place. As industrialization matures and the society switches to inventions, innovations and various creative activities, more workers become engaged in the tertiary sector than in others. In the most developed countries of the world, around 70 % of all workers are employed in the tertiary sector.

In the traditional economies of Arunachal Pradesh, secondary and tertiary sectors were not separate; they were subsumed in the primary sector. The household was the unit for the production of all kinds of goods and services required by its members. A household did cultivation, a gender-neutral activity in the traditional society. Apart from this, women were engaged in weaving of clothes, an industrial activity and male members used to make cane baskets, bamboo mats, etc., all these are again industrial activities. In some households there were priests playing a dual role, performing puja (worship) and treating patients with traditional medicines. In the major part of Arunachal Pradesh the priests were not much different from other people but in Tawang and West Kameng they were a separate category empowered to collect taxes for their sustenance.

Distinction between Occupational Structure and Sectoral Distribution

Sometimes an occupation is identified with a sector of the economy. For example, farming or

cultivation as an occupation is identified with the agricultural sector; fishing as an occupation is identified with the activity of the same name. In the traditional society, occupational differentiation being insignificant, all the people engaged in an activity have almost the same quality and serious error is made in identifying an occupation with the sector or the sub-sector of an economy. But in a developed or even a developing economy, an occupational category is different from an industrial category. (It is important to know that the classification of economic activities is called industrial classification. Thus, agriculture is an industry category or sector, crop production is an industrial sub-category or sub-sector, etc.).

Workers of the same occupation may be engaged in different sectors of the economy. For, a doctor engaged in a factory is not by occupation an industrial worker; s/he is a medical practitioner. An accountant may be engaged in a government job or in an industrial concern. If an accountant is engaged in the Government and the other in the factory, then occupationally they belong to the same category but in the industrial classification of workers, one will be counted in the tertiary sector and the other in the secondary sector. In our discussion, we don't take into consideration the occupational structure of the workers, our focus is the sectoral distribution of the workers. This is what is called workforce structure.

Onset of the Sectoral Redistribution of Workers in Arunachal Pradesh

The process of development began along with the emergence of modern secondary and tertiary sectors of the economy. These two sectors, initially staffed by the migrant workers, were engaged in the creation of administrative social, economic and health infrastructures. In course of time, education spread and educated ST people entered the secondary and tertiary sectors in different occupational categories. The process of sectoral redistribution of ST workers started in the beginning of the 1950s and the redistribution has been continuing since then.

The data of the sectoral distribution of workers in Arunachal Pradesh is available only for three census years: 1971, 1981 and 1991. This limits our analysis to a period of two decades only. During 1971 the workers of all categories numbering 270 thousand formed 58.19 per cent of a population of 464 thousand in the State. The proportion of workers was quite high in the population. In 1971 the most dominating sector absorbing the labour force was agriculture as high as 80.30 per cents of all workers were engaged in this sector. Table 7.13 shows that cultivators were 78.34 and agricultural labourers were 1.96 per cent of all workers. The non-agricultural primary activities were not a significant provider of employment. Livestock rearing, fishing, hunting, forestry and logging employed only 0.14 per cent of the workers. With the employment in mining and quarrying being almost nil, the primary sector's share in the overall employment in the State amounted to 80.44 per cent. In the course of 20 years the primary sector lost its share by 13.00 percentage points, employing 67.44 per cent of the workers in 1991.

In the primary sector, the sub-sectoral behaviour differed markedly. The agricultural share in employment declined by 14.81 percentage points to 65.49 per cent of total employment in the economy, but the share of the other primary activities increased. In agriculture the share of cultivators declined but the share of agricultural labourers rose. In 1971 the agricultural labourers constituted only 1.96 per cent of all workers in the State. By 1991 their share rose by 3.17 percentage points to reach 5.13 per cent of the workers. The employment in livestock, fishing, hunting, forestry and logging, mining and quarrying, etc. rose sharply and their relative share in the overall employment in the economy also rose.

Table-7.13
Changes in the Sectoral Distribution (in percentage)
of Workers in Arunachal Pradesh

Sl. No.	Sectors	1971	1991	Changes
1	Primary Sector	80.44	67.44	-13.00
2	Cultivators	78.34	60.36	-17.98
3	Agricultural labourers	1.96	5.13	3.17
4	Livestock, fishing, hunting, forestry and logging	0.14	1.77	1.63
5	Mining and Quarrying	0.00	0.18	.18
6	Secondary Sector	0.44	8.66	8.22
7	Household industry	0.30	.19	-.11
8	Non-household industry	0.04	2.49	2.45
9	Construction	0.10	5.98	5.88
10	Tertiary Sector	19.12	23.90	4.75
11	Trade and Commerce	0.58	3.30	2.72
12	Transport, Storage, Communications, etc	0.00	1.13	1.13
13	Other Services	18.54	19.47	.93
14	Total	100.00	100.00	.00

Note: The distribution of workers is given in percentage. The changes in percentage points are for two decades. The data used are from population censuses of India (Arunachal Pradesh), Economic table 1971, 1981 and 1991.

During 1971-91 the number of workers in the secondary sectors increased at a rate which was significantly higher than that of the primary or tertiary sector. A high growth of employment in the secondary sector employment raised the share of this sector from 0.44 per cent in 1971 to 8.66 per cent in 1991. Among the secondary activities, the employment in the household industry lost its importance both absolutely and relatively. The share of workers in non-household industry and construction rose sharply. In 1971 only 0.04 per cent of all workers were employed in the non-household industries, the industries which were in the process of being established in the 1970s. Most of these industries were small-sized, very few medium and none of them were of large-scale. It may be noted that not a single large-scale industry has yet been established in this State. From being a non-significant source of employment in the 1970s, the non-household industries broadened their employment base in the 1980s. The rate of expansion of employment in this sub-sector was high during 1971-91. However, in spite of a high expansion, its share in the absorption of workers was still low-only 2.49 per cent in 1991. The employment generating capacity of the construction activities, which was also low in 1971, expanded rapidly in the 1970s and slowly in the 1980s. By 1991 construction workers formed 5.98 per cent of the total workers in the State.

The categories of activities which are most non-traditional predominate in the tertiary sectors, the sector which has been expanding its employment capacity since independence. In 1971 this sector was a large employer; 19.12 per cent of the workers in the State were employed in this sector. The employment in this sector grew and its share rose to 23.90 per cent of overall employment in the economy. In this sector trade and commerce was the highest absorber of workers. From a mere 0.58 per cent in 1971, its share in

employment rose to 3.30 per cent in 1991 showing a gain of 2.72 percentage points. The workers in other services which include public administration constituted 18.54 per cent of the total in 1971, 19.47 per cent in 1991. The working population in the State rose during 1971-91 at an average rate of 1.86 per cent per annum, a rate much lower than the growth of population which was 3.11 per cent.

Check your progress-VIII

1. When did the sectoral redistribution of S.T workers begin in Arunachal Pradesh?
2. What was the percentage of industrial workers in 1991 in Arunachal Pradesh?

7.11 Let Us Sum Up

Our analysis provides some unique features of the Arunachal economy: rapid transition of the barter-based traditional economies to an integrated market economy, and rapid structural transformation of the economy, etc. The population of the state has also some interesting features especially in respect of its growth, spread of education, growth of urbanisation, etc. Though neither per capita income nor the literacy rate is very high in the state, yet a comparison of the present values of different development indicators with their past values provides a very promising picture. At the time of independence, most of the people depended on Jhuming which is low productive. Now about 40% of the working people are engaged in non-agricultural activities, some of which are highly productive. In 1947, not even one person out of 100 was literate, by 2001 the literacy rate in the state was 54.34%. The picture of development does not have only brightness, there are some dark patches as well. One of these is the inability of the state to get sufficiently industrialised.

7.12 Key Words

Gross Domestic Product (GDP)	:	The value of final goods and services produced in an economy during a period of time. The economy may relate to a country, a state, a district or an administrative unit. The period is usually a year.
Net Domestic Product (NDP)	:	When depreciation of capital is deducted from GDP, we have NDP.
Gross National Product (GNP)	:	GDP + net factor income from abroad.
Net National Product (NNP)	:	GDP-depreciation of capital
Per Capita income	:	NNP divided by the total population. Since NNP is a flow and population a stock, in order to make population consistent with NNP, the average size of population during the period of time is taken. In our country the population of first October of the mid-year, is taken to be the population during a financial year.
Structure of an economy	:	This is also called the sectoral composition of income or domestic product. It shows how the total output is distributed among different sectors of the economy such as agriculture, industry, etc.

Structural transformation of an economy	:	This is the changes in the sectoral composition of income, labour force, etc. Sum narrowly, the structural transformation is the irreversible large-scale changes in the sectoral shares of GDP. Its broader definition also includes changing occupational composition and the technological progress.
Sex ratio	:	The number of females per 100 males in the population. Sex ratio may be calculated for any sub-population, e.g. an age-group or an ethnic group, etc.
Literacy rate	:	Number of literate people per 100 people aged 7 years and above. In finding out the literate population, those belonging to the age-group 0-6 years are excluded.
Traditional economy	:	The economic system of a tribe existing in Arunachal Pradesh prior to the launch of the development programme by the government of India after independence. There were many traditional economics in the state prior to the emergence of the Arunachal economy.
Insular economy	:	An economy closed to foreign trade. A traditional economy was insular or closed because of very limited inter-tribal economic transactions
Work force structure	:	The sectoral distribution of the work force. It shows, for example, the proportions of workers engaged in agriculture, manufacturing industry, trade, etc.

7.13 Check Your Learning

1. What are the features of the traditional economies of Arunachal Pradesh? Discuss the features which the Arunachal economy has inherited from the traditional ones.
2. What is the measure of economic position of an economy? Describe the economic position of Arunachal Pradesh among the state.
3. Provide the growth profile of the Arunachal economy.
4. Describe the pattern of inter-district distribution of population in Arunachal Pradesh.
6. Explain the behaviour of sex ration in Arunachal Pradesh.
7. When did education start spreading in the state?
8. Show how the work force structure changed during 1971-91 in Arunachal Pradesh. Is it related to the structural changes of the economy?

