

**DEMAND FOR AND SUPPLY OF TECHNICAL MANPOWER:
A STUDY WITH SPECIAL REFERENCE TO DOCTORS AND ENGINEERS
IN MIZORAM**

Dissertation

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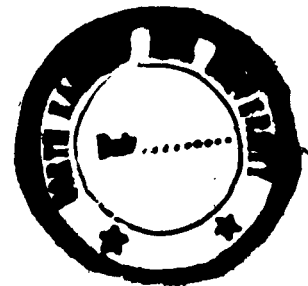
IN

PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF
Master of Philosophy in Economics

By

R. LALNUNTLUANGA

To



DEPARTMENT OF ECONOMICS
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CERTIFICATE

This is to certify that this dissertation entitled **DEMAND FOR AND SUPPLY OF TECHNICAL MANPOWERS : A Study with Special Reference to Doctors and Engineers in Mizoram** submitted by Mr. R. Lalnuntluanga for the award of the degree of **Master of Philosophy in Economics**, is an original piece of work carried out by him under my supervision. This work or part thereof has not been submitted for the award of the degree of any other University nor has it ever been published anywhere.

The dissertation, in my opinion, is worthy of being considered for the award of the Degree of Master of Philosophy.

November 29 , 1990


(T. Lawma) 29/11/90.
Supervisor

Forwarded :



(K. Bez)

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CONTENTS

	Page No.
Chapter I	
INTRODUCTION	1-10
Chapter II	
GENERAL BACKGROUND OF MIZORAM ECONOMY	11-34
Chapter III	
REVIEW OF LITERATURE	35-68
Chapter IV	
EMPIRICAL ANALYSIS	69-94
Chapter V	
MAJOR FINDINGS AND CONCLUSION	95-100
BIBLIOGRAPHY	101-118
APPENDICES	
Statistical Supplements	I-XXV
Abbreviations	XXVI-XXVII

Chapter I
INTRODUCTION

The present developing countries has since recently been growing at a relatively faster rate than at any time in the past. The per capita income also increases at a rate higher than those achieved by today's developed countries in their early years of development.¹ This is particularly true for the developing countries like India since it is not necessary to go through all the stages of growth that the developed countries had undergone or experienced in their history of development. Economic growth and development in modern time is generally brought about by scientific and technological advancement which is generally associated with the replacement of labour intensive by capital intensive techniques of production. This brings about a systematic improvement in equipments, machines and tools. For proper utilization of these machines and other equipments, it is necessary to improve the skill and knowledge possessed by manpowers. However, scientific and technological improvement cannot be evolved without proper training and education of the labour force. A country may be rich in natural and physical resources such as machinery and other capital equipments, but unless there are men who can mobilise, organise and harness nature's bountiful resources for the production of goods and services, the country cannot make rapid progress towards economic and social advancement. It is, therefore, imperative for developing countries to build up and formulate systematic manpower requirement projection to generate the ever increasing requirements of scientific knowledge and technological improvement. Thus, "the fundamental problem in developing countries is, therefore, not so much the creation of wealth but rather the creation of the capacity to create wealth".²

There is a growing realisation that human capital acts as an active agent to increase production and productivity. Natural resources and physical capital alone are not sufficient in developing a highly productive economy. Human skills and expertise are essential in fueling the dynamics of development. Anderson and Bowman traced the linkage between early industrialisation in the west and literacy and they showed that the development and transmission of practical knowledge and intellectual skills are at the heart of economic development. They made a conclusion of their studies that :

"... a dynamic economy can be launched and sustained only through the efforts of men at all social levels who embody both conventional learning and technical manipulative skills - including specifically skills in the decoding of instructions and the 'debugging' of new processes. A complex economy rests on widely diffused tools for communication, storage, and retrieval of knowledge."³

Another study undertaken by an American economist, Edward F. Denison⁴ identified the contribution of different factors of production to the increase in the national income or gross national product (GNP) of the United States between 1910 and 1960 by using the concept of production function. His preliminary analysis showed that increases in the quantity of labour and physical capital did not explain the increase in GNP. There was a large 'residual factor'. He suggested that improvements in the quality of the labour force, including increased education, were important, together with other factors such as technological progress and economies of scale. He concluded his analysis that increases

in the level of education of the labour force accounted for as much as 23 per cent of the annual rate of growth of GNP in the United States between 1930 and 1960. Another studies have also been taken up by economists like R. Solow,⁵ B. Massal⁶ and O. Auckrust⁷ and the broad conclusion which emerges from these studies is that major part of growth in production in the developed countries, over the last half a century, cannot be accounted for by the inputs of physical capital, man-hours and natural resources. The major part of the growth in production must be ascribed to technical progress and the investment in education, training and research.

Economic growth and development may be the result of many factors. But the contribution of human capital rather than physical capital, has gained ground in recent years. However, most of the human capital formation takes place through the process of training and education of the labour force. The contribution of education to growth and development in turn occurs through the increase in the productivity of labour force in various ways. A fast growing economy requires more people who can read and write in order to keep financial records, read plans and blueprints, and carry out similar functions related to the production and distribution of goods and services. Higher levels of per capita income are also based on a higher level of scientific and technological attainment, requiring a larger number of scientists, technicians, engineers, and doctors to conduct research and oversee the technological adaptation of research. Moreover, in general, countries that have higher levels of income also have higher levels of educational attainment. However, education and

training of manpowers for the development of the economy is a long-term process. It is, therefore, necessary to plan education and training of labour-force well in advance so as to ensure availability of skilled manpowers of right types in right numbers and to avoid the using of scarce resources in educating more people than required or to prevent shortage of manpower of requisite types acting as bottlenecks constraining development.⁸

Thus, changes in economic structure necessitate changes in the structure of manpower as well which can be manipulated more efficiently through planned rather than market forces. For self-sustaining economic growth, it is, therefore, necessary to integrate manpower projections and educational planning as a part of national economic planning. The success of development planning depends on whether planning for educational development is consistent with manpower requirement, on the one hand, and whether manpower requirements and educational planning go hand in hand with planning for economic development. It is, therefore, obvious that manpower planning based on realistic estimates for the present and perspective manpower requirement is now-a-days the core of development planning. However, manpower projections are an integral part of national economic planning in general and educational planning in particular. The need for manpower projection arises because⁹ : first, economic development is very often the direct result of improvement in the techniques of production that are generally brought about by the substitution of capital for labour and the systematic improvement in the existing equipments. The new techniques of production call for the employment of labour force

having the relevant specialized skill and knowledge. Therefore, the training and education of manpower should be planned in advance so that shortages and surpluses of these specialized manpower would not hinder the economic development of a country. Secondly, projection of future manpower requirement would help individual student and their parents in shaping their future careers and courses of studies. Prospect of employment and rate of return from investment will be the most important deciding factors in this regard; and lastly, there have been efforts to place medium term plans into long-run perspective planning so that the structures of the economy and the labour force can be influenced.

Mizoram, being a late starter in development planning, is lagging behind the other states of India. Prior to the attainment of Union Territory status in 1972, there was practically no development programmes and schemes sponsored by the central or the state government. It was one of the remotest districts of Assam and had been neglected for a long time. After the district became Union Territory, some planning programmes and schemes were started in different departments. But this was not enough. Moreover, lack of the resources and expertise in planning had been felt in many fields, especially in manpower planning. Although, Mizoram has one of the highest literacy percentage in India, it is also one of the most backward states in the country. This may, perhaps, be due to the lack of education planning in general and technical manpower in particular. The educational system has been dominated by general education rather than scientific and technical education. This is

clearly seen from the fact that there are more than one thousand institutions for general education as against only two for technical education, i.e. Polytechnic Institute at Lunglei and Industrial Training Institute at Aizawl. The number of matriculate and above who registered themselves as on 1.4.1987, with the employment exchange at Aizawl alone were 8652 as recorded in the Statistical Handbook of Mizoram. Unfortunately, none of these people has a degree or even diploma in technical education.

The important role that technical manpowers play in the economic development of a backward state like Mizoram can hardly be over-emphasised. Shortage of supply of specialised manpowers like doctors and engineers no doubt, hinders the economic development of the state. However, since Mizoram became Union Territory, the government has taken up some measures by sending students to study medicine and engineer in different institutions of the country. The supply of these highly specialised technical manpower has been increasing. After Mizoram attained statehood in the year 1986, the number of seat reserved also increased and the number of students enrolled in technical education also become larger. This means that there is an increase in the supply of skilled manpower, but it is still far short of the rapidly increasing demand.

Moreover, in a new state like Mizoram where developmental planning is still at an early stage, it is very necessary to start in a right direction. For a steady and self-sustaining economic growth, proper planning programmes and schemes have to be implemented. Economic growth and development of the state can go along smoothly if there is a proper manpower planning. This

has, therefore, prompted us to take up this problem for an indepth study. Moreover, to the best of our knowledge, no empirical attempts have ever been made to study manpower planning in general and the planning of technical manpower requirements like doctors and engineers in particular with respect to a particular state like Mizoram. This will, therefore, be the first ever attempt, albeit a modest one, in the study of the demand-supply interrelations with respect to doctors and engineers in Mizoram. The study attempts to investigate the nature and conditions of the labour market in a fast growing but still backward economy of Mizoram.

The major objective of the study are :

i) to investigate the nature of the demand for and the supply of two highly specialized types of manpowers viz., doctors and engineers and to establish the interrelation between the demand for and the supply of these two technical manpowers in Mizoram,

ii) to examine the interrelations between education and occupation, education and earning, and earning differentials between industries and firm,

iii) to estimate the extent of unemployment or under employment among doctors and engineers in Mizoram,

iv) to investigate the substitution possibility between formal education and informal training such as diplomas, certificate, in-service or on-the-job training and experiences, and

v) attempts have also been made to look into the existence of migration of these specialised technical manpowers to and from Mizoram and to highlight the implications thereof while analysing the problems.

Sources of Data

Data, both the demand and supply side, are collected from government departments. Departments under study have been approached personally and through questionnaires and information regarding the educational qualification, experience, salary, grade, etc. with respect to doctors and engineers are collected from the employers. Besides, information relating to the future prospects of the technical manpowers are drawn from various publications by the department concerned in the form of books, booklets, journals, magazines, etc. Personal interviews and questionnaires, to get more detailed information, are also made.

Methodology

From the informations collected, matrices are prepared in the form of table which serve as the major tools of our analysis. In these matrices, we indicate interrelations between occupation, education, earning, industries/firms etc. Firstly, we prepare the table representing Occupation-Education-Industry-Earning matrix from the raw data which form the master table of our analysis. Various occupations are grouped into occupational code according to the International Standard Classification of occupation adopted by the International Labour Organization (ILO). For further detailed analysis of the demand side the following matrices are prepared :

- 1) Occupation-Education Matrix,

- 2) Education-Occupation Matrix,
- 3) Earning-Education Matrix, and
- 4) Earning-Occupation Matrix.

The supply side informations are supplied by the candidates who have finished different levels and types of technical education. These job seekers are mostly government sponsored students in different technical institutions of the country.

Chapterization

The study have been divided into the following chapters :

The first chapter deals with the nature and importance of manpower planning for economic development and growth of a country. It forms the general introduction of the subject highlighting the role of manpower in the economic development of the developed countries of the west. Chapter two contains the general background of the economy of Mizoram. In chapter three, a short review of literature relevant with the subject is given and chapter four contains the empirical analysis of the subject and lastly chapter five presents the major findings and conclusion of the study.

All the statistical tables are contained in the Statistical Supplements. Important abbreviations are appended in the Appendix.