7.14 Suggested Readings

- | | | |
|------------------------------|---|--|
| Arumugham, R.R. | : | Economic Development of Arunachal Pradesh since independence, Chennai, 2000 |
| Behera, M.C. and M.S. Sahoo. | : | An Introduction to National Income Accounting, Delhi and Itanagar: Himalaya Publishers, 1997 |
| Bose, Ashish, | : | Demographic Diversity of India 1991 census. Delhi: B.R. |

- Mirtra, A. : Publishing corporation, 1991
 : Internal Migration and Economic Development in the Hills of North-East India. New Delhi: Qensons 1997.
- Roy, N.C. and P.K. Kuri. : Land reform in Arunachal Pradesh, New Delhi, Classical Publishing Company. 2001.
- Yogi, A.K. : Development of the North East Region-Problems and Prospects Delhi: Spectrum 1997.

7.15 Hints/Answers to Questions in Check Your Progress

Check Your Progress-I

1. The community.
2. With the launch of development programmes by the Government of India after Independence, particularly after 1971. The thrust area was the development of infrastructure.
3. No, Property right is not as strong as in other states, though in recent times community ownership is giving way to individual property rights.
4. Nearly 80% of the State budget depends upon the central funds.

Check Your Progress-II

1. GDP is the value of final output produced within domestic territory whereas GNP is the gross value of output produced by a nation irrespective of domestic territory. GNP equals the Net factor shares, inclusive of factors employed abroad.
2. No, because the world economy is closed.
3. Yes, per capita income is lower than per capita GDP in Arunachal Pradesh because it is the recipient of the positive net factor services from the rest of the country.

Check Your Progress-III

1. We know that Growth rate of per capita NSDP

$$= \text{Growth rate of NSDP} - \text{Growth rate of population}$$

Growth rate of NSDP	7.07%
Growth rate of population	2.93%

$$\therefore \text{Growth rate of NSDP} = 7.07 - 2.93 = 4.14\%$$
2. We know that Growth rate of per capita NSDP

$$= \text{Growth rate of NSDP} - \text{Growth rate of population}$$

$$\therefore \text{Growth rate of population} = \text{Growth rate of NSDP} - \text{Growth rate of per capita NSDP}$$

Given that Growth rate of NSDP	= 7.09
Growth rate of per capita NSDP	= 4.22

$$\therefore \text{Growth rate of Population} = 7.09 - 4.22 = 2.87$$
3. Since NNP grew by 6.01 % and NSDP of Arunachal by 2.79%. The national economy grew far more than Arunachal economy.

Check Your Progress-IV

1. Primary, Secondary and Tertiary.
2. It was 38.33 in 1970-71, which declined to 36.91 in 1980-81 and to 35.09 in 1990-91. It dropped down significantly further to 27.43% during 2003-04.

- 6.51%
- Because, in absence of a proper secondary sector the tertiary sector rose significantly from 20.48% in 1970-71 to 46.22% in 2003-04.

Check Your Progress-V

- The state of Arunachal Pradesh has the lowest density of population.
- Density of population $= \frac{12,37,335 \text{ person}}{83,743 \text{ sqkm}} = 14.7 \text{ person/sqkm}$
 $= 15 \text{ person/sqkm}$
 $= \frac{\text{Population}}{\text{Area in Sqkm}}$
- Inter-district difference in density of population ranges from lowest 4.10 person per sq.km. in 5(three) districts covering 50.73% of area and 24% of population. While on the other hand 3(three) districts have 31-42 person per sq.km, covering only 7.82% of total surface area and 25.32% of population.
- Papum pare, where the State Capital is located in the most urbanised district with 50.85% of urbanisation.

Check Your Progress-VI

- Spread of education is measured by literacy rate, in which a person is considered as literate when s/he can read, write and do simple arithmetic. Two formulae, namely Crude Literacy Rate (CLR) and Literacy Rate (LR), are used to measure the spread of education.

$$\text{Crude Literacy Rate} = \frac{\text{Literate Population}}{\text{Total Population}} \times 100$$

$$\text{Literacy rate} = \frac{7 + \text{Literate Population}}{7 + \text{Population}} \times 100$$

- 54.34%
- It is 19.83% in Arunachal Pradesh in 2001.

Check Your Progress-VII

- During the 1960s the growth of population was highest in Arunachal Pradesh.
- The rate of growth of population in Arunachal Pradesh is higher than that of the country as a whole. During 1961-2001 the population grew at the average yearly rate of 2.98% in Arunachal Pradesh and 2.14% in the whole country. So, the difference between the growth rates is 0.84% per annum.
- In Arunachal Pradesh non-ST population grew faster than the ST population during 1961-2001, but during the 1990s the ST population grew faster than the non-ST.
- The natural growth rate of population is the difference between the birth rate and the death rate.

Check Your Progress-VIII

- In the beginning of 1950's after the introduction of plan programme.
- 8.22%

Unit III: Agriculture

Structure

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- 8.1 Introduction
- 8.2 Agricultural Practices in Arunachal Pradesh
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 - 8.2.2 Jhuming in Arunachal Pradesh
 - 8.2.3 Settled and Shifting Cultivation: a comparison
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 - 8.5.5 The Problems: Specific
 - 8.5.6 Strengthening Institutions as a Step towards Solution
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- 8.9 Suggested Readings
- 8.10 Hints/Answers to Questions in Check Your Progress

8.0 Objectives

After reading this unit you should be able to understand:

- the relative importance of the two main agricultural practices in Arunachal Pradesh-settled and shifting cultivation;
- the traditional land tenure in Arunachal Pradesh and its implications;

- the present land tenure and land tenancy;
- the pattern of land use, cropping pattern and the intensity of cropping;
- the distribution of land holdings; and
- the problems of industrialization in Arunachal Pradesh.

8.1 Introduction

Agriculture and industry are the two important sectors especially in a developing economy but in Arunachal Pradesh agriculture is more important than industry. These two sectors produce output which is material in nature, and this output can be contrasted with what is produced by the tertiary sector. The production of the tertiary sector is service. Public administration, banking, etc do not produce goods but services. The tertiary or service sector is not independent of agriculture or industry. There is an intimate relationship among these three sectors. In the traditional economy agriculture is all-important. Development normally starts with industrialisation and the expansion of the service sector. However, in Arunachal Pradesh development started with the expansion of the tertiary sector. Agricultural expansion followed the growth of the services, but industry lagged behind. This Unit deals with the problems of agriculture and industry in Arunachal Pradesh. The service sector remains outside our scope.

8.2 Agricultural Practices in Arunachal Pradesh

8.2.1 Settled and Shifting Cultivation

The fertile plains and river valleys in Babylon, which first witnessed the emergence of agriculture as the main activity of the people, became the birth place of human civilisation. Agriculture, in its beginning, appeared as a great force of transformation. The less risky yield from the cultivated field appeared so attractive to the moving bands of hunters that they abandoned their risk-ridden traditional occupation and settled in villages to practise sedentary cultivation. The nourishing soil of the river valleys made agriculture so flourishing that it generated a surplus to support an urban population. With urbanization came trade and commerce and most important of all, a centralized government. However, as agriculture diffused to less fertile and inhospitable areas, its system of production changed and productivity declined.

In the plains and plateaus agriculture was sedentary but in the hilly terrains with sloppy surface this type of agriculture could not be practised. A different practice evolved. This is shifting cultivation, also called swidden or slash-and-burn method of cultivation. Locally known as the jhum cultivation or simply Jhuming, this type of agriculture is widely practised in the hills of North-East India.

8.2.2 Jhuming in Arunachal Pradesh

In Arunachal Pradesh which is 95 per cent hilly and only 5 percent plain, Jhuming was, only a few decades ago, the main source of livelihood of the most of the people. This overwhelming dependence on Jhuming made the state known as the land of jhum cultivation. Jhuming influenced not only the economic but also social and cultural life of the people. The traditional social relations in the state have been characterized by a high degree of equality and cohesion, a direct outcome of Jhuming. True that Jhuming has influenced all dimensions of life in the state but when compared with what settled cultivation did in the plains, its performance does not appear very elevating. The settled cultivation effected an improvement in the standard of living; the unsecured nomadic life was transformed into a secure sedentary life. Not only that, the surplus of settled cultivation paved the way to urbanization.

Jhum cultivation could not wholly supplant the pre-agricultural means of survival, the hunting and gathering activities. Jhuming required the support of these activities. So Jhuming co-existed with them, and in doing so, it failed to create a sedentary life style in its true sense. The most creative role of the

settled agriculture emerged from its ability to generate a surplus big enough to lay the foundation for development. Jhuming could not create any significant surplus to support a non-agricultural population. So prior to 1947, all people in the state depended on agriculture which was largely jhum cultivation. Not that all people depended only on Jhuming. In the river valleys and plains adjacent to Assam, wet-rice cultivation was practised. The settled agriculture of Ziro Valley, also known as the Apatani Plateau, has a long history.

Since independence the government has made intensive efforts to replace, of course, slowly, Jhuming by more productive agriculture and allied activities. In many areas jhum fields have been terraced. The cultivation on terraced land is called terraced cultivation and it is a permanent form of agriculture.

8.2.3 Settled and Shifting Cultivation: a Comparison

Before discussing relative importance of different agricultural practices we should make a comparison between settled and jhum cultivation.

Similarities

There are some similarities between traditional settled cultivation and Jhuming.

(i) Absence of Profit Motive

In both traditional settled cultivation and Jhuming the production is organized at the family farm. The purpose of production in both is to meet the consumption needs of the family members. Cultivation cannot be considered to be a commercial activity because its purpose is not to earn the maximum profit but to maximize the total consumption of the family.

(ii) Use of Family Labour

Both traditional settled cultivation and Jhuming depend largely on family labour. Family members participate in agricultural activities. Of course, there may be some specialization based on gender and age.

(iii) Way of Life

Settled agriculture in its traditional form and Jhuming are the occupation of not only the individual members but of the entire family. There are very few occupations which can transcend the individuals to become the identity of their family. A person is born as a cultivator and he dies as a cultivator. There is no fixed timing for his work. In the non-traditional sectors the length of the working day as well as the length of working life is fixed. There is a definite age at which the working life begins and there is also the age of retirement. In the traditional agriculture neither a minimum nor a maximum age for work is fixed. All these factors make traditional agriculture in all its forms a way of life.

Dissimilarities

(i) Mono Cropping versus Mixed Cropping

In settled cultivation there is usually mono cropping; only one crop is grown at a time. But in jhum cultivation there is mixed cropping; more than one crop is grown at a time. Paddy is the main crop in jhum cultivation; but paddy is not grown alone. A good number of other crops are grown along with paddy.

(ii) Land Scarcity versus Land Abundance

In settled cultivation land is the scarce factor and so it is used intensively, but in jhum cultivation land is relatively abundant which does not require an intensive form of use. If we consider the intensity of cropping, then we find that it is higher in land under settled cultivation than in jhum cultivation.

(iii) New Technology versus Traditional Technology

New technology can be applied in settled cultivation easily but it is difficult to apply new technology in jhum cultivation. This is due to the topography. Land under settled cultivation is normally plain where mechanized system of cultivation can be introduced. Jhum is practised on the slopy surface of the hills where tractors, power tillers, etc. cannot be used. It is very difficult to irrigate the jhum land.

(iv) High Productivity versus Low Productivity

The productivity of land under settled cultivation is higher than that of jhum land. Settled cultivation is taken to be progressive while jhum cultivation is considered outdated. Because of its inability to accommodate new technology, jhum cultivation is thought not to have a long future. However, as long as the alternative use of land is not made viable Jhuming will continue.

8.2.4 Relative Importance of Settled and Jhum Cultivation

Though jhum cultivation was the main stay of the most of the people in Arunachal Pradesh its importance has declined in recent years. Two factors are responsible for this. One is the expansion of the settled cultivation and the other is the job opportunities in the non-agricultural sectors. We shall show below the relative importance of settled and jhum cultivation in Arunachal agriculture.

We can use a number of criteria to measure the relative importance of settled and jhum cultivation. One is the area under each agricultural practice, the second one is the production from each and the third one is the number of people engaged in and dependent on each. One more criterion can be used. This is the linkage effect. A sector can help the other sectors in various ways, through surplus production, spread of technical knowledge, etc. Linkages are two types-backward and forward. The backward linkage is established through the purchase of inputs and the forward linkage is created through the sale of output. There is a limitation of data and because of that our analysis will be confined to the showing of area under each agricultural practice. At the last stage, however, we shall make some comments on the linkage effect of both settled and jhum cultivation.

8.2.5 Area under Settled and Jhum Cultivation

Two concepts of area are used here: one is operated area and the other is net area sown. These concepts are discussed in the section under land use. Table-8.1 shows the distribution of land between settled and jhum cultivation from 1970-71 to 1995-96. The first agricultural census in Arunachal Pradesh took place in 1970-71. So we have data only from 1970-71. The latest data available is from 1995-96 census.

In the census year 1970-71 total area operated in agriculture was 489011 hectares of which the area under settled cultivation was 28006 hectares and jhum land was 461005 hectares. If we take the relative share of land under each type of cultivation, then we see that the permanently cultivated land was 5.73 per cent of the operated area, and jhum land the rest, 94.27 per cent. So the area under settled cultivation was very small compared with the jhum land. In any particular crop season, only a fraction of the operated land is used in jhum cultivation, the rest is left fallow. We see in Table-8.1 that in 1970-71 only 87220 hectares was sown out of a total operated area of 461005 hectares. The net sown area in Jhuming was only 18.92 percent of the total area operated under it, the rest was lying fallow. Some of the jhum land might have been lying fallow for many years and some might be fallow in the crop season of 1970-71.

Table -8.1
Agricultural Practices in Arunachal Pradesh
Settled and Jhum Cultivation

Year	Operated area			Net area sown		
	Settled	Jhum	Total	Settled	Jhum	Total
1970-71	28006(5.73)	461005(94.27)	489011	28006(24.31)	87220(75.69)	115226
1976-77	40013(10.12)	355513(89.88)	395526	40013(35.75)	71901(64.25)	111914
1980-81	52012(15.49)	283720(84.51)	335732	52012(43.99)	66220(56.01)	118232
1985-86	76759(22.30)	267495(77.70)	344254	76759(51.41)	72555(48.59)	149314
1990-91	108803(31.10)	241088(68.90)	349891	92616(55.92)	73000(44.08)	165616
1995-96	109847(31.96)	233872(68.04)	343719	80192(48.84)	84002(51.16)	164194

Note : (i) Figures in parentheses are percentages of the total.
(ii) Data are from different Agricultural Censuses of Arunachal Pradesh.

In settled cultivation the net sown area and operated area were the same in crop season 1970-71. Of the net sown area of 115226 hectares in 1970-71, the land under settled cultivation was 24.31 per cent and jhum land 75.69 per cent. In the next agricultural census which took place in 1976-77, the area under settled cultivation increased but the area under Jhuming declined. The operated as well as net sown area under settled cultivation increased by 12,007 hectares to 40,013 hectares during 1970-71 to 1976-77, in percentage the increase is 42.87. In each agricultural year during this period, 2001 hectares was added on average to the permanently cultivated land. The total area operated under Jhuming declined by 22.88 per cent and net area sown under Jhuming declined by 17.56 per cent.

This is all about area, but the next important query is the production under each agricultural practice. All available evidences show that the yield per hectare is higher in settled than in jhum cultivation. However, aggregate production under each agricultural practice is not available. So we are to depend on only data available from different small-scale surveys. To date no survey has found that average productivity is higher in jhum land than in permanently-cultivated land. So we can accept that the yield per hectare is higher in permanently-cultivated land than in jhum land. Given this, our conclusion then is that aggregate production of settled cultivation is at least as high as that of Jhuming.

The next question is how many people are engaged in each type of cultivation. Here no data is available. However, many experts think that Jhuming employs more people than settled cultivation. Jhuming is still wide spread in the State, and settled cultivation is confined to the plains and plateaus. So in terms of employment Jhuming may be more important than settled cultivation.

Our final point is concerned with linkage. On this we can make a categorical statement. Settled agriculture has more linkage with other sectors of the economy than Jhuming. In settled cultivation some inputs such as power tillers, tractors, chemical fertilizers, etc. come from the industrial sector. This is backward linkage. On the other hand, the settled agriculture produces some surplus which is used by other sectors. In case of Jhuming linkage, both backward and forward, is very limited.

Check your progress-I

1. How does the settled cultivation lay the foundation for development?
2. Do you find any similarities between the traditional settled cultivation and Jhuming?
3. Distinguish between settled and jhum cultivation.
4. Which type of cultivation is more important in Arunachal Pradesh?
5. What are the problems of extension of permanent cultivation in Arunachal Pradesh?

8.3 Land Tenure in Arunachal Pradesh

8.3.1 Introduction

We use land in many ways. We produce crops and vegetables on it. From forests we collect fuel wood, timber and a variety of products. A pond gives us water and fish. On a weekend we like to visit a park. These are only a few uses of land, more can be listed. The use of land in any capacity indicates our relationship with it. This relationship defines the nature of our rights in it. The set of rights that we enjoy in a plot of land is our property rights in it. In order to understand land tenure which is of complex nature in Arunachal Pradesh, we must have a clear idea about the concept of property. Not only land tenure, but also some burning issues of the day such as privatization, liberalization, etc. in the country and industrialization in Arunachal Pradesh can be understood better with a knowledge of property rights.

8.3.2 Land and its Operation

In the beginning of this section we mentioned various uses of land: cultivation, forestry, park, etc. The analysis of all the uses goes beyond our scope. We would consider only agricultural land. The land may be operated or cultivated by a person who may or may not own it. If the land is cultivated by the owner, it is called owner-cultivated land. It is not always necessary that the person or the family owning land should cultivate it using their own labour. Two situations can arise. One is the use of wage labour and the other is tenancy.

Use of wage labour

When labour market exists, the land owner can use the wage labour to supplement the family labour. In case family labour is not available the entire agricultural operations can be assigned to the hired labourers. If the market for managerial services exists, then hired management services can be used to run an agricultural farm, and the owner may not participate in its running at all. However, in agricultural sector the market for managerial services does not usually exist. The reason is the risky nature of agricultural production. Unlike industrial production which is controllable, agricultural production cannot be fully controlled by operators. There are many factors, apart from human efforts, which influence agricultural production: rainfall, temperature, sun shine, pest attack, etc. In many cases it is not possible to separate the human efforts from the effect of natural factors. For example, a hired manager might have worked hard, but the rainfall was not optimum, and so the output is not good. Since our tendency is to measure the effort in terms of result, the land owner may not believe that the hired manager had worked hard when output is not good. This is called agency failure in agriculture or in any biological production where natural factors play a big role. This problem applies not only to the managerial services but also to the agricultural labourers. The workers require monitoring and supervision; otherwise the owner cannot be sure how much work the hired labourers have done. In order to avoid the problem of management the land owner can use another method, leasing.

8.3.3 Land Tenancy

The owner may not cultivate his/her land by himself/herself or by using hired labour. He can lease it

out to a person called a tenant, or a lessee or an agent. The owner in the language of tenancy is called the landlord, or lessor or principal. The terms and conditions of the lease constitute a contract. The contract determines how the tenant should pay the landlord. Depending on the nature of payment by the tenant, the tenancy can be divided into two types: fixed rent tenancy and share-cropping.

Fixed Rent Tenancy

If the payment by the tenant is pre-fixed so that the output does not affect it, we have fixed rent tenancy. The payment to the landlord can be made in cash or in kind or partly in cash and partly in kind. We are not interested in what is paid to the landlord for the use of his land. Our interest is whether the payment is affected by the output of the land leased. As long as the rent does not vary with the output we have fixed rent tenancy.

Share-cropping

In share-cropping the tenant, called a sharecropper, does not pay a fixed rent to the landlord who instead receives a share of output. This sharing is based on contract which may be formal or informal, that is verbal. The owner may provide some inputs for cultivation such as seeds, fertilizers, etc. When the owner thus shares the cost of production, his/her share of output may be more than when he does not.

What is Land Tenure?