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Chapter II

GENERAL BACKGROUND OF MIZORAM ECONOMY

2.1 Physiographic Feature

Mizoram is located in the north-eastern corner of India, lying between 21°58' to 24°35'N latitude and 92°15' to 93°29'E longitude.¹ It is bounded by Manipur state and Cachar district of Assam in the north, by Burma in the east and south and by Bangladesh and Tripura state in the west. Sandwiched between Burma in the east and south and Bangladesh in the west, it occupies an area of great strategic importance in the eastern corner of India. It has a total of 710 km international boundary with Burma and Bangladesh.² The total length of the territory is 260 miles with a maximum breadth of about 120 miles.³ Mizoram has an area of 21,087 sq. kms.⁴ The Tropic of Cancer passes through the heart of the state, and therefore, the entire territory is under the influence of the south-west monsoon coming from the Bay of Bengal in summer. Winter in Mizoram is rain-free and the temperature varies from 11°C to 21°C and summer temperature varies between 20°C and 29°C. The average rainfall is 254 cm per annum.⁵

The topography of Mizoram is composed of steep slopes and deep gorges. It has a few patches of flat lands between hill slopes along narrow valleys. Rivers are of monsoon-fed and are almost dry up during winter season. But during summer, rain bearing monsoon wind shower heavy rainfall from May to September and then rivers swell up rapidly causing havoc to farmers who cultivate a small flat lands along the narrow valleys and often block passes from one side of a river to the other side. Rivers flow along hilly terrain,

they form deep gorges and rapids which reduce their navigability. Only few rivers such as Tlawng, Tuirial and Khawthlangtuipui are navigable throughout the year.⁶

Mizoram is covered by thick forest. Almost all tropical plants are found. Bamboos of different kinds grow abundantly everywhere. Of the total forested area of 7127 sq. kms., nearly about 90 percent is covered by bamboo forests.⁷ The forest types of Mizoram are the Tropical Wet Evergreen Forest, Tropical Semi-Evergreen Forest and Montane Sub-Tropical Forest. The low lying valleys are thickly vegetated by bamboos where tree forests are found in the higher altitudes. But due to the century-long practice of the slash and burn method of cultivation, large areas of forests are now destroyed in most of the areas thus converting them into a barren land. Some of the forest areas which are left undisturbed are known to have the valuable timber species like Cham, Hallong, Bonsum, Hallack, Gamari, Manrisal, Nahor, Bogipoma, Sam, etc.⁸ Due to the devastation of forests, wild animals which used to be numerous in the past are becoming scarce. The State Forest Department has taken necessary step to regenerate the forest area either naturally or artificially through plantation. Plantation of teak trees on the lower slopes of the hills, pine trees and eucalyptus trees on the higher slopes started recently.

The soil in Mizoram comprises of mainly sandstone shale and limestone and is also red loamy and lateritic. The soil acidity is also high but are low in potash and phosphorus content.⁹ Nitrogen content is high in uneroded soil because of organic matter accumulation. Though there is a fair percentage

of clay in the soil, the water holding capacity of the soil is very low and therefore the top soil becomes very dry during winter. Due to the continuous washing away of the top soil by rain water, the soil becomes more and more acidic in nature. But the portion which are lying in the plains are rich alluvial soil.

However, no minerals of economic value have been so far discovered in the territory. Thin seams of lignite coal have been reported but the quality and extent of these seams have not been examined.

Agriculture is the dominant sector of the state economy. Land is the common property of the village, individuals have no separate holdings. About 85 percent of the workers in rural areas are engaged in agricultural activities. But the cultivation method which is called 'Jhuming' is very primitive and unproductive. Trees are cut down, dried up in the sun and then burned into ashes. This slash and burn method destroys a vast area of forests annually. In higher altitudes, a repeated clearing of trees lead to fast erosion of soil and the rock beds become exposed to surface. The government of Mizoram is now taking some measures by inducting the jhumyas to change over to better technique and advanced method of cultivation. The permanent system of cultivation like terraced-plots on hillsides is being encouraged and practised. There are also schemes to grow plantation crops like rubber, coffee, tea, etc., and orchard plantation is also being encouraged to reduce heavy pressure on jhum cultivation.

Paddy is the chief food crop, followed by maize. They are grown on the hill slopes. It has been estimated that even half of the food requirement

of Mizoram is not produced in the state and with the gradual decrease of jhum cycle which is about four years only, the prospect of meeting the requirement of foodgrains in the state is all the more bleak.

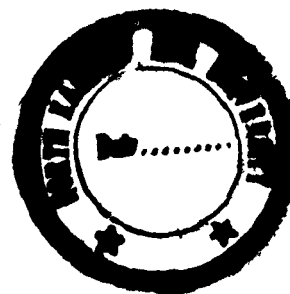
2.2 Population

According to 1981 census, the total population of Mizoram is 4,93,757. Out of this, 3,71,943 live in rural areas and 1,21,814 live in urban areas.¹⁰ The whole territory is a tribal area occupied mainly by the Mizo scheduled tribes although few scheduled caste and non-tribal population are residing in Aizawl town. The density of population in Mizoram is one of the lowest in India. The overall density of population in the state, according to 1981 census, is only 23.42 per sq. km. Aizawl district has the highest density with 27.10 per sq. km. followed by Lunglei and Chhimtuipui districts which have 19.10 and 17.00 per sq. km. respectively.¹¹ The decadal population growth rates in Mizoram during the last seventy years were not uniform. Since 1911, the decadal growth rate was steadily rising from 10.64 per cent in 1911 till it reached 35.61 per cent in 1961, whereas in 1971 the decennial growth rate dropped down to 24.93 per cent. This may be due to the reason that those who were counted in 1961 census left Mizoram to join the Mizo National Front (MNF) underground or some of the villages in the interior and isolated places were left out due to frequent curfew and lack of security on the part of the enumerators. However, during the next decade of 1971-81, the rate of population growth has become as high as 48.55 per cent. The present rate of popula-

tion growth has given rise to a number of problems such as food shortages, increasing unemployment, pressure on land etc. In fact, the state has to import more than half of the food requirements from outside. This rapid rate of population growth, if not checked or controlled will cause a lot of socio-economic problems in the future.

The percentage of decadal variation of population for rural and urban is given below :

District/State	Rural/Urban	1971-1981	1961-1971
Mizoram	Rural	26.24	17.01
	Urban	222.61	164.85
Aizawl	Rural	23.24	16.52
	Urban	207.47	122.63
Lunglei	Rural	23.50	18.01
	Urban	185.84	--
Chhimituipui	Rural	44.38	--
	Urban	--	--



Source : Statistical Handbook, Mizoram, 1989.

The above table shows that there is a marked change in the settlement pattern. The decadal variation of population of Mizoram rural areas from 1961 census to 1971 census was 17.01 per cent, but the urban decadal variation of population was extremely high, which was 164.85 per cent. Taking Aizawl district alone, the percentage variation of population in rural areas within ten years between 1961-1971 was only 16.52, but the urban variation of population within the same years span registered the level of 122.63 per cent. Only from 1971 census Lunglei with a population of 6,019 was classified as urban areas. This marked shift in the pattern of settlement towards the urban areas might be as a result of the outbreak of political struggle in 1966.

This event of armed struggle caused much dislocation of life along with the evacuation of several villages in order to find a safe place in bigger villages where they could avoid frequent raid they suffered from the Indian Armed Forces as well as from the M.N.F. volunteers. Besides this, villages were grouped together compulsorily by the Armed Forces; a large number of families moved to Aizawl or Lunglei rather than to the so called grouping centres. In addition to this, major areas of the cultivable land had become far away from the villages and were beyond the reach of the farmers which aggravated the economic positions of young men of the productive age-groups which in turn, compels them to go underground resulting in the loss of a sizeable amount of labour. The resultant effect of this was the deterioration of the rural economy; the rural masses lose their capacity to fulfil their basic consumption needs and many of them had to migrate to town from the villages. Taking

1971 census and 1981 census, the percentage of decadal variation of population in Mizoram in rural areas is 26.24, while in urban areas it is as high as 222.61 per cent. In Aizawl district, the decadal variation of population in rural areas is only 23.24 per cent, but in urban areas it marked up as high as 207.47 per cent. In Lunglei district, the variation of rural population between 1971 and 1981 is 23.50 per cent while the variation of urban population comes up to the level of 185.84 per cent. Prior to 1981 census, Aizawl and Lunglei towns were the only towns classified as urban areas and the rest of the whole area of Mizoram were classified as rural.

The high percentage of urban concentration between 1971 census and 1981 census may be the result of the disruption of self-sustaining rural economy consequent upon the outbreak of political struggle in 1966 on the one hand and the attainment of Union Territory in 1972, on the other. This political higher ladder opened up contact with the other parts of the country and money inflow became more which changed the outlook and life style of Mizo society. As a result, the primitive agriculture practice had become less attractive as monetisation of the economy expanded through increased public expenditure. Gradually they had to switch over to other occupations where immediate money income would be earned. They shifted to contract-based money wages which reduced pressure on land, but at the same time production of agriculture was decreasing and made the rural poor migrated to towns and grouped centre villages along the main roads entirely dependent on the market for their basic needs. Most of them become wage labourers.

2.3 Work Participation Rate

In 1961 census, out of the total population of 2,66,063, about 64,332 males and 61,354 females were engaged in economic activities and were defined as workers.¹² The work participation rate of the total population was 47.23 per cent and male and female work participation rate were 48.56 per cent and 45.92 per cent respectively. In 1971 census about 45.61 per cent of the total population were reported as worker. In 1981 census the work participation rate in Mizoram was 45.44 per cent. Here it is revealed that the work participation rate in 1971 is lower than that of 1961 census by 1.62 per cent and 1981 is still lower than that of 1971 census by a margin of .17 per cent. This declining per centage of work participation rate in 1961, 1971 and 1981 censuses may be due to the conceptual difference of workers in these censuses. The rural population contributed about 80 per cent of the workers. This shows that Mizoram economy is a rural economy. Out of the three districts of Mizoram, Chhimtuipui district has the highest percentage of work participation rate which is 47.28, next comes Aizawl district with a rate of 45.42 per cent and Lunglei district has a lowest with a rate of 44.06 per cent. The working population is dominated by male workers which account for 63 per cent while female workers share 39.76 per cent only in 1981 census.

2.4 Industry

Mizoram is one of the most industrially backward states of India. There

is no major industry in the state even today. The few industries found in the state are small and cottage industries. Among them tailoring, carpentry, bakery, printing press, vehicle workshop, knitting mills, handloom industry, hotel-cumrestaurant, candle making, chow making, are the important ones.

As indicated in the Statistical Handbook, 1989 published by the Department of Economics and Statistics, Mizoram,¹³ the number of small scale industry registered unit in Aizawl District in the year 1985-86 were 236, employing 1251 manpowers and the total investment being 70.27 lakhs of rupees. In Lunglei district 21.83 lakhs of rupees was invested for 23 SSI registered units and the total manpower employed being 98 only. In Chhimituipui district, no unit had been so far registered in the year 1985-86. In 1986-87, the unit registered in Aizawl district had increased to 326. These units employed 1708 persons and the total investment capital was Rs.374.08 lakhs. But in this year, the SSI unit registered had increased only by one, which was being 24 and the total capital investment decreased to Rs.12.92 lakhs and the number of persons employed also decreased to 85 only. Again, we do not find any registered unit in Chhimituipui district. In 1987-88, there was a slight increase in the whole of Mizoram. In Aizawl district, the unit registered were as many as 336 employing as many as 1751 persons and the total capital investment for these units were 912.671 lakhs of rupees. In Lunglei district, there were 35 units registered, employing 160 persons and the total capital investment for these units was Rs.24.89 lakhs. In Chhimituipui district, there were 10 new SSI registered Units employing 49 persons and the total capital investment being 15.61 lakhs of rupees. In the year, 1988-89, there were as many as 219 units registered in

Aizawl district; these units employed 1321 persons and the total capital investment was Rs.307.16 lakhs. In Lunglei district, 38 new units were registered with the total capital of Rs. 20.29 lakhs and these units employed 100 persons.

In Chhimituipui district, there was a rapid increase of the unit and by 1988-89, 98 new units were registered employing as many as 342 persons. The total capital investment also rose to Rs.87.07 lakhs. Since all these units of small and cottage industries are in an infantile stage, they are completely dependent on the market conditions and many of them have to be closed down as a result of depression in the demand.

Before the attainment of Union Territory, there was no specific scheme executed by the Government of Mizoram for the development of small and cottage industries. The Directorate of Industries was created only in 1972, when Mizoram became a Union Territory. In view of the significant and important role that village and cottage industries played for the upliftment of the rural economy, it is necessary for the governments at the state and at the centre to make more fund available within the reach of village artisans and industrialists. The village and small scale industries which require very little capital and minimum level of skill and labour are to be developed for the upliftment of the rural people, and creating employment opportunities for them as well as for the urban areas. The development of small and cottage industries will also serve as a feeder industries for a medium and large scale industries which are yet to come up in the State and also for the already existing industries in different parts of the country. Again, this will also relieve too much

pressure on land resulting from the primitive and unproductive method of jhum cultivation.

Inspite of large-scale deforestation, Mizoram is still rich in forest resources. There is a good scope for establishing forest based industries at many places within the territory. In order to profitably exploit these natural resources, and to make proper assessment, it is utmost necessary to conduct Techno-Economic Survey of natural resources including mineral and other.

2.5 Livestock and Animal Husbandry

Livestock play a very important part in the economic development of Mizoram. It was used as a medium of exchange in the past and it still occupies a place of social prestige and economic strength specially among the rural people. Besides this, it serves as a nourish food for health and happiness which is conducive to economic development.

According to the livestock population census in 1987, there were as many as 50355 cows in Mizoram and 5602 buffaloes.¹⁴ But these two economically important animals were not employed to their fullest extent as they were employed in the fields in other parts of the country since there are few patches of flat land here and there along the mountain ridges. They are mainly domesticated for their meat and milk. Pig is another important domestic animal among the Mizos. The total number of pigs domesticated in 1987 census were 15,443. Almost every house, especially in rural areas, domesticated fowl; ducks also are another important domestic animal. In 1987 census, there were as

as many as 8,31,815 fowls and 9,212 ducks. The detailed statistics are as follows :

Livestock Population in Numbers (1987 Census)

Categories	Aizawl	Lunglei	Chhimituipui	Mizoram
1. Cattle (cows)	35207	6565	8583	50355
2. Buffaloes	4717	205	680	5602
3. Sheep	758	-	41	799
4. Goat	12505	3860	3303	19668
5. Horse & Ponies	2105	20	117	2302
6. Pigs	52447	12365	16693	81505
7. Dogs	8853	2940	3650	15443
8. Fowl	535221	172681	123913	831815
9. Duck	7499	324	1389	9212

Source : Directorate of Animal Husbandry and Veterinary Department, Government of Mizoram.

During Second Five Year Plan, Animal Husbandry and Veterinary Department was started in Mizoram. By the end of the Second Plan (1963-64) there were two establishments, one each at Aizawl and Lunglei, three veterinary dispensaries each at Aizawl, Lunglei and Kolasib and two Rural Veterinary

Centres at Thenzawl and Ngopa. Distribution of few numbers of pigs, poultry and breeding bull was also made. During the Third Plan, the government stated one poultry farm at Aizawl and pig demonstration farm at Neihbawi, but these farms were closed down during the disturbance in 1966 and almost all development plans and activities were abandoned. During the Fourth Plan, when Mizoram was elevated to the status of Union Territory, a beginning was made again. The department progressed slowly and by the year 1987, there were two Veterinary hospitals, one each in Aizawl and Lunglei, thirty dispensaries, twenty in Aizawl district, four in Lunglei district and six in Chhimtuipui district respectively. Again, there were forty six rural animal husbandary centres in Aizawl district, seventeen in Lunglei district and twelve in Chhimtuipui district.

From 1972 onwards, dairy farming has gradually improved. By 1987, there were as many as ten poultry farms in the state and two duckery farms. Breeding farms have also showed some improvement and by 1987 there were five cattle farms and two pig breeding farms in addition to two piggery demonstration farms in the state. Milk production in 1986-87 was as much as 7367528 kgs. and 8070162 kgs. in 1987-88 and again, in the year 1988-89, milk production increased to 8173518 kgs. The production of eggs by the year 1985-86, reached 344013 numbers and 336351 numbers in 1986-87, but the production showed a further decline of 244617 in 1987-88.¹⁵

Inspite of all these, the requirements of meat, milk, eggs etc., are much higher than the present production level in the whole of the territory. the

prevailing price of all these items in the local market is comparatively higher than the other markets in India. At present, more than half of the demand are supplied from outside the state.

2.6 Health Services

Before 1972, there was not much progress in the field of health services in Mizoram. There were only two government hospitals, viz., Aizawl Civil Hospital and Lunglei Civil Hospital. But after Mizoram became Union Territory, efforts were made to improve the condition of general public health. The Fifth Five Year Plan was practically the First Five Year Plan for Mizoram in regard to planning for public health. During the Fifth and Sixth Plans, various health schemes and programmes were undertaken and at present there are as many as 11 hospitals in the whole state with a total strength of 731 beds. There are also 33 Primary Health Centres with 150 beds and 22 Sub-Health Centres with a strength of 170 beds. Besides these, there are 314 dispensaries.¹⁶ The department has also made significant achievement in various national programmes like Public Health, Family Welfare, T.B. Control, Leprosy Control and Malaria Eradication Programmes.

According to the hospital records maintained by the Health department¹⁷, in the year 1987-88 some 2,02,820 patients were treated in Aizawl district; out of these, 1,92,585 were treated as outdoor patients while 10,235 of them were admitted into hospitals. In Lunglei district, the number of patients who got outdoor treatment were as many as 77,531 and 8,736 were registered as indoor patients. In Chhimtuipui district, while there were 38,083 outdoor patients,

there were as many as 3,424 indoor patients. In the year 1988-89, the total number of patients treated in Aizawl district alone was 2,80,283; the number of outdoor and indoor patients were 2,62,819 and 17,464 respectively. In Lunglei district, there were 64,117 patients of which 54,876 were outdoor patients and 9,241 were indoor patients. In Chhimituipui district, we had 42,326 patients in 1988-89. Out of these, 38,679 were outdoor and 3,647 were indoor patients. During the year 1988, 2839 major and 7437 minor operations were conducted in Civil Hospital, Aizawl. In Lunglei Civil Hospital, 401 major and 1052 minor operations were carried out while 86 cases were major and 452 minor operations in Saiha Civil Hospital. Whereas there were 511 major and 359 cases of minor operations at Serkawn Christian Hospital.

Although the health department has made a commendable achievements in different fields, the different health schemes and programmes cannot be carried out in a large scale due to the lack of doctors and medical personnel in the state. The following table will show the number of medical personnel in Mizoram :

Table showing the Number of Medical Personnel in Mizoram

Sl. No.	Number of	1985	1986	1987	1988	1989
1.	Doctors	65	76	83	97	112
2.	Staff Nurses	228	231	231	298	298
3.	Sisters	28	28	28	36	36
4.	Pharmacists	74	88	98	103	106
5.	Health Supervisors (M)	53	53	57	66	66
6.	Health Supervisors (F)	61	64	66	67	77
7.	Health Workers (M)	243	254	271	285	285
8.	Health Workers ANM (F)	338	348	355	365	370
9.	Community Health Officers	-	25	25	29	29
Total		1090	1167	1214	1346	1379

Source : Directorate of Health Services, Government of Mizoram, 1989.

2.7 Development of Power

Before Mizoram became Union Territory in 1972, there was no progress worth mentioning in the field of power and electricity except the commissioning of 75 K.W. Diesel Power Station at Aizawl in 1962. Since, Mizoram was then one of the districts of Assam, all the development plans and schemes were from the government of Assam. The implementation of these programmes was very slow. Although Mizoram had a high potential of hydro power generation, proper investigation and survey had not been done. In 1971, the construction of a 66 K.V. line was taken up to draw power from Assam Grid to Aizawl.

Soon after Mizoram attained Union Territory status, the government took various steps towards the development of power. Lunglei town and three other villages viz. Kolasib, Serchhip and Hnahthial were electrified by Diesel Generator. The total installed capacity was 150 K.W. and then Aizawl power station was also raised to 400 K.W. At the end of the Fourth Plan, two towns and three villages were electrified with a total installed capacity of 0.84 M.W. and another 2.916 M.W. installed capacity added the existing installation during the Fifth Plan. The 66 K.W. line from Assam Grid had already been completed and was utilised to add the existing installed capacity in Aizawl and Lunglei towns and for the electrification of ten villages. Development of power cannot go fast due to many reasons, but the government of the state is taking necessary step to improve the condition, the progress is steadily going on and now 201 villages were electrified in Aizawl district, and another 69 villages in Lunglei district and in Chhimtuipui district, 43 villages were also electrified.¹⁸

Mizoram has abundant hydro-power resources. The state government has been taking necessary survey and investigation and few projects have already been identified. One micro-hydel project, 'Serlui A' near Aizawl town has been completed with an installed capacity of 1 M.W. and another investigation of medium hydro-project at 'Serlui B' near Bilkhawthlir village has also been taken up. This project is expected to produce about 15 M.W. installation capacity. Besides, construction of Tuivai Hydel project with an installation capacity of 200 M.W. has been taken up and another investigation and survey has also been done at Tlawng river which is called 'Bairabi Hydro-Electric Project' with a proposed installation of 160 M.W.

The bulk of power generated in Mizoram is used for domestic consumption but the use for industrial purpose is negligible. Per capita power consumption in Mizoram is one of the lowest in India, but still, it has abundant hydro power potential resources. The governments at the state and at the centre need to step up the investigation and survey of the prospective hydel power resources for the rapid development of the region in general and the state in particular.

2.8 Transport and Communications

The availability of good and easy means of transport is essential for the development of a region particularly in a state like Mizoram where there is not other means of communication like railway, air services and ropeways, etc. In Mizoram, the only means of transport available is road transport which is also in an infant stage.

The state is a hilly terrain characterised by steep slope. It is not easy to construct road every where, but good net-work of road is still the basic infrastructure for development of Mizoram. The government takes necessary steps to link every part of the state and to improve the existing ones. The first ever jeepable road of about 180 kms was constructed in 1942 between Silchar and Aizawl. This road was originally meant for defence purpose during the Second World War, it was then maintained by Assam Public Work Department. As time passed on, road development is gradually improving and at present, the Border Road Development Organisation and the state Public Work Department are the main agencies in the development and improvement of road in Mizoram.

Road in Mizoram can be classified into the following three types¹⁰ :

1. National Highway : Mizoram is connected by one National Highway, i.e., National Highway Number 54. This Highway stretches from Silchar to Tuipang via Aizawl and Lunglei. The total length of this highway is 572 kms. This highway is the most important road in Mizoram. It serves most of the traffics of the territory as it connects Silchar from where almost all goods and commodities are supplied to Mizoram.