In simplest terms, the land tenure is the relationship between the land and the people having interest in it as a tenant, landlord or any other entity. When tenancy is absent, the land tenure is the nature of relationship between the land and its owner. As mentioned earlier, this relationship is nothing but the owner's property rights in land. Since property may be strong or weak, our interest is in the degree of property rights in land. In tenancy, the land is the centre of attention of two parties, the tenant and the landlord, called also agent and principal. Then land tenure becomes land tenancy which is the principal-agent relationship established through operation and ownership of land.

8.3.4 Traditional Land Tenure in Arunachal Pradesh

Ownership did not fragment the land i.e. the wall of property did not partition it. Land was un-segmented beyond the capacity of the individual to own it. It was much above the individual. It was too valuable to be claimed by the individual. At the same time, it was too abundant to occasion any necessity to own. Land and community were inseparable. In a tribal community, the fundamental entity is not an individual but a clan or a tribe and this feature is transmitted into the ownership of land. Land belongs to a clan or a tribe. There were local variations; but the essence of land tenure in the traditional society of Arunachal lies in the land's being coterminous with a tribe.

We would neglect all small variations but pick up one which has a distinction mark of its own. This is land ownership under chieftainship. The institution of chieftainship was prevalent in three districts of Arunachal Pradesh : Lohit, Changlang and Tirap. Under chieftainship, the chief is the owner of the land. However his ownership is nominal. The chief was the symbol of the society and it was the society which reigned supreme. That is, the chief was subordinate to the village elders. So operationally the chieftainship in the three districts and village councils elsewhere in Arunachal Pradesh did not differ much. This makes the claim that land was coterminous with the community unassailable. We can elaborate on the salient features of the traditional land tenure.

8.3.5 Salient Features

(i) Land and the Community: Co-extensiveness

Being co-extensive, land cannot be separated from the community and the individual interest in land must be subordinated to the social interest in it. The land of one community cannot be alienated to the others.

(ii) Usufructuary Rights

Land is community's property, but individuals must operate it for their livelihoods. The individual families are given the rights to operate it. Jhum cultivation goes through cycles. The land is cultivated for a few years and then it is left fallow. The farming family achieves all rights in the land during the period of its cultivation. The family gets all output and all fruits of labour put on the land. Once the land is left fallow it becomes community property. The rights enjoyed by the cultivating family are called the rights of use. In more technical language these are called usufructuary rights.

(iii) Community Ownership and Jhum Cultivation

Community ownership is found to exist in those areas where jhum cultivation was practised. Given low productivity of this type of land use and its risky character because of heavy dependence on natural factors, a family could not survive on its own efforts; social assistance was necessary. The community ownership was the foundation on which the social co-operation was developed.

(iv) Absence of Land Rent: Institution of Sharing

The community owned the land but did not impose any tax on its users. The use of land was apparently free because no explicit rent was paid to anybody. However, at the deeper level, there was a kind of indebtedness created through the use of land. When a family faced the crop failure, other families were obligated to help it. The basis of this obligation was the restlessness of land. This is sharing which took various institutional forms such as mutual insurance, mobilization of labour, etc.

8.3.6 Consequences of Traditional Land Tenure

(i) Low Improvement of land

Since land was community owned and the cultivating families enjoyed only users' rights, the motivation for improving the quality of land was small. The cultivators did not make any long-term investment in order to raise the quality of land. Not much bunding or terracing was done to improve productivity.

(ii) Low Productivity

Agriculture remained low productive. No technological improvement took place, nor any sustained efforts taken to raise the productivity of the soil.

(iii) Low saving and Investment

Because of low productivity, agriculture could not produce much surplus. So the levels of income, saving and investment remained low. The society was characterized by generalized poverty. However, the existence of some institutions of sharing, the suffering from poverty was minimized.

8.3.7 Changes in Land Tenure

The community ownership was limited to the areas practising jhum cultivation. In some areas especially the river valleys and plateaus settled cultivation emerged. In these areas the community ownership of land gave way to its individual ownership. The settled cultivation and individual ownership of land seem to be

deeply connected. In the Ziro Valley (Apatani Plateau) settled cultivation has a long history; the individual ownership of land there seems to have the same length of history. However, before independence settled cultivation was highly limited and so was the individual ownership of land. Major changes came after 1947.

The Government of India launched the development programme to reduce the gap in development between Arunachal Pradesh and the rest of the country. The Government's agricultural policy was to encourage the permanent cultivation. Assistance was extended to those who undertook the reclamation of land from jungles and made various improvements in land so as to make it capable of permanent cultivation. In the mean time market emerged. Those who cleared jungles and improved the land quality claimed the permanent ownership of land. Already in the traditional society, the ownership, though temporary, was enjoyed by the cultivator during the operation of the land. So when land became capable of permanent cultivation, the usufructuary rights became transformed into permanent ownership rights.

The settled cultivation has expanded in the state in the last four decades. With this has spread the institution of individual ownership. This is called individualization of the community-owned property, the cultivable land. Initially the institution of individual ownership was limited to the permanently cultivated land. Later this institution spread to the jhum land. In many areas jhum-fields are now individually owned.

8.3.8 Salient Features of Current Land Tenure

In most areas agricultural land is now individually owned and the owners have property rights in it. The question is: what is the degree of property rights? Is the property in land strong or weak? In what follows we provide a few features of land tenure.

(i) Permanent Ownership

Land is now the permanent property of the owner. On his/her death, his/her heirs enjoy that land. The society or community cannot claim it as long as a person has heirs.

(ii) Inalienability

The owner of land cannot sell his/her land to the members of other communities. In many areas of Arunachal Pradesh land market has emerged but the land transactions are limited to the members of the same community.

(iii) Lack of Formalization

The individual ownership has not yet been formalized by the Government through a settlement or what is called cadastral survey (revenue survey and settlement of land). The Government passed the Arunachal Pradesh (Land Settlement and Records) Act in 2000. This Act aims to facilitate the formalization of individual ownership of land. The Government will undertake the revenue survey of land and prepare the records of rights.

(iv) Implications for Credit

Since the individual owners do not have the records of rights, they cannot use the land as security for bank credit. This restricts the flow of agricultural credit.

(v) Birth of Tenancy

Tenancy was unknown in the traditional land tenure, but with the emergence of individual ownership of land, the institution of tenancy has come into being. The type of tenancy which is prevalent especially in the plains of the State is share-cropping. We cannot say that tenancy is wide spread throughout the state

because the jhum land is yet to be affected by it. Table-8.2 shows the incidence of tenancy in Arunachal Pradesh. In the agricultural year 1980-81 as high as 97.98 per cent of the holdings were owner-operated, 1.70 per cent were partly owned and partly leased in and 0.41 per cent were wholly leased-in. In the whole of Arunachal Pradesh, only 319 holdings were tenant-cultivated and in 1337 holdings there was some leased-in land. In 1980-81 the total number of agricultural holdings was 78542. Out of these holdings only 1656 were fully or partly tenanted. So tenancy affected only a small proportion of the holdings.

The incidence of tenancy declined over time. In 1995-96 only 0.46 per cent of the holdings were wholly leased-in and 0.88 per cent of the holdings were partly owned and partly leased-in. In terms of area only 0.10 per cent in 1980-81 and 0.13 per cent in 1995-96 were cultivated by the tenants. The owner-cum-tenant-operated farms constituted, like pure tenanted farms, a small proportion of the area cultivated. In 1980-81 the partly-owned and partly leased-in farms cultivated only 1.70 per cent of the total cultivated area. In 1995-96, the share of these holdings declined to 0.92 per cent.

Table -8.2

Tenancy Status in Arunachal Pradesh

Status of Tenancy	1980 - 81			1995 - 96				
	No. of holdings	% of total	Area	% of total	No. of holdings	% of total	Area	% of total
Wholly owned and self-operated	76886	97.89	331130	98.63	102340	98.66	340121	98.95
Partly owned and partly leased-in	1337	1.70	4270	1.27	914	0.88	3162	0.92
Wholly leased-in	319	0.41	332	0.10	480	0.46	436	0.13
Total	78542	100.00	335732	100.00	103734	100.00	343719	100.00

Source : Agricultural Census of Arunachal Pradesh, 1980-81 and 1995-96

8.3.9 Effects of Tenancy

Effects of tenancy are wide-spread. The tenants may not have the same amount of incentives as the owners have. Moreover, the tenants may not make the permanent improvement of the land, because they may be evicted at any time. It may be noted that the Government of Arunachal Pradesh has not yet passed any legislation to control tenancy. In the absence of any legislation, tenancy remains an informal arrangement between the tenant and the landlord. This arrangement of contract is not between the equals; the landlord is stronger than the tenant. In any contract there should be a third party (the Government) to enforce it. When the contract is not enforced by the third party its performance suffers from many problems. So in Arunachal Pradesh the Government should recognize the problems of tenancy and try to regulate it through legislation.

Tenancy and Inequality

In the traditional land tenure of Arunachal Pradesh ownership was coterminous with operation. Because of individualization, ownership has been separated from operation. One can now own land and lease it out to the others. This enables the owner to get rent without cultivating it or putting any efforts in it. So tenancy creates inequalities in the distribution of land ownership. The data from agricultural censuses show a high inequality in the distribution of landholdings. Though the inequality is more an effect of the availability of the wage labour than that of tenancy, yet the effect of tenancy cannot be denied.

Check your progress-II

1. Describe the concept of property.
2. What is the usufructuary right in land?
3. What do you mean by land tenure and land tenancy?
4. How is the usufructuary right in land transformed into the permanent ownership right?
5. Distinguish between fixed-rent tenancy and sharecropping.
6. What is the extent of tenancy in Arunachal Pradesh?
7. What is the effect of tenancy on production?

8.4 Pattern of Land use in Arunachal Pradesh

8.4.1 Land as the Non-Homogeneous Factor

One characteristic of the factors of production is their non-homogeneity. Different units of the same factor have different qualities. Take the simplest example, labour. Some workers are highly skilled, some are less skilled. A highly skilled worker may earn rupees one lakh per month while an unskilled worker's monthly earnings may not exceed rupees one thousand. This is not all; some workers with skill not saleable on the market may be forced to stay jobless, and still others may be sick and unable to work. Land is as non-homogeneous as labour. Like labour, land varies in quality over a wide range.