2. State Highway : The state highway is all-weathered, truckable metalled roads. Under this type of road, Seling-Champhai road is the longest with a total length of 150 kms. It serves the traffic of the eastern part of Mizoram. Seling-Tipaimukh Road is another important State Highway running along the

north-east corner of Mizoram with a length of 139 kms. This road connects Manipur state. Sairang-Tuipuibari road runs from the central part of Mizoram to the western part bordering Tripura state and Bangladesh. It has a total length of 134 kms. Lunglei-Tlabung Road with a length of 88 kms, Serchhip-Thenzawl Road which is 34 kms and Kawnpui-Serkhan-Aizawl via Durtlang Road are other important State Highways in Mizoram.

3. District Road : There are a number of District Roads in the State, but during rainy season landslide and sometimes, falling trees block roads of this type and disturb a smooth traffic system. The most important of them are Khawzawl-E.Lungdar via Biate road about 65 kms, Kanhmun-Kawrtethawveng Road which is about 65 kms, Aizawl-Lunglei via Thensawl Road, W.Phaileng-Tlabung via Marpara which is running in the western part of the region. Besides these, Kolasib-Zamuang Road, Daplui-Tuidam Road, Saitual-Ratu Road, Tlabung-Chawngte Road are other important district roads.

2.9 Education

According to 1981 Census²⁰, Mizoram has 59.88 literacy percentage which is the fourth highest in India, surpassed only by Kerala (69.17 percent), the Union Territories of Chandigarh (64.69 percent) and Delhi (61.06 percent). The all-India average is only 36.23 percent which is well below the percentage of Mizoram. The literacy percentage in 1901 census was 0.93 but within a short period of 80 years it rises upto one of the highest in India. British Mis-

sionary work and the spread of Christianity were among the obvious reasons for this rapid progress of education in Mizoram. There is a higher literacy percentage in urban areas which is 74 per cent as against 55 per cent in rural areas. The percentage in Aizawl and Lunglei towns is more than 70 per cent, but in Saiha the percentage is a little lower which is 62.36. In Aizawl district the variation of literacy in urban and rural is 13.74 per cent, in Lunglei district it is 24.45 per cent, Chhimituipui district has the highest gap of 28.25 per cent. In all the three districts, the literacy percentage of male is higher than that of female. The difference in Aizawl district is 9.49 per cent whereas in Lunglei district, it is 16.93 per cent and Chhimituipui district has again the highest difference which is 26.67 per cent.

By giving emphasis on education, the government of Mizoram has made a commendable achievements. In 1951-52, there were 354 Primary Schools with only 449 teachers, but by 1988-89, the number increased to 1127 Primary Schools with 2002 trained teachers and 1662 untrained teachers. As for Middle School, there were 44 in 1951-52 with 222 teachers, but in 1988-89, there were as many as 1009 schools with 1613 trained teachers and 1471 untrained teachers. In 1951-52, there were only 5 High Schools in the whole of Mizoram, but by 1988-89, there were as many as 194 high schools with 586 trained teachers and 724 untrained teachers.²¹ Pachhunga Memorial College, which was the first college in Mizoram, was established only in the year 1958. But now, the number of colleges increased to 13 with 341 teachers. Among these, there are 4 government colleges with 122 teachers and 6 deficit colleges with 151

teachers. Besides, there is one University College, i.e., Pachhunga University College and two other private colleges.²² Mizoram has also North-Eastern Hill University extension Campus at Aizawl.

There are also vocational or professional training institutes such as District Institute of Education and Training at Aizawl and Teachers' Training Institute at Lunglei, Mizoram Institute of Education at Aizawl, one Industrial Training Institute at Aizawl, one Polytechnic Institute at Lunglei, Mizoram Hindi Training Institute at Aizawl, four Nursing and Health Worker Training Centres and 500 Centres of Adult Education.

Although Mizoram has a very high percentage of literacy and yet the incidence of unemployment problem is also precarious. The number of unemployed persons are increasing rapidly as a result of relatively rapid educational development dominated mainly by general education rather than technical and scientific education. At the end of 1987, there were as many as 23,557 persons who registered themselves at the Employment Exchange at Aizawl. Out of these, 17,696 were males and 5,861 were females, and 12,615 were under matriculates, 10,942 were matriculates and above.²³ These unemployed aspirant job seekers were almost having general education. This highlights the need for manpower planning as an integral part of development planning and to avert the problem of unemployment that has been confronting the regional economy. While the literacy percentage in Mizoram is relatively high in comparison to other states of India, it is still one of the most backward states. A number of students who complete their education from various institutions and who

are now available for jobs simply swell the number of educated unemployed who get themselves registered in the Employment Exchange. At the same time, Mizoram is lagging far behind other states of India as far as technical education is concerned. This is indicated by the fact that none of these people who are registered in employment exchange has a degree or even diploma in technical education. Whereas there are more than one thousand institutions for general education in the state, there are only two institutions for technical education.

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Chapter III
REVIEW OF LITERATURE

3.1 Human Capital

The importance of human capital for the economic development of a country has been emphasized recently. It has now been a strategic policy issue and a central point of development planning programme of any country. By human capital, we mean the 'sum total of the knowledge, skills and aptitudes of the people, inhabiting the country. Broadly, it includes the initiative, resourcefulness, capacity for sustained work, right values, interest and attitudes and all other human qualities conducive to higher output and accelerated economic growth'.¹ From the above definition it implies that a country having the largest population is not necessarily the richest in human capital. Many of the very densely populated countries of Asian region are the most deficient in human capital. The most important resource in the world consists of the education, experience, skills and health, etc. of the people. Professor T.W. Schultz thinks of population quality as derived from the sources, namely, genetic endowment and acquired abilities.² Of the two, acquired abilities seem to play a more important role for economic growth and development of a country. The genes inherent in different population, of course, are not the same, it is not responsible much for the difference in abilities and efficiency in different countries. For an accelerated economic growth and development it is necessary to improve the quality of the population. Increased investment in physical capital alone will not bring much change unless there is improvement in human skills and knowledge. In fact, advances in knowledge and skill made a vast improvement in physical and capital which, in turn, affect economic growth.

It is now widely believed that development of human quality through education, training, health, migration etc. has a very important role to play in achieving self-sustaining economic development. The developing countries have, therefore, become increasingly conscious of the need for an urgency of developing human resources as part of national economic development planning.³

For quite sometime, the importance of human factor as an agent of development has been neglected. It was only in the later part of 1950s and an early part of the 60s that the role of human capital as an essential input in development planning has been realised even in the United States and United Kingdom. Since then, it has stimulated new interest and earned much discussion in the literature of economic growth and development. The economists and development planners had taken up serious studies and analysis of this important issue which led to mushrooming of seminars, research and publications. The economists encourage and lay stress on the improvement in population quality and advances in knowledge which in turn set the pace of growth and development. Realising the crucial role that human capital plays in the development of a country, a great economist, Theodore W. Schultz says, "Mankind's future will be determined by the intelligent evolution of humanity."⁴

The urgency in developing manpower for rapid economic growth may be felt, all the more, by the developing countries like India. A country may possess abundant natural and physical resources but so long as it lacks skill and technical manpowers who can mobilise, organise and harness these resources for the production of goods and services, it cannot make rapid growth and development.

Thus, "the fundamental problem in developing country is, therefore, not so much the creation of wealth but rather the creation of the 'capacity to create wealth', and strengthening, widening and improving the 'absorptive' capacity of the country".⁵ This is apparent from the fact that the economic growth and development of western developed countries could be attributable more to the improvement in human skills and knowledge rather than the conventional non-human resources. Moreover, investment in human resource development such as education and training, health care, research and innovation, mobility of labour, etc. directly contribute to economic development of a country by increasing production and productivity. Lastly, it is clearly demonstrated that countries that suffered complete destruction of physical capital and other resources during the Second World War, as for example, Japan and West Germany could be able to recover within a relatively short period of time due mainly to abundant human capital. The abundance and easily available technical and skilled manpower in the country helped rebuilding the entire productive system damaged by the war. They have, therefore, not only recovered but also become, during a short period of forty years, the leading industrial countries which control, in one way or the other, the world's economy.

Human capital is basically formed by education and training. Investment in 'population quality' opens up the prospect and welfare of poor people. Education and training, research and innovation, health care and migration of manpower are some of the most important means of improving 'population quality'. There is a close relationship between the spread of scientific/technical

education and the pace of technological advancement and scientific innovations, and between the trained manpower and the utilisation of advanced technique of production.⁶ Since skill formation is mainly through education and training, it is necessary to look into the system that not only the right type of manpowers are produced, but also in right numbers. Education has to be planned in advance, basing it on realistic estimates of present and future manpower requirements so that there is no shortages and surpluses. Imbalances as a result of lack of proper planning has to be avoided as far as possible; if not, unemployment problem will emerge in the economy which will slow down the growth and development of the country. In a developing and underdeveloped country, it is seen that development cannot be sped up due to lack of technical manpowers. It is, therefore, necessary that educational planning has to be integrated with the general economic planning of a country.

The importance of manpower planning through education can hardly be over-emphasized to achieve an accelerated economic growth. There is now a realisation that education is a pre-condition for development and social change. Lenin was of the opinion that education and electricity are the two main factors of transformation of an underdeveloped agrarian economy into a highly industrialised one.⁷ Even in India, the pivotal role that education play for the developmental process has been recognised right from the inception of planning. The Third Five Year Plan, for example, has emphasized the role of education in the process of economic development, thus, "Education is the single most important factor in achieving rapid economic development and technological

progress and in creating social order founded on the values of freedom, social justice and equal opportunity. Programmes of education lie at the base of the effort to forge the bonds of common citizenship, to harness the energies of the people, and to develop the natural and human resources of every part of the country".⁸

Though economics of education as a branch of economic theory and investigation has formally appeared only after 1960s, it has a much longer history. The writings of many of the classical economists like Adam Smith, Alfred Marshall and John Stuart Mill in the eighteen and nineteen centuries drew attention to the importance of education as a form of national investment and they had considered the question of how education should be financed. As far back in 1924, the Russian economist Strumilin had already examined the economic significance of education in the Soviet Union.

However, there is a long drawn controversy among economists as to whether expenditure on human capital can be regarded as an investment. In fact, it is important to make a distinction between an investment and consumption. All expenditures can be classified as either investment or consumption, although the border line is not always clear cut. Consumption refers to the purchase or use of goods and services which bring immediate but short-lived benefits. Investment, on the other hand, refers to the acquisition of assets which yield benefits over a long period of time; as the stock of assets which will yield benefits in the future is called capital.⁹

Investment in economic theory usually signifies investment in physical capital, such as buildings, factories and machines which generate income in the form of production of goods and services. But in fact, many classical economists, notably, Adam Smith, pointed out that education helped to increase the productive capacity of workers in the same way as the purchase of new machinery, or other forms of physical capital increased the productivity of a factory or other enterprise. In his book, The Wealth of Nation, Adam Smith said "a man educated at the expense of much labour and time ... may be compared to one of those expensive machines."¹⁰ Other classical economists also observed that expenditure on education could be regarded as a form of investment that promise future benefits. Many economists are of the opinion that education and training create assets in the form of knowledge and skill which increase the productivity of manpower in just the same way as new machinery raises the productive capacity of the stock of capital. In recent years, a number of economists such as T.W. Schultz, Simon Kuznets, Edward F. Denison, Gary S. Becker, Jacob Mincer, B.A. Weisbrod and many others regarded investment in human capital in the form of education and training as productive and income yielding as investment in physical capital. This investment directly contributes to economic development by promoting the knowledge and application of science and technology to production processes and developing innovation and research. Schultz believed that much of what we call "Consumption" in fact constitutes investment in human capital. It appears logical that some of the direct expenditure on technical and vocational education, on-the-job

training, internal migration which enables workers to find better job opportunities have a direct bearing on the worker's productivity and his capacity to contribute towards the national output, and hence, should be treated as investment in human capital. He further argued that part of the expenditure on food, housing and clothing, which maintains worker's efficiency and productivity should be treated as current investment.¹¹ It is true that such investments in human capital account for most of the impressive increase in real earnings per worker in most of the countries, and hence, should be treated, to the extent that they contribute towards production, as investments rather than consumption. In fact, investment in education and training produces future benefits in the form of higher income for both individuals and for society as a whole.

However, the notion that education and training increase the productivity of workers by imparting useful knowledges and skills and hence, their lifetime earnings is not out of any controversy. Critics argued that the higher earnings of educated workers simply reflected their superior ability, rather than the specific knowledge and skills acquired during the educational processes. More recently, they have gone further and have argued that education does not improve productivity by imparting necessary knowledge and skills, but simply acts as a "screening device", which enables employers to identify individual who possesses either superior innate ability or certain personal characteristics, such as attitudes towards authority, punctuality or motivation, which employers value and which are, therefore, rewarded by means of higher earnings. They suggested that education simply confers a certificate or a diploma which enables

the holder to obtain a well-paid job without directly affecting his or her productivity.¹² But this argument has been refuted by a number of economists that education and training not only increase knowledge and skill but also affects attitudes, motivations, and other personal characteristics which help shape and develop human productivity. This is revealed by the fact that employers continue to pay educated workers more than uneducated throughout their working lives. Other forms of investments in human capital such as on-the-job, migration etc. can all increase earning capacity, and can, therefore, be regarded as investment in human capital. Mark Blaug in his survey of research on human capital pointed out that "the concept of human capital, or 'Hard core' of the human capital research programme is the idea that people spend on themselves in diverse ways, not for the sake of present enjoyments, but for the sake of future pecuniary and non-pecuniary returns ... All these phenomena - health, education, job search, information retrieval, migration and in-service training - may be viewed as investment rather than consumption, whether undertaken by individuals on their own behalf or by the society on behalf of its members. What knits these phenomena together is not the question of who undertake what, but rather the fact that the decision-makers, whoever he is, looks forward to the future for the justification of his present action ... The human-capital research programme has moved steadily away from its early naive formulations ... (but) it has never entirely lost sight of its original goals of demonstrating that a whole range of apparently disconnected phenomena in the world are the outcome of a definite pattern of individual decisions having in common

the feature of foregoing present gains for the prospect of future ones."¹³

The deliberations among economists and planners at present no longer revolve around the controversy as to whether expenditures on education should be treated as investment or consumption, but rather around the question as to how the most effective process of education can be carried out in order to meet the requirements of the economy at large. In the remaining part of the chapter an attempt is made to review, in brief, the three most important methods and techniques of educational planning viz. 1) Manpower Requirement Approach, 2) Rate of Returns Approach and 3) Social Demand Approach to Educational Planning.

3.2 Manpower Requirement Approach to Education Planning

Education planning based on estimates of present and future manpower requirements is known as Manpower Requirements Approach to Educational Planning. The method of forecasting manpower requirement is formulated to determine how many people possessing specific skill level will be needed at some future date for the economy to achieve its objectives and targets, keeping in mind the expected size and nature at that time. The educational system is then geared to produce the required number of individuals with the necessary skills. This approach has been followed by many countries to assist in educational and overall economic planning. Normally, manpower projections are made on the basis of data in the recent past or in the present.¹⁴

The purpose of making manpower forecasts is to ensure that supplies of manpower are available when new requirements arise. As a result, manpower shortages and surpluses can be avoided and output increased. Since education is very important for the economic development, and educated manpower is one of the most crucial inputs in the economy especially in developing countries where there is frequently a shortage of physical capital, the availability of skilled manpower may be particularly crucial. However, in the absence of planning, shortages and surpluses of different qualified groups of labour will constantly arise simultaneously which will be a major constraint to economic growth and development. In advocating educational planning 'an attempt is made to foresee the future occupational structure of the economy and to plan the educational system so as to provide the requisite numbers of personnel with the qualification which that structure demands'.¹⁵

Manpower Planning Approach is based on the following assumptions :

(a) There is a fixed and stable relationship between the level of educational qualifications of workers and the level of output of an industry or sector of the economy;

(b) there is also a rigid relationship between the occupational structure and the educational qualifications of workers; and

(c) it is, therefore, possible and desirable to make long-term forecasts of future levels of output and the occupational structure and the educational qualifications of the labour force that will be needed to produce that output.

However, many economists challenge the validity of manpower forecasting on the ground that the assumptions were mistaken. They further argued that it is possible to produce the same level of output with different combinations of inputs that there are no fix educational requirements for the majority of jobs, and it is impossible to make accurate long-term forecast because of the problem of predicting technical change.

In spite of these criticisms, it may be argued that manpower forecast has been used extensively to project a rough estimate of the future demands for labour and that action can be taken in time to ensure availability of the requisite supply. The removal of potential imbalances lead to increased national production and a higher level of average earnings. For the less developed countries seeking to make fundamental structural changes in their economies, forecasting the shifts in demand for different skills is argued to be particularly necessary.¹⁶

3.2.1 Methods and Techniques of Manpower Forecasting/Projections

Recognising the crucial role that education plays in economic growth and development of a country and shortages of skilled manpower represent one of the major constraints to economic growth, especially in developing countries, forecasting manpowers in advance so as to avoid imbalances of skilled manpowers in the economy is an important task confronting planners. But unfortunately, there is no single and universally accepted method of forecasting

manpower requirements. Different countries use different methods which are appropriate to their specific requirements. Sometimes, a combination of two or more than two methods have been used in order to arrive at the desired results.

Let us discuss some of the most important methods and techniques of manpower forecasting.

1. Employers' Estimate Method

Under this method total manpower requirements can be estimated by asking employers directly to forecast their own levels of employment in the future. In the absence of knowledge of past trends in the labour market, government of less developed countries have regularly used this method. But in general, this method is usually accurate only for short-term and it is more appropriate to overall employment policy than to manpower forecasting as a guide for educational planning.

Although, this method is not out of any problem, but it has a number of specific conceptual and operational difficulties. Since the usual method applied is simply to ask the employers to forecast their manpower requirements on, or up to, a particular date, employers are unlikely to make common assumptions about the future growth and structure of output. Inconsistencies are very likely. Another problem is that while some firms may take much time and care in arriving at their forecasts and may even consider the manpower impact of new technology, trends in relative salaries, and so on, others may

simply guess. A simple aggregation will not reflect the variety in quality of forecast.

In spite of all the problems, this method of forecasting manpower requirements is still in common use in a number of less developed countries in the absence of a detailed knowledge of how the labour market functions.

2) International Comparisons

This method of forecasting manpower requirements is usually practised in less developed countries where there is no sufficient information of domestic labour market. These may take the form of either time series data from a single country whose experience is regarded as particularly relevant or of cross-sectional data from a range of countries.¹⁷ Cross-sectional international comparisons have been most extensively used as a base for forecasting manpower requirements. The central idea running through all international comparison models of manpower requirements forecasting is the existence of a world manpower growth path on which every country is placed.¹⁸ Following this growth path, the less developed countries will imitate the experiences of the developed countries.

3) Labour-Output Ratios

Labour-output ratios have mainly been used for forecasting manpower requirements in single occupations and these occupations are usually ones

requiring high-level qualifications : engineers, scientists, doctors and teachers.¹⁹ This method is simple, and is done by extrapolating manpower per unit of output and the level of output. At its most sophisticated, this requires time series data on output per worker cross-classified by sector, occupation, and educational qualification. More simply, linear regressions relating on occupation, for instance, engineers, to national income have been extrapolated.

Another method of the labour-output ratio approach to forecasting manpower requirements is the use of density ratios. Here, the ratio of a particular occupation to the total sectoral labour force is calculated. The size of this labour force is then forecasted for future dates on the basis of output and productivity forecast and divided by the ratio to give the occupational requirements. Calculations of output are central to all these approaches.

4) The OECD'S Mediteranean Regional Project

The methodology of the Mediterranean Regional Project was originally formulated by Herbet S. Parnes.²⁰ It is essentially a direct manpower planning model based upon an input-output view of the economy. The final designed output of the economy is forecasted in advance and then the planners estimate the required number of enrolments in each of the main branch of education to produce the forecast output. In order to achieve the target output, the required labour force is categorically classified and then divided into different occupations. Moreover, the occupational make-up of the labour force is

translated into national educational requirement by applying a standard measure of educational achievement necessary to perform successfully in each occupational classification. The whole activity, thus, consists of multiplying a series of vectors and matrices together, each consisting of fixed coefficients relating occupational structure to output, educational qualification to occupation, and flows of students within education to educational qualification.²¹

But this model has been criticised on being excessively deterministic, depending on the specific relationships between qualification structures, occupational structure, and pattern of national economic output. Apart from the technical problems of fixed coefficients and the difficulty of incorporating behavioural relationships into the model, it is essentially a long term approach relating the broad structure of educational systems to the long term development of an economy.

5) Input-Output Analysis of Manpower Requirements

Input-Output analysis may also be used to education as a tool to forecast manpower requirements. This method is based on the assumption of the existence of a homogenous production function in the economy.²² The model describes, in figure, production processes as in receipts; how much of each necessary ingredient is needed to produce one unit of product.²³ Since, education may be considered, especially from an economic point of view, as a production process, input-output analysis may also be applied to education.

In forecasting manpower requirements, the input-output method assumes both constant return to scale and diminishing return. Tinbergen, Correa, Bos, Stone are some of the analysts who use input-output framework in educational planning.

6) The Inter-Industry Model

The inter-industry model is another important educational planning model that utilises the country's input-output table for arriving at the desired future structure of the labour force by level of educational attainment. The inter-industry relationships in an economy are described by the input-output table which is an accounting scheme of flows of goods and services between producers, intermediate users of raw materials and final consumers.²⁴

This model is essentially a variant of the manpower requirements approach in educational planning, because it shares the zero substitutability assumptions and no consideration of costs.²⁵

7) Cost-Effectiveness Analysis in Education

Cost-Effectiveness analysis is a technique for measuring the relationship between the total inputs of a project and its outputs. Both the cost and effectiveness have to be quantified, but it is not necessarily measured in terms of money. It was originally developed for the evaluation of public policy as in the fields of military defence where the objectives are definable

and measurable, but not in money terms. It is now commonly used for evaluating public policy including health and education.

Cost-Effectiveness can be evaluated in two different ways. In the first case, two or more schools or other institutions with similar level of costs are compared and find out which one of them achieve the highest level of output or results. Another method of using cost-effectiveness analysis is that an objective is set, then a comparison is made between the alternative ways. After this, it is possible to find out the lowest cost by which target objective is achieved. This will be the most cost-effective method of achieving the set objective. In case of education, a comparison is made between different institutions, different types of education, or different teaching methods. The method with the best result to achieve the objective can be found out, even if they have different costs.

But due to the difficulty of identifying and measuring the output or objective of education, it is difficult to apply cost-effectiveness analysis to education satisfactorily, and in fact, some analysis of this method do not advocate much the use of this method.

8) Linear Programming Models

Linear Programming is a technique for the mathematical solution of a constrained optimization problem.²⁶ In education planning it is generally used by formulating an objective function to be maximised or minimized

subject to a set of resource constraints. The objective function could be the contribution of education to the gross national product of a country and the constraints be the teachers, classrooms and other resources available to the school system. It is possible to apply Linear Programming to education by formulating in dynamic form or static form, depending on whether the solution refers to a series of years over the period of the plan, or to a single year, respectively.²⁷

The problem with the linear programming technique is lack of data required for formulating relationships in the model and, therefore, can give quite wild solutions. Furthermore, it uses a set of assumptions that might not correspond to the real world. It is, in fact, reliable in micro level analysis but when applied to education-wide or economic-wide problems, satisfactory data collection and specification are difficult or almost impossible.