Some lands are very fertile; they may be cultivated all the year round without producing any soil fatigue. There are less fertile lands which once cultivated become so exhausted that they must be left fallow for regeneration of their fertility. There are lands which are like sick people. Without treatment such lands cannot be used for any agricultural purposes. There is also soil specificity for crop production. Some soils are suitable for the production of paddy; some are suitable for cotton. Some soils produce highly valuable crops and others produce cheap crops.

8.4.2 Land use in Arunachal Pradesh

The pattern of land use depends on a large number of factors. Some are physical characteristics of the land: topography especially gradient, porosity of the soil and its fertility. Some are climatic factors: rainfall, temperature, duration of sunshine, etc. Above all, human action on land is very important. If we keep aside human agency, then all other factors constitute agro-climatic conditions. In Arunachal Pradesh there are five agro-climatic zones. The pattern of land use varies from one agro-climatic zone to the other. The agro-climatic zone in the hilly topography is suitable for jhum cultivation and the plains zone for various types of crops.

Table 8.3 shows the use of agricultural land for the four census years, 1970-71 to 1995-96. Unlike the population census which is decennial, the agricultural census is quinquennial - every five years the census is conducted.

In 1970-71 the operated area, the total land for agricultural use, was 489011 hectares which is only 5.84 per cent of the total area of the State (you must keep in mind that the area of Arunachal Pradesh is 83,743 square kilometres which is equal to 83,74,300 hectares). That is, one hectare out of 17.12 in the state was agricultural land in 1970-71. Of the total land under agriculture only 23.56 per cent was cultivated. The absolute amount of this land is 115226 hectares, the net area sown. The current fallow, the land which was cultivated in the previous year but not in 1970-71, was 10.55 percent of the total operated area. There is another category of fallow land. This has been lying fallow for more than one year. Most of this type of

fallow land is used for jhum cultivation. During the agricultural year 1970-71, this category formed 24.08 percent of the total operated land. Degraded land which is called culturable waste land was 30.41 per cent of the total.

Table - 8.3
Land Use in Arunachal Agriculture (Area in hectares)

Particulars	1970-71		1980-81		1990-91		1995-96	
	Area	% of operated area	Area	% of operated area	Area	% of operated area	Area	% of operated area
Net area sown	115226	23.56	118232	35.22	165616	47.33	164194	47.77
Current fallow	51612	10.55	23127	6.89	28463	8.14	30431	8.85
Other uncultivated land(excluding fallow land)	19164	3.92	34888	10.39	44437	12.70	39929	11.62
Fallow land other than current fallow	117740	24.08	57253	17.05	35823	10.24	47024	13.68
Culturable waste land	148698	30.41	47595	14.18	32999	9.43	36605	10.65
Land not available for cultivation	36571	7.48	54637	16.27	42553	12.16	25536	7.43
Operated area	489011	100.00	335732	100.00	349891	100.00	343719	100.00

Sources: Different Agricultural Censuses of Arunachal Pradesh

Note: Equivalent to 2.471 acres, a hectare is a square with its side equal to 100 metres. So, 10,000 square metres makes a hectare. One square kilometre is equal to 100 hectares.

The land under agriculture declined sharply during the 1970s. In the agricultural census 1980-81 the operated area was 3, 35,732 hectares which is 153279 hectares less than what was operated in 1970-71. In percentage, the fall is 31.34. The operated area increased marginally in the 1980s but again declined a little during 1990 - 91 to 1995-96. It is interesting to note that the net area sown increased at a high rate during 1970-71 to 1990-91, but in the next five years there was a small decline. The land currently fallow declined through fluctuations during 1970-71 to 1995-96, but there was a sharp rise in the category called other uncultivated land (excluding fallow land). The proportion of culturable waste land declined during 1970-71 to 1995-96. What is remarkable in the pattern of land use is not the decline of operated area but the expansion of the net area sown.

8.4.3 Intensity of Land use

Land in the traditional agriculture is used in a very relaxed way. Agricultural activities are timed in such a way that the seasonal rainfall can be utilized to the utmost degree. Rainfall is unpredictable and this makes the agricultural output unpredictable. Because of the dependence on the natural forces, land in the traditional agriculture cannot be used intensively. During the dry season cultivation is impossible. So, traditional agriculture finds it difficult to produce more than one crop per year. In jhum cultivation even

that is not possible. Jhum land can be cultivated for two or three years and then it must be left fallow for a number of years. So the nature of Jhuming is such that land cannot be used intensively.

Technological changes in agriculture tend to raise the intensity of cropping; the same land becomes capable of being used more than once in a year. Take, for example, irrigation facilities. The irrigated land can be cultivated during summer. So irrigation augments land. Similarly, mechanization reduces the requirement of labour and it has labour augmenting effects. Fertilizers, manures, pesticides, etc. tend to raise the productivity of the land. In Arunachal Pradesh some technical changes have taken place in settled cultivation. In some areas irrigation facilities have been developed; chemical fertilizers, pesticides, etc. are being used in some farms. The net effect of all these improvements is the intensification of the land use. Table- 8.4 shows the intensity of land use in Arunachal Pradesh. Intensity of land use is measured by cropping intensity which is the ratio of gross cropped to net cropped area. This ratio is usually multiplied by 100.

Table -8.4
Intensification of Land Use: Changes in Cropping Intensity in Arunachal Pradesh

Year	Net area sown	Area under multiple	Multiple cropped area as % of net cropping	Gross cropped area area sown	Cropping Intensity
1970-71	115226	14549	12.63	129775	113
1980-81	118232	17878	15.12	136110	115
1990-91	165616	27882	16.84	193498	117
1995-96	164194				

Source: Different agricultural censuses of Arunachal Pradesh

Difference between Net Area Sown and Gross Cropped Area

Net cropped area or net area sown is the total area cultivated at least once in a year. It does not take into consideration the number of times the land is cultivated in a year. The frequency of cultivation in a year is taken into consideration in the calculation of gross cropped area defined as below:

$$\text{Gross cropped area} = \text{single-cropped area} + 2 \text{ double-cropped area} + 3 \text{ triple cropped area} \dots \dots \dots (1)$$

$$\text{Gross cropped area} = \text{net area sown} + \text{double-cropped area} + 2 \text{ triple cropped area} \dots \dots \dots (2)$$

$$\text{Net area sown} = \text{single-cropped area} + \text{double-cropped area} + \text{triple cropped area} \dots \dots \dots (3)$$

The difference between gross and net cropped area:

$$\begin{aligned} \text{Gross cropped area} - \text{net area sown} &= \\ &= \text{double cropped area} + 2 \text{ triple cropped area} \dots \dots \dots (4) \end{aligned}$$

In all definitions above it is assumed that the maximum number of times the land can be cultivated in a year is three. In the definition of net area sown (definition 3) single, double and triple cropped areas are mutually exclusive and so these are added. We can see in the definition of gross cropped area (definition 1) that double cropped land is multiplied by two and triple cropped land is multiplied by three.

An example:

Assume that a farmer has 5 hectares of land. In all land kharif paddy is planted in July and harvested in the beginning of December (Kharif is an Arabic word meaning autumn). Harvesting over, in 3 hectares mustard is sown and harvested in February end (mustard is a Rabi crop; Rabi in Arabic means spring). In March aus paddy (aus is a kind of summer time paddy) is sown in 2 hectares and harvested in June end. We are to find out the gross cropped area. You can see that net sown area is 5 hectares being the sum of 2 hectares of single cropped, 1 hectare of double cropped and 2 hectares of triple cropped land. Next we find out gross cropped area.

$$\begin{aligned}
 \text{Gross cropped area} &= 2 \text{ hectares of single cropped area} \\
 &+ 2 \quad 1 \text{ hectare of double cropped area} \\
 &+ 3 \quad 2 \text{ hectares of triple cropped area} \\
 &= 5 \text{ hectares of net area sown} \\
 &+ 1 \text{ hectare of double cropped area} \\
 &+ 2 \quad 2 \text{ of hectares of triple cropped area} \\
 &= 10 \text{ hectares}
 \end{aligned}$$

The intensity of cropping in this example is

$$\frac{\text{gross cropped area}}{\text{net area sown}} \times 100 = \frac{10 \text{ hectares}}{5 \text{ hectares}} \times 100 = 200$$

This means that each parcel of land is used, on average, twice. That is, on average two crops are grown in a year. You can see that the intensity of cropping is a scale-free number, that is, it has no unit of measurement. It becomes scale-free because the hectare in the numerator is cancelled by the hectare in the denominator.

We see in Table- 8.4 that the intensity of cropping increased in Arunachal Pradesh during 1970-71 to 1990-91. In 1970-71 the intensity of cropping was 113 which increased to 117 in 1990-91. This means 13 per cent of the net area sown in 1970-71 was cropped more than once and the area under multiple cropping increased to 17 per cent of the net area sown in 1990-91.

8.4.4 Farm size in Arunachal Pradesh

Over the years the average size of farms in Arunachal Pradesh has decreased. In 1970-71 the average farm size was 6.19 hectares. This is a large size. As shown in Table-8.5, the farm size declined to 3.31 hectares in 1995- 96. The numbers of holding in 1970-71 were 78990 and operated area 489011 hectares. From 1970-71 to 1980-81 there was a sharp fall in the operated area and the most surprising thing is that the number of farms (holdings) also declined in that decade. The decline was, of course, very small.

In 1980-81 there were 78542 farms in Arunachal Pradesh operating an area of 335732 hectares. In the next 15 years the number of farms increased rapidly. In 1995-96 there were a total of 103734 farms operating an area of 343719 hectares.

It can be noted that in the calculation of the farm size the operated area is taken. Instead of that if net sown area or gross cropped area is taken a better picture will be available. In 1995-96, the net area sown per farm was 1.58 hectares.

Table - 8.5
Changing farm-size in Arunachal Pradesh
(Area in hectares)

Year	Number of operational holdings	Operated Area	Average size	Changes in of size of holdings
1970-71	78990	489011	6.19	—
1980-81	78542	335732	4.27	1.92
1990-91	94357	349891	3.71	0.56
1995-96	103734	343719	3.31	0.40

Note: Farm size is the average size of holdings

8.4.5 Size-Class Distribution of Holdings

From the average size of the farm we do not know about the inequality in the distribution of holdings. The inequality is shown by the distribution of different size classes. Table 8.6 shows the distribution of holdings from the agricultural census 1995 - 96. In Table 8.6 column 1 is the size class of holdings. Column 2 shows the number of holdings in each size class. In column 3 the area under each size class appears. The percentage of holdings in each size class is shown in column 4 and the percentage of area appears in column 5. Cumulative percentage of holdings and area are shown in columns 6 and 7 respectively. The last column shows average farm size in each size class.

The smallest size class is below 0.5 hectares. There are 9593 farms in this class and the area cultivated by these farms is 2697 hectares. The number of holdings in this size class constitutes 9.25 per cent of the total, but the area under these holdings is only 0.78 per cent of the total area. The average farm size under this class is only 0.28 hectares. If we proceed this way we see that 39.46 per cent of the holdings are less than or equal to 2 hectares but the total area cultivated by them is only 10.39 per cent of the total cultivated area. On the other side of the distribution, 9.05 percent of the holdings are large-sized; these are more than 7.5 hectares. The area cultivated by these farms is 31.63 per cent of the total.

The largest size-class is above 20 hectares. In Arunachal Pradesh there are 722 farms in this size class and the average farm size of this class is 27.37 hectares. These farms form only 0.70 percent of the total; but the area cultivated is 5.75 per cent of the total. In the traditional society of Arunachal Pradesh, the distribution of landholdings was not very unequal. With the establishment of individual ownership of land, the inequality in the distribution of landholdings has increased.

Table -8.6
Size-class distribution of holdings in Arunachal Pradesh: 1995-96
(Area in hectares)

Size class of holdings	No. of holdings	Area (ha)	% of holdings	% of Area	Cum % of holdings (X)	Cum % of Area (Y)	Average far in size
1	2	3	4	5	6	7	8
Below 0.5	9593	2697	9.25	0.78	9.25	0.78	0.28
0.5-1	11264	7408	10.86	2.16	20.11	2.94	0.66
1 - 2	20077	25600	19.35	7.45	39.46	10.39	1.28
2 - 3	17188	38045	16.57	11.07	56.03	21.46	2.21
3 - 4	12188	39033	11.75	11.36	67.78	32.82	3.20
4 - 5	10806	45574	10.41	13.26	78.19	46.08	4.22
5 - 7.5	13234	76632	12.76	22.29	90.95	68.37	5.79
7.5 - 10	3839	32011	3.70	9.31	94.65	77.68	8.34
10 - 20	4923	56956	4.65	16.57	99.30	94.25	11.81
Above20	722	19763	0.70	5.75	100.00	100.00	27.37
Total	103734	343719	100.00	100.00	100	100	3.31

Source : Calculated on the data from the Agriculture Census of Arunachal Pradesh 1995-96

8.4.6 Cropping Pattern

Rice was the principal crop in jhum cultivation. Even in settled cultivation, rice is so important that it is often called the wet-rice cultivation. However, in the last few decades Arunachal agriculture has shifted somewhat from this crop. A number of non-traditional crops are changing the face of agriculture in the State. Wheat, pulses, oilseeds and different spices are new-comers but their importance is rising slowly. As shown in Table 8.7, rice was cultivated in 58.47 per cent of the area in 1980-81, the next crop in importance was maize occupying 15.10 per cent of the cultivated area and the third crop was millet which was cultivated in 11.81 per cent of the area under crops. Wheat was the least important cereal. All these four crops, rice, wheat, maize and millet together claimed 87.31 per cent of the State's cultivated area. Vegetables, spices, oilseeds, etc. were cultivated in 12.69 per cent of the cropped area

Table - 8.7
Land under Different Crops in Arunachal Pradesh
(Area in hectares)

Crops	1980-81		1990-91		2002-03	
	Area	% of total area	Area	% of total area	Area	% of total area
Rice	83442	58.47	121846	52.98	124584	48.89
Maize	21554	15.10	37565	16.33	40548	15.91
Millet	16851	11.81	19785	8.60	21110	8.28
Wheat	2751	1.93	3536	1.54	4114	1.61
Sub-total	124598	87.31	182732	79.45	190356	74.69
Vegetables	9002	6.31	16037	6.97	21324	8.37
Pulses	960	0.67	5471	2.38	7305	2.87
Oilseeds	6309	4.42	22589	9.82	28494	11.18
Spices	1285	0.90	2838	1.24	6570	2.58
Sugarcane	548	0.39	320	0.14	798	0.31
Sub-total	18104	12.69	47255	20.55	64491	25.31
Grand total	142702	100.00	229987	100.00	254847	100.00

Source: Statistical Abstract of Arunachal Pradesh: different years

Cropping pattern changed in the next two decades. Rice lost its supremacy. In 2002-03, rice claimed less than half of the cultivated area in the State. Maize retained its relative position, but millet suffered a relative decline, the share of land under it was only 8.28 per cent of the total in 2002-03. The share of all cereals declined from 87.31 per cent in 1980-81 to 74.69 per cent in 2002-03; it is indeed a sharp fall. In the non-cereal sector the largest gainer was the oilseeds; its area rose from 4.42 per cent of the total to 11.18 per cent in 2002-03. The area under spices also expanded but the expansion was not very high. The area under pulses rose from 960 hectares in 1980-81 to 7305 hectares in 2002-03, registering an increase of 660.94 per cent in the course of 22 years. However, its relative importance did not increase during this period.

Agriculture in the State has been turning towards the non-traditional crops. In the process the commercial principle is being applied to the selection of crops. New inputs are being used and the productivity of land is on the increase. However, Jhuming is still practised in many areas. No viable alternative to Jhuming has yet been found. Orchardisation is one alternative but gestation in fruit-cultivation is a hindrance to its adoption. Moreover, market has not yet penetrated in the interior areas and as a result the fruit producers find it difficult to sell their products. So the problem of substituting Jhuming by alternative agricultural practice remains as complicated today as it was before.

Check your progress-III

1. How does non-homogeneity of land affect its uses?
2. What is fallow land? Do you find any relationship between the duration of fallow and the stage of agricultural progress?
3. Distinguish between gross cropped and net cropped area.
4. What do you mean by cropping intensity?
5. What is the rate of decline of average size of holdings in Arunachal Pradesh?
6. From Table 8.6, find out the percentage of area of the holdings whose size is less than 3 hectares.
7. Why is cropping pattern changing in Arunachal Pradesh?

Unit IV: Industry

8.5 Problems of Industrialization in Arunachal Pradesh

8.5.1 Industrialization and Economic Development

Industrialization and economic development are so deeply related that it is difficult to think of development without industrialization. Since no country has yet been able to develop without being industrialized, industrialization is often equated with development. Industry has been the breeding ground of inventions, innovations and new technologies, which have proved the motive force of all development. Because of adoption of new technology, the principle of diminishing returns cannot operate in the industrial sector. The spread of industrial technology and organizational principle in different sectors has released the forces of growth.

The organizations of production, work culture and progressive outlook in the industrial sector have always been attractive to the other sectors which have adopted the industrial principle. The spread of industrial principle throughout the economy is often called industrialization of the economy. Thus we talk of industrialization of agriculture or banking industry, etc. The organizational principle, the rapid adoptions of new technology, etc. followed in industry are sometimes considered to form a system of values called industrialism. In this view industrialization is not just setting up a particular industrial firm; it is much more than this. It is the urge of the people to invent and innovate in the areas of technology and organization of different activities and to satisfy this urge by being guided by science. This broad sense makes development just a product of industrialization.

We can make some elaboration of how industrialization works. The motive force of modern industry is science and technology which is also the vehicle of modernization. In a number of ways industrialization provides the ingredients for modernization and development. One way is through urbanization. Industrialization leads to the concentration of population in towns and cities. A dense population in the urban areas facilitates the development of infrastructure cheaply. Educational institutions come up; transport and communication systems are established and improved health services become available. All these factors along with a high frequency of contact among the urban people facilitate the accumulation of human capital. People become more innovative and at the same time there is a high rate of diffusion of innovations and information. The diffusion does not remain limited to the urban industrial areas; it covers more and more areas. The process of diffusion becomes automatically slow in the rural areas because of low density of population, low literacy, and poor transport and communication systems.

From industry flow not merely the ideas, but also the inputs for agriculture and other rural activities. Fertilizers, pesticides, power tillers, tractors and various implements are the products of industry.

Thus, industrial expansion helps agriculture. The help is not, however, only in one direction. The growth of agriculture also helps industry in a number of ways: supplying food, raw materials and labour. The relationship between the growth in agriculture and industry is thus positive. Being the seat of new technology, industry acts like a school for skill formation. By working in industry people become more skilled, and more capable. They become more productive and innovative. Skill, capability, innovativeness, etc. are the raw materials which compose development.

8.5.2 Modern Industry in Arunachal Pradesh

Modern industry is very new in Arunachal Pradesh. There was no modern industry prior to the independence of the country. Even in the 1950s and 1960s no modern industry could be established in the State. Industrialization began in the 1970s under the direct initiative of the Government. A number of small and medium-scale industries were established and they became operational in the 1980s. These industries, owned and managed by the Government, could not show much profits. Some of these suffered huge losses. So they were closed down. Apart from this the Supreme Court's restrictions in 1996 on the felling of trees rendered some timber-based industries in operational. In the 1970s the contribution of manufacturing industry to the Net State Domestic Product (NSDP) of Arunachal Pradesh was very small. For example, in 1970-71 manufacturing contributed only 0.85 per cent of the NSDP. In the 1980s industrial contribution to the NSDP increased substantially. Throughout the 1980s NSDP derived more than 6 per cent from manufacturing. The year 1989-90 witnessed the highest contribution from the manufacturing industry to the NSDP. We can say that Arunachal Pradesh, in her short history of industrialization, achieved the most glorious point in 1989-90 when industry contributed 6.60 per cent of the NSDP. Afterwards, the relative position of industry in the economy declined, first slowly and then sharply. So industrialization shows a rise and a fall. It began in the 1970s, reached the climax in the 1980s and suffered an eclipse in the 1990s. Thus, the 1980s can be called the decade of industrialization, and the 1990s the decade of deindustrialization.