The pioneering studies of educational planning in linear programming model have been associated with Bowles,²⁸ Adelman,²⁹ Benard³⁰ and others. Several attempts have also been made to apply this model in Indian educational system. Among them, Biswas and others,³¹ Ramanujam,³² Mathur,³³ and Panchmukhi³⁴ are some of the important scholars who have studied in the Indian context by using Linear Programming Models. Panchmukhi's linear Programming model attempts to minimize the cost of education subject to the constraint that with an increase in the level of education, facilities for education also expand; teacher-student ratio is raised and a balance of general

and professional education is obtained.

Model for India

Burgess, Layard and Pant³⁵ had undertaken educational planning in India by using the manpower requirement approach. They defined the structure of employment in India by levels of education and industry on the basis of 1961 Census, and this became the basis for the report of the Education Commission. By assuming the sectoral growth rates, they estimated the manpower requirements of various educational categories of higher level. They then projected the sectoral expenditures and consequently concluded that in service sectors, other than trade and transport, half of the matriculates and two-thirds of the graduates would be employed at a fixed and given norms. But this study has been criticised by economists, notably Sen and Tilak. Sen argued that the estimates of this study are highly exaggerated and the sectoral growth rates are given as much higher than the rate observed during 1956-61. Tilak also criticised that this study ignored the issue of chronic unemployment of various types of skilled manpower in the country.³⁶

Shri Prakash³⁷ also developed an input-output model for educational planning in India. This model deals with the flows of the inputs and the outputs of the educational system of India. However, this model deals only with the supply side of the manpower requirements and is, therefore, of limited use and application. In another case study, Prakah and Radhakrishnan³⁸ attempted to estimate the private demand for education. They opine that

the demand for education is a function of a number of factors, such as, socio-economic, cultural, demographic, educational factors, etc.

Another study was also undertaken by T. Lawma.³⁹ His study mainly deals with the imperfection of the labour market in the North-East India. He analysed the interrelation between the demand for and supply of manpowers in this region. The demand side of the analysis is fed by the numbers of applicants received against the advertisements coming from various governmental departments as well as from private company or agencies. He finally concluded that the North-East region of India have surplus manpowers including high level manpowers.

In his studies, T. Lawma suggests that the problem of educated unemployment cannot be solved merely by introducing vocational education and delinking of degrees from job. What is, therefore, needed to solve the problem in the present circumstances is to attain a more rapid rate of economic growth accompanied by improvement in the overall techniques of production through an integrated and systematic planning of education and manpower at the national level.

Assumptions and Limitations

Although Manpower Requirements Approach has been extensively used in many countries for planning educational programmes, it has a number of limitations and shortcomings. It is based on a number of assumptions,

many of which are unrealistic and arbitrary. The validity of Manpower Requirements Approach depends upon the reliability of these assumptions. But the problems and difficulties are mainly of methodological, statistical, and conceptual. Manpower forecasting rests on assumption of a set of fixed or rigid relationship between inputs and outputs and between educational qualifications and jobs. But this is unrealistic since there is flexibility and substitutability between different factors of productions, not only between different types of manpower but also between labour and capital. Economic systems are, in fact, more flexible than manpower forecasters usually assume. It is possible to produce the same level of output with different combinations of inputs, that there are no fixed educational requirements for the majority of jobs.

3.3 RATE OF RETURNS TO INVESTMENT IN EDUCATION

Educational planning by comparing the costs and benefits of education is called the Rate of Returns Approach to educational planning. The method, which has generally been adopted in estimating the rate of returns on investment in education is to aggregate the salaries or wages earned, over the working life of various occupation, discounted for interests, and to compare this total with the cost of education for those occupation adding to the extent feasible both the compound interest and opportunity costs. In other words, the relationship between costs and benefits is expressed in terms of the ratio between the present value of the costs and the present value of expected future benefits.⁴¹

The costs of education are measured in terms of the opportunity cost of total resources devoted to education. The opportunity cost includes the value of all goods and services used in the process of education, the time of teacher and other staff, the use of books, equipments, furniture, heat, light, materials and institution buildings and the time of students which is measured in terms of earnings forgone. By enrolling in full-time or part-time course of education, a student lost a considerable amount of money which he could have earned. For the economy as a whole, the lost of output that the student could have produced, if in employment, is part of the resource costs of education.

The benefits of education are measured in terms of the extra life time earnings enjoyed by educated individuals, compared with workers with lower levels of education, or illiterate workers.

The purpose of rate of returns analysis is to compare the opportunity cost of education with the expected benefits, measured in terms of the additions to income that will accrue in the future as a result of the education.

Development in education produces benefits both to the individual and to society as a whole. A measure of private rate of return to investment in education shows how profitable it is for an individual student, or his or her family, to invest in education and have a strong influence on student and family to take decision about the types and levels of education. The private cost of education includes direct and indirect cost of education, that

must be borne by the individual including fees, expenditure on books or equipments and earning forgone while in school, college or university, whereas the social costs include all current expenditures on tuition, school or college buildings and equipment, and the forgone earnings of students if they join the labour market.

The educational planners use the rate of return to investment on education as a method of determining the inter-sectoral and intra-sectoral priorities in allocating resources and of determining optimum levels of investment. The optimum level of investment is reached when the marginal rate of returns to investment in all the sectors of the economy or on all the levels and types of education are equal. If the rate of returns to investment in education is higher than in other sectors, more resources should be invested in education. Till the marginal rate of returns to investment in all sectors are equal or taking education alone, the types and levels of education giving the highest returns to investment should be increased relative to other types or levels of education.

Several attempts have recently been made to calculate the rate of returns on investment in education and training. Psacharopoulos in 1973 made a review of rate of returns studies in 32 countries⁴² and concluded in the following lines :

a) The rate of returns to all forms of education is positive, in most countries, and in general the rate of returns to primary and secondary education is higher than the rate of returns to university level education.

b) The private rate of returns is consistently higher than the social rate of returns, indicating that education is more profitable as an investment for the individual than for society as a whole.

c) In general, rate of returns are higher in less developed countries than in developed economies.

Thus the knowledge about the rate of returns to investment provides an answer to the question how the society's resources should be allocated between different types of investment. Comparisons between the rate of returns to human capital enables the planners to decide how much resources should be devoted to education or to other forms of investment in physical capital. Moreover, comparisons between the rate of returns to different levels and types of education can serve as a guide to resource allocation within the educational system.

Becker studied about college education in the United States and he measured earning differential attributable to the cost of acquiring a college education.⁴³ By using T.W. Schultz's estimate of total earning foregone and expenditures for high school, college and university education. Renshaw computed an average returns to education for the United States between 1900-1950.⁴⁴ Other interesting studies include T.W. Schultz's The Economic Value of Education,⁴⁵ H.P. Miller's Annual and Lifetime Income in Relation to Education : 1939-1957,⁴⁶ Edward F. Denison's Education, Economic Growth and Gaps in Information,⁴⁷ Bowman's Converging Concerns of Economists

and Education,⁴⁸ Gary S. Becker's Investment in Human Capital : A Theoretical Analysis⁴⁹ and Jacob Mincer's On-the-Job Training : Cost, Returns and Some Implications.⁵⁰

Limitations

Although the Rate of Returns to Investment Approach is popular and in common use to the planners in estimating cost-benefit of education, it has, no doubt, some limitations and shortcomings. Firstly, the approach is based on certain arbitrary and unrealistic assumptions. The approach is based on the assumption that differences in earnings reflect the differences in labour productivity. But, this assumption is unrealistic in the sense that differences may be due to many factors other than education and training, health care, etc. which increase labour productivity, such as status, age, good relationship with the employer, strong bargaining power of the labour union, economic and social environment, personal mobility and many other factors. It is a fact that labours with the same level and type of education do not have the same salaries and wages. Due to the shortages or surpluses of manpowers, earning may not be the same; that is earnings of the average and marginal labourer may be different, even though the marginal labourer has the same level and type of education. It is also assumed that perfectly competitive labour market prevails in the economy. But in reality, labour market is almost always imperfect contrary to this assumption. Another unrealistic assumption of the approach is that the age-education-earning profile will remain constant

throughout the reference period. But as a result of changes in the techniques of production, constant returns to scale, which is implied by the assumption, will not hold true.

Secondly, it is difficult to measure the rate of returns on investment in education. There is no suitable techniques and methods to measure the benefit received out of investment in education and training. In some cases, part of the investment may be in the nature of consumption expenditure. The decisions for investments in education, training, health etc., are not necessarily governed by the rate of return criterion, but more by considerations of the social good rather than economic returns. In many cases, the returns of the investment are immeasurable and do not lend quantitative analysis. It is difficult to isolate and identify the direct and indirect benefits. The approach, however, takes into consideration only the direct and monetary benefits of education, but indirect and non-monetary benefits may play a more important role in certain occupation. Social investment may be the goal of investment, but the benefit may not be quantifiable.

Thirdly, rate of returns criterion is commonly applied in the determination of how society's resources should be allocated between different types of investment. Comparisons between the rate of return to human capital and the return to physical capital or comparisons between the rate of returns to different levels and types of education can be used as a guide to resource allocation. However, since the rate of returns to investment analysis has not succeeded in measuring all the indirect benefits of education, or of other

types of social investment, it is very difficult and almost impossible to identify optimality.

Lastly, another limitation of the approach is that the effect of investment in education on earning cannot be estimated precisely. This is because, earnings may be influenced by many factors like endowed ability, personal motivation, social origins, educational background and training which are all interrelated that the direct effect of education cannot be isolated in any useful manner.⁵¹

3.4 SOCIAL DEMAND APPROACH

The Social Demand Approach is an educational planning methodology based on the individual demand for education rather than the requirements of the economy in terms of educated manpowers. The central philosophy of the social demand approach is to predict the number of school places likely to be demanded in future by individuals and their families and to provide these places so that social demand is satisfied.⁵² It is, therefore, a concept at the collective level where the decisions of individual persons are aggregated. Under this approach of education planning, it is necessary to know that many individuals will want various types of education in the future. Therefore, projections have to be made. Population projections are the basic data for this task. However, a problem still remains is that the amount of education and type desired both depend on the cost of education, income of families, job expectations, and possibly other factors.⁵³

It is more likely that the social demand approach is adopted by advanced industrial countries rather than low per capita income developing countries. Since a rich country can afford to satisfy the peoples' study wishes without much concern for the internal efficiency of the expenditure. In these countries there exists a big overlap between what individual wants to study and the skill needed by the economy hence manpower-oriented planning is relegated to a residual role. This is in contrast to the situation in developing countries where the overlap between the spontaneous supply by means of social demand and the demand for certain type of educated labour is much smaller.

This approach to educational planning suggests that education should be regarded not just as a mean to development but also as an end in itself. Moreover, this approach does not only give consideration to economic ends, but also emphasizes education as a part of cultural, social and political development. The approach gives due concern to social and cultural objectives such as elimination of illiteracy, free and compulsory education for children, adult education, better-student-teacher ratio, improvement of standards, etc.

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Chapter IV
EMPIRICAL ANALYSIS

Introduction

Education has, for quite sometime, been regarded as an aid to the achievement of individuals' economic ambitions and economic and social objectives of a country. However, the interrelations between education and employment are many and cannot, therefore, be discussed fully in this short study. The stress here, will mainly be on the educational characteristics of individuals and the nature of the jobs they enter into.