8.5.3 Present Status

At present there are mainly village and small-scale industries operative in Arunachal Pradesh. The numbers of medium-scale industries are very small. In 2002-03 there was no medium-scale industry in operation; only 491 village and small-scale industrial units were working on 31st March 2003. All these units employed 2044 people; the average employment per unit is 4 people. The total output produced by these units was Rs. 14.17 crores. The average output per unit is Rs. 2.89 lakh, and the average output per employee is only Rs. 69 thousand (The data is from Statistical Abstract of Arunachal Pradesh 2003). The size of the average unit is very small. As we know when the size is small, the average cost of production may be high.

The output of the village and small-scale industries is only a part of the total industrial output. As you know the households especially in the rural area are also involved in many industrial activities. If the output of the household-level industrial activities is added to what is produced by the village and small-scale industries, we get the measure of total industrial output, called value added in manufacturing. In fact the net value added in manufacturing is nothing but the amount of NSDP from manufacturing. In 2003-04 manufacturing contributed Rs. 40.34 crores at current prices to the NSDP. This is a very small amount of output. Even a medium-sized firm produces an amount higher than that. So, Arunachal Pradesh remains very weak industrially. We should now try to identify the problems of industrialization in the State.

8.5.4 The Problems: General

Gap in Work Culture

A large gap exists between the work culture in the traditional and modern industry. The traditional industrial activity was not full-time. It was done leisurely when the pressure of other activities was less.

Since the output was not for sale in the market, the production activity was not time-bound and no fixed routine was followed. The industrial activity was part of the work space consisting of jhum cultivation, hunting, fishing and various gathering activities. Some of these activities such as hunting, fishing, etc. were done jointly. These activities were, often, full of joy and satisfaction, and created a lot of diversion. Not that all the activities in the traditional economy were full of recreation. Far from it, parts of jhum cultivation were strenuous involving a substantial amount of drudgery. But if we take the totality of work, we can find that there was freedom and work was not pursued with a mechanical rigour.

The work culture in the modern industry is so removed from that in the traditional household industry that there is hardly any similarity. The very purpose of the modern industry is to earn profit. An industry can stay in business as long as it earns profits. So production becomes time-bound, and work becomes routinised and largely full-time. Skill and efficiency are highly valued. A lot of work is mechanized and the worker has to maintain rhythm with the machines. Carelessness may bring accidents. The commonly observed outcomes of industrial work are monotony and boredom. Because of the large gap in the work culture, industrialism is yet to make inroads in the demand side of the job market. That is, industrial work is not yet attractive to many who are on the job search. So we cannot say that the industrial labour in the State has emerged. No doubt education has spread in the State, but educated people have chosen the jobs in the service sector specially in public administration. Even in trading activities their presence is not yet substantial; only work in which they have advanced is in different construction activities. However, their presence in these activities is not in the form of labourers, skilled or unskilled, but in the form of contractors.

Technological Gap

The gap between the Jhuming technology and modern industrial technology is very wide. In jhum cultivation the tools used are axe, spade, sickle, hoe and dao (bill hook). From sickle-hoe technology to the computer-aided industrial technology is a distance too long to be covered easily.

The view of Stage Theorists

The stage theorists hold that a society's technological progress takes place through stages. A big jump is almost impossible. A society can adapt itself to incremental improvements in technology. A new technology requires learning, if it is very sophisticated; the amount of learning required for its profitable application is too high to be feasible. For example, a student of class VI must pass through the next four classes to matriculate. A direct route from class VI to matriculation is unthinkable for most of the students.

Critique of Stage Theory: Diffusionism

There are many scholars including economists who do not believe in stage theory. They argue that the actual technological progress does not follow a linear path. There are discontinuities and jumps. Diffusionists think that the new technology appears in some society and from there it spreads throughout the world. When the new technology is better than the old it finds acceptance. Since the new technology may be easier to handle, may be more user friendly and more automatic than the old, its adoption does not create insurmountable problems. We can give many examples to show that the view of the stage theorists may not be true at all. Take steam engine and diesel engine. Which one is easier to handle? Evidently, diesel engines. Take another example, a bullock cart and a motorized vehicle. The driving of both requires learning but we cannot say that a bullock cart driver would not be able to learn the driving of a motorized vehicle. So the problem may not be as serious in technological gap as it is made out to be.

Round-about production: waiting and patience

The production with capital is round-about, as the famous economist, Bohm-Bawerk told long ago. The use of capital in production is often called capitalized production. In some processes of round-

about production, the length between the application of inputs and final output is high. This length is called gestation period. In the traditional production system in Arunachal Pradesh the use of capital was insignificant and so the production was not round-about and the length of production was, in general, small. This involved a small waiting compared with that in capitalist production. Take the example of fishing. Catching fish in a river does not involve much waiting but a person rearing fish in a pond must wait for at least three months. If she/he becomes impatient, then rearing is not possible. This is indeed a problem for a switch-over from traditional non-capitalized to modern capitalized industrial production.

Problems in Production for Market

There is a fundamental difference between the production for market and the production for home consumption. The industrial production is meant for market. It can be visualized as a triangle with one side being science, the second side technology and the third art. This production triangle is composed by the condition of demand and the efforts of cost minimization. In the process of traditional production the forces of composition, demand and cost, are so different that no triangle is visible. The technology in traditional production is empirical, not guided by science. Art is not joined with production through cost. A lot of artistic work may exist but it may be guided neither by the demand in the market nor by a desire to minimize cost. A huge amount of efforts may be applied to artistic creations required in religious rituals or for personal use, but from cost point, it may not be feasible for market production. In general the products used for home consumption may not be aesthetically attractive. It may have neither a good design nor a good finishing. So the production for market requires a totally new orientation, because unlike home consumption anything cannot be put on the market.

Getting a Niche in the Market: Competition

In the traditional economy, there is supply constraint. The problem lies in production. In the industrial production, the problem lies in the ability to sell. The market is flooded with goods and services. To capture a segment of the market is not easy. One must be able to compete with the existing producers. Since it is difficult to innovate a totally new product; a newly industrializing state would have to produce the existing products with new brand names. The product should be qualitatively better if it is to be sold at the existing market prices or if the quality of the new product is the same as the old, then its price must be lower; otherwise getting a market niche is almost impossible. This is a basic problem of industrialisation not only for Arunachal Pradesh but for any newly industrialising society.

8.5.5 The Problems: Specific

The problems discussed above are the general problems of industrialization in any society where the gap between the industrial and traditional production systems is wide. But we should highlight some problems which are too specific to Arunachal Pradesh.

Specific Problems

Lack of Demand

Arunachal Pradesh has a very low density of population. No big urban agglomeration exists, not even a city. This along with a low per capita income keeps the local demand for industrial goods low. There is also no big market in the neighbourhood of the State.

Lack of Infrastructure

This is a problem which afflicts industrialization in the hilly areas. The plains, the urban and semi-urban areas are not so much affected by the lack of infrastructure. True that infrastructure is a necessary condition but it is not sufficient. So other problems must be identified. We have examples of infrastructure being present but no industrialization.

Lack of Inputs

Industrial production requires a large number of inputs most of which are not locally available. These inputs are to be procured from a market situated far away. This raises the cost of production.

Lack of an Entrepreneurial Class

Unlike many traditional societies, Arunachal Pradesh did not have a business class of its own. Now only a business class is growing but this class is yet to enter the industrial sector.

Weak Property Rights

This is a basic issue plaguing industrialization in the State. Economists belonging to the property rights school will tell in one voice that the main problem in the industrial breakthrough in the state is the absence of a strong property rights regime. When property is not well-protected by a healthy social atmosphere and the Government's judicial system, accumulation of capital, investment activity and especially long-term industrial investment suffer badly. It may be noted that in Arunachal Pradesh the judicial branch has not yet been separated from the executive branch and so the provision of judicial services is not yet adequate.

Weak Enforcement of Contract

Industrial production is largely organized in a firm situated outside the home. This is extra familial organization of relations with different cultural and social backgrounds. Bound by contract they are supposed to work unitedly.

In any contract the third party intervention is necessary. This third party in case of any formal contract is the government. The government must enforce all contracts with a strong hand, otherwise contractual relations cannot grow. In our context contractual relations are industrial relations. When the government's enforcement mechanisms are weak, industrial relations and hence industry cannot grow. One glaring example of weak contract enforcement mechanisms in the state is the low recovery of bank loans.

8.5.6 Strengthening Institutions as a Step towards Solution

A weak property rights regime and weak contract-enforcement mechanisms are organically related. One cannot be strong and effective unless the other is. In order to strengthen the base for industrialization it is essential that the Government of Arunachal Pradesh should strengthen the property rights regime as well as contract-enforcement mechanism. The government should start with protecting its own property: roads, highways, public offices, etc. This requires a strong enforcement capability guided by fairness and impartiality. Unless the Government can protect its own property, it will be hardly successful in protecting the private property and ensuring the performance of contracts.

Along with the building of institutions such as protecting property rights and enforcing contracts, the Government should take a number of policy measures to create the climate for industrialization in the State. Training of entrepreneurs, establishing market network, creating facilities for marketing industrial products in the rest of the country, etc. are essential steps to be undertaken by the Government in order to promote industrialization in the State.

8.6 Let Us Sum Up

Arunachal Pradesh has experienced substantial progress in agriculture and industry in the last 50 years. However, the progress in agriculture is more pronounced than that in industry. The traditional agricultural practice was predominantly Jhuming, which was low productive. The land tenure vested

ownership rights of land in the community and the individual cultivator enjoyed only usufructuary rights. In the years after independence settled cultivation was extended in the plains of the State. This was accompanied with far reaching changes in the institutional and technological configurations of agriculture. The permanently-cultivated land became individual property, plough replaced spade, and new crops, especially the commercial ones, were introduced. High yielding varieties of seeds, chemical fertilizers and pesticides found applications in many farms. As an income generator, settled cultivation became more important than Jhuming; but in terms of employment the traditional agricultural practice is still more important than settled cultivation.