It is now a widely held view that education, occupational status and earnings from employment have positive interrelations whatever is the levels of economic development and the types of socio-economic system that the country is passing through. Various studies and analysis have invariably indicated that while much of the variance remains unexplained, the largest single indicator is education. In other words, the number of years of schooling has been found to be the best single predictor of the eventual occupational status of an individual entering the job market for the first time. However, the main interest of both the state and the individuals lie in the relationship between the additional earnings associated with higher education and the cost of acquiring them. This can be measured by calculating the rates of return arising from the resources used in education. Most international comparisons of these rates of return demonstrate that :

- (a) returns are larger at lower levels of education;
 - (b) returns are larger in low-income than in high-income countries, and
 - (c) due to the policy of public subsidy in educational programmes, the net benefits to the individual are invariably greater than the social ones.
- This is particularly true in low-income countries like India, especially at

the higher levels of education.

In this chapter, the empirical analysis of our study particularly the relationship between education and occupation, education and earnings and the nature of the labour market in Mizoram is discussed. Table I, which is also a Master Table from which all other tables are prepared, contains information about relations between occupation, education, industry and earnings. These informations are collected from government offices mainly through personal contact and also through questionnaire wherever necessary. This questionnaire is appended in the appendix.

Sources of Data and Methodology

The data relating to the demand for and supply of engineers and doctors including veterinary doctors are collected from various government offices. This study is mainly based on census rather than sampling method. This is made possible as Mizoram is only a very small state with a population of only a little more than 5 lakhs and the total number of technical manpowers covered by our study is also less than a thousand. To be exact, the number is only 787. The demand for these technical manpowers is given by the total number of opportunities or job openings within the State and since no industries and private enterprises are in existence, these job opportunities are confined only in government services and therefore the total number of posts available in various government offices where engineers and doctors have access for their services are taken to indicate the sum total of demand for these man-

powers. The supply side data is also collected from the offices. At first, the number of post filled up is taken to indicate the supply and thus the remaining posts which are lying vacant or unfilled are taken as the shortfall in the supply. However, this alone cannot be taken as a proof of the shortage of supply since vacancies may not be filled up due to many other reasons.

However, the fact that there are neither engineers nor doctors who remain involuntarily unemployed excepting about 5 or 6 doctors who prefer to open private clinics instead of joining Government services, implies that there are no excess of supply over the demand at least within the State of Mizoram.

This is, no doubt, a peculiar situation in the sense that Mizoram is experiencing shortages of engineers and doctors while the country as a whole has more than a million surpluses of these manpowers. According to the survey conducted by T. Lawma¹ for the year 1984, there are surpluses of engineers and doctors even in North-East Region of India.

To analyse the interrelations between education, occupations and earnings, simple statistical tools such as percentages, χ^2 and coefficient of contingencies are used. Although we are well aware of the limitations of these test statistics, yet, we have not opted for the application of more powerful tools of analysis such as co-variance analysis mainly because, first, we believe that simple tools are often capable of revealing a lot about the data under consideration and second, we feel that we are not fully proficient in using a more sophisticated statistical techniques due to our own limitations.

χ^2 is a measure of the discrepancy between the observed and the expected

ted frequencies. The higher the value of χ^2 , the greater will be the degree of association between the attributes under study. χ^2 may, therefore, be adopted as a rough measure of correlation. However, since the upper value of χ^2 varies directly with the number of observations it is required to be normalised. Hence, the coefficient of contingency may be accepted as a better measure of association. The coefficient of contingency measures the degree of contingency or dependence between two variables or sets of attributes. However, since pure chance distribution indicates no association, the more nearly this pure chance distribution approximates the observed distribution, the weaker the affinity must necessarily be. Similarly, the greater the discrepancy between the observed and chance distributions, the greater must be the association or dependence between the variables.²

$$C = \frac{\chi^2}{\chi^2 + N}$$

where, C = Coefficient of contingency
 N = Number of observations

The maximum value of the coefficient is furnished by the following formulae

$$C \text{ max} = \frac{t-1}{t}$$

where, t = the number of rows or columns.

4.1 EMPIRICAL FINDINGS : Occupation-Education-Industry-Earnings Relations:

In Table I, the two types of manpower under study such as doctors, engineers and other related workers are classified under occupational code numbers following the International Standard Classification of occupation adopted by ILO. In all, we have 787 jobs of which the civil engineers, and overseers group comprises the highest number of jobs with more than 56% of the total jobs. The next highest number of posts is allopathic doctors which contributes 16.77% of the total, closely followed by Electrical Engineering groups with 16.01%. Then Veterinarians and other related workers comprises 6.73% of the total post while mechanical engineers contribute just about 3% of the jobs and the remaining two occupations - architect and tracer groups consist of less than 1% of the total post.

In Table II, Industry-occupation Matrix is given. The technical man-powers such as engineers and doctors covered by this study are accommodated in just 5 different departments of the Government administration, viz. Public Works Department (PWD), Power and Electricity (P&E), Health Services (HE), Public Health Engineering (PHE) and Veterinary and Animal Husbandry (V and A.H.). The P.W.D., has the maximum share of 303 posts out of the total of 787 jobs under our study. This is almost 40% of the total jobs. Within this department, more than 95% of the workers belong to civil engineers and overseers, only 2.6% are mechanical engineers and the remaining 1.6% belong to the technician groups.

The next highest number of 175 manpowers are located at the department of Power and Electricity. The share of this P & E department is 22.2% of the total filled up posts. Out of these 175 workers, 126 of them i.e., more than 70% are engineers with specialisation in electric and electronic and about 26% of them belong to civil engineering group. The remaining 2% belong to mechanical engineering group.

The third biggest employer is the department of Health Services. This department accommodates as many as 132 doctors which is more than 16% of the total technical manpowers under our study. There are no other technical manpowers employed under this department as nurses and other related health workers are not covered by this study.

The other two employing departments are Public Health Engineering and Veterinary and Animal Husbandry departments. While the former employs as many as 124 technical manpowers, which is about 16% of the total posts, the later accommodates only 53 workers that is, less than 7% of the total jobs. Thus the department of Public Health Engineering has openings for 111 civil and 12 mechanical engineers while the department of Veterinary and Animal Husbandry absorbs all the Veterinary doctors numbering 53.

Table III presents the relationship between education and occupation in detail. Under this Matrix, the educational qualifications and years of experiences of manpowers are classified into various levels, starting from elementary education, i.e. under matrix to the highest level of post-graduate education. Since our study is confined only to two different types of technical manpowers such as doctors, engineers and other related workers, the inter-

relation between these two types of education, i.e. engineering and medicine is rather rigid. In other words, these two types of manpower are both education specific in the sense that the substitution possibility between engineering and medical education is practically zero. It is interesting to note that education upto secondary level without any other specialised training or not supported by any certificate/or diploma or specialised training are accommodated in engineering occupation. However, these workers are mainly engaged at the lower level of occupational groups where not much specialised training is required. The post of Section Assistant (SA) may be cited as an example.

Out of the total 787 manpowers in our study, 446 of them are in the occupational group 001. This means that the civil engineering and the overseer group comprises almost 60% of the total jobs. Next is the physician and doctors group classified under occupation code 030 with 16.7% of the total, closely followed by electrical engineers with 16% of the total. The fourth largest group is Veterinarians and other related groups, is 021 with nearly 7%. The remaining three occupation groups is 002, 090 and 099 representing mechanical engineers, architects and Tracer respectively comprise just about 3% of the total job .

It may be noted from this Table III that among the different levels of educational qualifications, HSLC supplemented by Diploma with 0-10 years of service experience command the highest demand. This educational level alone contributes more than 36% of the total demand under the different categories covered by this study. In other words, HSLC + Diploma with expe-

rience ranging from 0-10 years contribute as many as 285 jobs and of the total 787 posts. The second highest educational qualification demanded is graduate with 0-10 years of service experience contributing 216 job opportunities which is slightly more than 27% of the total post under this study.

The next Table, i.e. Table IV gives us the occupation-education matrix. This matrix shows the interrelations between occupation and education. The range of educational qualifications actually possessed by the different occupational groups is shown in this Table IV. Although we do not have empirical evidence to show (as it is outside the scope of the present study) that the different levels and types of educational qualification is an indication of the level of productivity associated with the different occupational groups, yet, the fact that the employers determine and fix the minimum educational qualifications as requirement for the performance of the occupational duties implies that there is an intimate relationship between educational attainment and the ability to production and productivity. However, this is an area where more elaborate studies can be undertaken by competent researchers and scholars. In the present case of our study, we can only indicate that the seven occupational groups covered for our field study are associated with different levels and types of education, and that the nature of the interrelation between occupation and education shows that the higher the occupational status and the salary and grades associated with it, the higher is also the level of educational qualification and requirements. Even where formal educational level is not upto the minimum requisite standard, this has to be made good or supplemented by technical or professional training and/or long years of service

experience.

Lastly, Tables V and VI present the relationship between earnings and education and earnings and occupation respectively. Just as there is a positive correlation between occupation and education, earnings and education and earnings and occupation also have positive interrelations. In general, the higher the level of education, the higher is the level of grades and salaries.

Similarly, persons with higher level of education generally have a better chance of getting higher or better jobs than those with lower educational attainment. This is true everywhere in the world these days. As a matter of fact, this is the basic foundation of the economics of education and the evolution of the human capital development revolution since the early sixties of the present century.

4.2 Occupation-Education Interrelations

The occupation-education matrix is given in Table IV. This matrix shows the different levels and types of education possessed by the different types of manpower pursuing different lines of occupation. These educational requirements may be taken to represent the employers' perception of the knowledge and skills required for the performance of the occupational duties. Similarly, the education-occupation interrelation is also presented in Table III(A) and III(B) in which educational levels and number of years of practical experiences are taken as the control factors. This table shows the types of occupation and grades that the different levels of education command. In other words,

the interrelations between education and occupation indicate how a particular type and level of education prepares workers suitable and fit for a specific type of job. Table III(B) is the aggregated matrix of Table III(A).

In Table III, we find that there are as many as 28 workers who do not complete even their school education. That means they are all under matric. Of these, only half of them have some technical training leading to certificate qualification while the remaining workers do not have any specialised training excepting the practical experiences they are getting by doing the job. All these under matric workers are no doubt engaged in the categories of lower paid groups. It is most probably that these workers with only elementary education are engaged to do the type of work which requires no specialised skill or training and subsequently absorbed into works which require specialised skill and knowledge to which they are introduced by doing the job. All these workers excepting six of them are accommodated in occupation 001. These remaining six workers are engaged in the occupation code 003.

The next higher level of education is matriculate or HSLC. This group comprises the maximum number of workers totalling as many as 434 which is slightly more than 55% of the total 787 posts. All these workers with the exception of only five, have some technical training either a diploma or a certificate. In fact, as many as 384 of them have diplomas in addition to the formal education upto matriculate while 45 of them have training with certificate to support their formal educations. Most of these matriculate workers are accommodated in occupation 001, which is civil engineering

and overseer group. To be precise out of the total 434 matriculate workers, 344 of them is almost 80%, are found working under this occupation 001 group, and the remaining 20% are scattered into the other occupation groups such as 002, 003, 090 and 099.

As a matter of fact, 74 of the remaining 90 matriculate workers are absorbed under occupation 003 which is electrical engineering group. That means the share of other occupation group is practically insignificant as these two groups accommodate as high as 97% of the total matriculate workers. It may be noted here that most of these matriculate workers are employed as Section Assistants and Overseers which are the two bottom-ranked engineering professions. Education upto the level of matriculate supplemented by engineering diploma/certificate is the minimum statutory requirement of education for the post of overseer and/or assistant engineers. Although very few of the candidates may not have any technical training such as diploma or certificate, yet, they may also be recruited as Section Assistant with a hope that they will acquire the basic skill and knowledge through practical training by actually doing the job to chance of vertical movement in the occupational ladder. This point implies that there is specific type of education for technical manpower such as engineers and doctors.