The state has not achieved much success in industrialisation. No large-scale industry has yet been established in the state. Even the medium-scale industries which were set up under the initiative of the Government could not all succeed; most were closed down. Many problems tend to weaken the process of industrialisation: technological gap, new work ethic, capitalised mode of production in industry, weak contract enforcement mechanisms, weak property rights, etc. Industry can flourish in the state if most of these problems are solved.

8.7 Key Words

- Settled cultivation** : The agricultural practice which uses land intensively, usually the same land is cultivated year after year without keeping it fallow for more than a part of the year.
- Shifting cultivation** : It is also known by other names: swidden or slash-and-burn cultivation and Jhuming or jhum cultivation. This agricultural practice uses land extensively. A parcel of land is cultivated for two or three consecutive years and then it is left fallow for a number of years.
- Agricultural surplus** : The excess of production over consumption of different agricultural crops. A more precise concept is operating surplus in agriculture defined as the value of production minus paid-out cost. Also called marketable surplus, the agricultural surplus is a measure of the productivity of agriculture. In subsistence agriculture, for example, Jhuming the surplus is insignificant, but in commercialized or industrialized agriculture surplus is high.
- Property** : The relation between the person and the things possessed by him/her. In the concrete sense, the thing possessed is called property. Property is characterized in terms of the degree of rights enjoyed by the owner. Higher the degree of rights, the stronger is the property and the lower the degree of rights, the weaker the property.
- Land tenure** : The relationship between land especially cultivable land and the people having interest in it. A person may be related with a parcel of land in various ways, as an owner as a tenant or as a worker. The tenure of a plot of land shows the degree of rights of all these interested people.

Traditional land tenure in Arunachal Pradesh: The cultivable land especially jhum land was community owned; the individual cultivator enjoyed the ownership dur-

ing the operation of land. Once left fallow, the land reverted to the community. The right enjoyed by the cultivator is called the use right or usufructuary right.

Tenancy : A triangular relationship connecting the land, its owner and its operator (tenant). Tenancy can be characterized in terms of the rights and obligation of the owner and the cultivator of the land. There are two main types of tenancy: fixed-rent tenancy and share cropping. In fixed-rent tenancy the tenant pays a fixed amount in cash, in kind or in both to the land lord for the cultivation of the land. The amount of payment, rent, is normally decided before the tenant undertakes the cultivation. In share cropping the tenant pays the land lord a share of the output of the tenanted land.

Intensity of cropping : The ratio of the gross cropped to the net cropped area. The ratio is normally multiplied by 100. It shows the number of times the cropping takes place in a year.

Gross and net cropped area : Gross cropped area is the net cropped area plus the multiple cropped areas.

Contract enforcement mechanism: A fundamental responsibility of all governments is to enforce contracts made by the people. If government fails to ensure the performance of contracts, it is taken to be weak and inefficient. In the traditional society there is usually face-to-face relationship among the members of a community which is small, but in the urban industrial society, many relationships are contractual in nature. The contractual relationships require safeguards from the government.

8.8 Check Your Learning

1. Describe the changes that have taken place in the agricultural practices in Arunachal Pradesh since the 1970s.
2. What are the salient features of the traditional land tenure in Arunachal Pradesh?
3. Make a comparison between the traditional and the present land tenure of Arunachal Pradesh.
4. What is land tenancy? How does it affect production and distribution of land ownership?
5. How is operated land distributed among different uses in Arunachal Pradesh? Do you notice any changes in this distribution?
6. Discuss the changes in the cropping pattern in Arunachal Pradesh.
7. Describe the pattern of land holdings in Arunachal Pradesh.
8. Distinguish between the traditional industry in Arunachal Pradesh and the modern industry in terms of organization, work culture and technology.
9. What do you mean by technological gap? How does this gap stand in the way of industrialization in Arunachal Pradesh?
10. What do you mean by property rights and contract enforcement mechanisms? How do they affect industrialization in the state?

8.9 Suggested Readings

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- Majumder, D.N. (ed) : Shifting cultivation in North East India, New Delhi: Qursons, 1990.
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8.10 Hints/Answers to Questions in Check Your Progress

Check Your Progress-I

1. Development is the capacity of a society to increase its income, to improve the health status of its people and generate technological progress. This all-embracing capacity comes essentially from savings which is income above consumption. By generating savings settled cultivation lays the foundation for development because in settled cultivation surplus could be produced unlike jhum cultivation which is subsistence in nature.
2. The main similarities between the traditional settled cultivation and Jhuming are that both of these have subsistence orientation in production and both are the way of life of the people engaged in them.
3. The settled cultivation can be distinguished from Jhuming on several points. One is the intensity of cropping: settled cultivation is more intensive than Jhuming. The second point of difference is that settled cultivation accommodates technical improvement easily but Jhuming does not.
4. In terms of employment Jhuming is more important in Arunachal Pradesh than settled cultivation, but in terms of production settled cultivation has in recent years emerged more important than Jhuming.
5. The main problems of extension of permanent cultivation in Arunachal Pradesh are created by the hilly topography. The hill slopes especially when steep, cannot be terraced easily for permanent cultivation.

Check Your Progress-II

1. By property we mean a set of rights in an object. One element from this set may be the right to use the object, the second element may be the right to sell the object and the third one may be the right to will away the object. More elements are there in the set of rights which thus define the relationship between the owner and the object.
2. The usufructuary right in land is the right to use it, but this right does not endow the user with the permanent ownership of the land. The usufructuary right is, by its very nature, temporary.
3. Land tenure is the set of conditions defining the relationship between the land and its

owner and cultivator. The owner may enjoy a high degree of property rights in land in some societies while in others the degree of property rights in land may be low. Tenancy arises when the operation of land is separated from its ownership. In the traditional society of Arunachal Pradesh, the temporary ownership of land was not separable from its operation. So tenancy could not grow. When land came to be owned permanently, there arose a possibility of operation of the land being separated from its ownership. The operator when different from the owner is called the tenant. Tenancy is thus a relationship between the tenant (cultivator) and the landlord, established through the cultivation of the land.

4. The transformation of the usufructuary right in land into the permanent ownership right can be explained with the demand for and supply of land. In a barter-based jhum economy the land is used mainly in crop production. The absence of market discourages the production of fruits, flowers, medicinal plants, etc. So the demand for land arises from jhum cultivation which, however, is cyclical. Cultivation continues as long as the land is fertile. The exhaustion of its fertility leads to the cessation of its cultivation and vanishing of demand. The abundant land relative to the size of the population and its temporary demand do not give rise to any permanent value of land to the individual. So, there is only usufructuary right in the barter-based jhum economy.

When the quality of land is improved so as to make it capable of being cultivated permanently and simultaneously there is the growth of market, there is the upward shift of the demand for land. So when the jhum land is put to permanent use either for crop production or horticulture, the usufructuary right is transformed into the permanent ownership right.

5. In fixed-rent tenancy, the tenant pays the landlord a fixed amount of rent. The rent may be paid in cash or in kind or in both. Normally, the rent as well as its mode of payment is fixed before the land is given to the tenant. In sharecropping the landlord receives a share of the output. This share is usually fixed before the land is given to the tenant. The main differences between them are:
 - (a) In fixed rent tenancy, the tenant bears all risks of production but in sharecropping the risk is distributed between the landlord and the tenant (sharecropper).
 - (b) The tenant has full incentive in case of fixed-rent tenancy but in case of share cropping the tenant does not have the full incentives because the output of his /her labours is shared by the landlord.
6. Two types of tenancy are found in Arunachal Pradesh: fixed-rent and sharecropping. Sharecropping is however, more wide spread than fixed-rent tenancy. In fact most of the land in Arunachal Pradesh remains under owner-cultivator; only a small portion of land (about 1 percent) is under tenancy.
7. The effect of tenancy on production is likely to be negative. The share cropper has a low incentive to raise the output because of its sharing with the landlord. Though the fixed-rent tenant has the full incentive to raise the output, there is the high possibility that s/he would overuse the land at the cost of the long-run quality of the soil. So we can conclude that the overall effect of tenancy on production especially in the long-run is negative.

Check Your Progress-III

1. Non-homogeneity of land affects its uses in various ways. Topographically non-homogeneous land comes under different agricultural practices. Jhuming is practised on the hilly land while plains are permanently cultivated. Given the topography, there is a wide variation of soil fertility and its crop-specificity. A plot of land may be suitable for the cultivation of paddy while the other may be suitable for wheat.
2. The agricultural land, not being cultivated, is fallow land. In an agricultural year if a plot of land is not used but it was used in the previous year, it is called current fallow. A parcel of land may be left fallow for a number of seasons. For example, the jhum land may be left fallow for more than ten years. We can see a negative relationship between the duration of fallow and the stage of agricultural progress. That is, the duration of fallow declines as agriculture progress.
3. Gross cropped area takes into consideration the frequency of cropping during an agricultural year, but the net cropped area does not do so. For example, if a farmer has one hectare of land which is cultivated thrice in a year, then his/her gross cropped area is three hectares but the net cropped area is one hectare.
4. The cropping intensity shows how frequently the land is cultivated. It is the gross cropped area as the percentage of the net cropped area. So when the gross cropped area is 3 hectares but the net cropped area is one hectare, the intensity of cropping is 300.
5. The average size of holdings reported by the agricultural census of 1970-71 was 6.19 hectares in Arunachal Pradesh. In 1980-81 the average size of holdings turned out to be 4.27 hectares. The average size declined by 1.92 hectares and the rate of decline is 31.02% during 1970-71 to 1980-81, and in this decade the yearly decline is 3.10%. If we take the entire period of 25 years (from 1970-71 to 1995-96), then the yearly fall in the average size of holdings is 1.86%.
6. The area of the holdings whose size is less than 3 hectares is 21.46% of the area under all holdings.
7. Three factors are responsible for changing in cropping pattern in Arunachal Pradesh. One is technological: The extension of settled cultivation which enabled the farmers to produce new types of crops. The second factor is the change in consumption habits of the people. This is due to the spread of education, migration and urbanisation. Lastly, the slow spread of market led to the introduction of commercial crops.



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