Again, most of these matriculate workers have long years of practical experiences ranging from 0 to 40 years. This may be taken to imply that the shortfall in formal education is to a great extent made good by practical experience although the exact ratios of substitution between the two variables

are not indicated by the empirical evidence we have collected in our studies.

The next higher educational level is Graduate with and without diploma/certificate. This group comprises the second highest number of workers totalling 302 technical manpowers. This group thus, comprises about 38.3% of the total manpowers. Most of these workers belong to the middle and high levels of occupation and only a very few of them have diplomas or certificates to supplement their formal educations. In fact, only 20 of the 302 graduate workers have additional qualifications in the form of diplomas and certificates. This indicates that formal education upto the level of graduate degree seems to be more or less sufficient to meet the occupational or work requirements. Thus, there is a specific level of education required for particular type of occupation or job. This may not be true in case of all types of occupation. However, at least in case of the two types of technical manpowers covered by our study, the empirical evidence shows that there is a unique relationship between formal educations and technical occupations such as engineers and doctors. If a person does not have the required formal educational qualifications, this has to be made good either by long years of service experience or by a specialised training such as diplomas or certificates.

The highest level of education is Post-Graduate and above. This group comprises only a small number of the total manpowers. Altogether, there are only 23 workers with post-graduate degrees and above. This is also shown in Table III(B). Like graduate almost all of this group belong

to the high level group of manpowers and the fact that none of these post-graduate degree holders do not have any subsidiary degree like diplomas/certificate, it may be taken to imply that the level of formal education upto this level is more than enough for the technical occupations we have taken up for our study and, therefore, need not be supplemented further by diploma or certificates. However, most of these workers also have long years of service experience.

As already pointed out earlier, Table IV presents the occupation-education matrix in which occupation rather than educational qualification is the central factor. Altogether, we have seven categories of occupation classified under occupational code numbers: 001, 002, 003, 021, 030, 090 and 099 representing civil engineers and overseers, mechanical engineers, electrical engineers, veterinarian, physicians/surgeons, architects and tracer/technician respectively. Out of the total 787 posts covered by our field study, civil engineers and overseers comprises 56.67%, then physicians and doctors contributing 16.77% closely followed by Electrical engineers with 16.01%. The fourth highest number is veterinarians with 6.73% while the remaining three occupations such as mechanical engineers, architects and tracers comprises just about 4% of the total post.

It is interesting to see from Table IV that within the Civil Engineering and Overseer group, the educational qualifications vary right from elementary education (under matric) to post-graduate degree such as M.E., A.M.I.E. etc. In this respect, our investigation reveals that under this occupation

group there are different levels of job including Muhurrer or section assistant which is especially meant for persons with school or elementary educations. It is prevailing practice of the employer to relax the minimum educational requirement result in the induction of quite a few under-matric candidates to these lower level jobs which incidentally do not require any specialised technical skill or knowledge. It is expected that the employee would acquire the required skill and expertise through practical training on the job. However, all the middle and high level groups of engineer have relevant technical training and qualifications as in these cases the relationship between education and occupation is rather rigid. Usually, the minimum educational qualification required for the post of overseer or junior engineer is HSLC/PU supplemented by Diploma or Certificate in Civil Engineering, while the minimum requirement for assistant engineer and above is at least graduate degree in civil engineering. Nevertheless, it may be pointed out here that there are certain cases wherein a person without a formal university degree may climb to a high level of post through promotion or vertical movement. In the present study, we have at least nine Executive Engineers whose formal qualifications are just HSLC supplemented by diploma and long years of service experience. Therefore, vertical mobility even to the highest rank of engineering occupations is determined not merely by formal qualifications but also by experiences and training on the job. This points clearly supports the proposal for the vocationalization of education after or at the +2 level under the New Education Policy Measures, 1986.

The second largest occupation group in Table IV is Physicians and Surgeons which comprises nearly 17% of the total posts. It is generally accepted that the statutory provision for minimum educational qualifications for doctors and surgeons is bachelor degree in medicine or any relevant specialisation. This also implies that this qualification is the minimum requirement for the performance of the occupational entries.

The next highest occupation group is Electrical Engineering group. Under this group also, the relation between education and occupation is rather rigid. The minimum educational qualification for an electrical engineer is a degree in the relevant field of engineering studies.

Coming to Veterinarian group of occupation which contribute a little less than 7% of the total posts, it is again to be noted that there is no scope for relaxation of the educational requirements as this occupation is intimately linked with the relevant field of specialisation and training. The range of educational qualification for veterinary doctors covered by this study is bachelor degree to Ph.D. The position is more or less the same in the remaining three occupational groups such as mechanical engineers, architects and tracer/technician. Depending on the level and grade of the occupation the educational qualification ranges from HSLC + Diploma to degree in the relevant fields of studies.

Thus our study highlights the existence of a unique and rigid inter-relations between occupation in technical lines and formal educational qualifi-

cations. The empirical evidence also reveals that there is no substitution possibility between different lines of technical education as in the case of doctors and engineers. However, there exists, to a certain extent, substitution probability between different levels of education in the same line of specialization. Shortages in the level of formal education may be made good by experiences and practical training on the job.

4.3 Earning-Education Interrelations

The interrelation between education and earning has earned much discussion in the economic literature. It is true that in both developed and developing economies, in capitalist and socialist countries, educated workers earn higher wages or salaries than those who have lower educational qualification or those who are illiterate. The analysis of this relationship is important to throw light on the relationship between education and economic growth, to measure the social and private rate of returns to education, to evaluate education as a form of investment in human capital, and to examine the links between education and the distribution of income.

The relationship between education and earnings is important on distributional grounds. The government policy on long-term redistribution of income rests on the fact that the distribution of educational opportunities will have an impact on the future distribution of income. However, there is no impact on the future distribution of income. However, there is no agreement among economists that while some of them argue that there

are strong links between education and earning capacity, others point to the importance of inherited characteristics, family background, and pure luck in determining an individual's earning power.

The links between education and earnings are also important in the efficient allocation of resources since it has been argued that the higher earnings of the educated reflect their superior productivity. However, the pattern of wages and salaries reflects many other factors, apart from the education of workers. Not only the individual's natural ability, family background, and other personal characteristics, but also historical and institutional factors and trade union bargaining help to determine the pattern of earning differentials. Thus there is considerable disagreement between economists who argue that education is a form of investment in human capital and they advocate cost-benefit analysis as a guide to resource allocation, and those who argue that education acts as a "screening device", or 'filter' enabling employers to identify the most productive workers.

Although the relationship between education and earnings is important on distributional and resource allocation, there is controversy and disagreement between economists on the question of what determine an individual's earning capacity, whether the existence of earnings differentials reflects differences in the productivity of workers, and how information about earnings differentials should be used to guide educational planning decisions. The one point of general agreement is summed up by Blaug³ thus :

We begin by noting a remarkable fact of life; between any two groups of individuals of the same age and sex, the one with more education will have higher average earnings than the one with less, even if the two groups are employed in the same occupational category in the same industry. The universality of this positive association between education and earnings is one of the most striking findings of modern social science. It is indeed one of the few safe generalizations that one can make about labour markets in all countries, whether capitalist or communist.³

EMPIRICAL FINDINGS : Earning-Education Interrelations

The Earning-Education Matrix is reported in Table V of the Statistical Supplement. In this table we have taken the different earnings accrued to the different levels of education in accordance with the various pay scales as a controlling factor and then arrange the different levels of education and experience they command. Altogether we have nine different pay scales arranged in an ascending order. It is very interesting to note that the level and qualifications in formal education influence, to a significant extent, the average earnings of these technical manpowers. In general, university graduates have consistently higher average earnings than those with only secondary schooling and these in turn earn more than those with only primary, middle or elementary education or illiterates with no schooling

at all. In Table V, it is shown that the maximum number of 359 technical workers, i.e. more than 45% of the total manpowers, are accommodated at the pay range of Rs.1640-2900 which is the lowest of the pay scales under our study. Most of these workers have education only upto HSLC supplemented by diploma or certificate, and while as many as 28 of them are under matric, none of them has graduate degree or above. However, most of the workers with less than HSLC education have a long years of practical experience or on-the-job training which is probably taken as a substitute for formal education. This particular fact lends support to the proposals for the vocationalisation of education after or at the +2 level under the New Education Policy Measures, 1986.

The next highest number of 251 posts are in the pay range of Rs.2200-4000, which is the starting scale of the Class I employees under the State Government. This group comprises 31% of the total post under our study. It is interesting to note that under this pay range we have workers with a wide range of educational levels right from simple matriculate to the highest level of post-graduate education. It is true that the maximum number of manpower within this group are graduates with experiences ranging from 0 to 40 years. All those who do not possess graduate degrees or who have education only upto school level, however, have long years of service experience and thus the short fall in their formal educations seems to be made good either by diplomas/certificate or long years of on the job training or experience. This point supports our proposition that formal education

or the number of years of normal schooling could be, to a certain extent, substituted with experiences such as on or out-of-the-job training and practical experiences. Although we are not in a position to indicate in clear terms the exact equivalence of the substitution possibility between the two variables, yet, our empirical evidence shows that this practice is quite common even at the level of organised sector such as Government services, not as mere convention but rather as a statutory provisions.

If we take the case of the high-level manpowers having earnings of Rs.4500 and above we find that all of them have degrees and post-graduate level education with only one exception, whose formal educational qualification is reported to be only HSLC supplemented by a diploma. However, this particular worker seems to have belonged to the group called 'practitioners', who do not have any formal education but have long years of practical experience on the job thereby gaining expertise in the work. It is not, therefore, surprising that our source of information could not supply the data with regard to the number of years of service experience that this particular worker possesses. This is shown in Table V itself very clearly.

In all other categories of salaries, the pattern is more or less the same. In other words, workers with lower level of education and lacking in practical training and experiences are generally employed in jobs carrying comparatively lower grades and salaries while those with higher and long years of formal education and training earn relatively more. This point

highlights the fact that the level of education or educational qualifications of workers influence to a significant extent, their average earnings, and university graduates have consistently higher average earnings than workers with only secondary education; these in turn earn more than those with only primary, middle or elementary schooling, or illiterates with no schooling at all. This may be cited as a conclusive prove that education is a profitable investment for the individual even though it may not necessarily prove that education confers economic benefits on society as a whole, unless it could also be proved that the higher earnings of educated manpowers are a direct result of their superior productivity, and hence a measure of their contribution to output or development.

Thus the hypothesis that earnings and education are intimately related to each other seems to have been indicated by the empirical evidence. Nevertheless, the hypothesis may also be examined by χ^2 and the coefficient of contingency for its more vigorous testing. As already explained, χ^2 gives us only a rough estimate or measure of correlation between the two variables i.e. earnings and education in the present case; but all the same it will give us a better idea about the degree of relationship between the two variables.

In this case, the calculated value of χ^2 from the earnings-education table is 784 which is .99 times more than the number of observation. This indicates a high level of correlation between earnings and education. The coefficient of contingency is also as high as 0.70 which does not differ

much from its corresponding maximum value, i.e. $\frac{8}{9} = .88$

This implies that the earnings differentials carried by the different posts/occupations are accounted mainly by the differences between the levels and types of education required for them. As the investments in different levels and types of education differ substantially, it is rational and logical to think that earnings differentials are explained by differences in the levels and types of education and/or the differential amounts of resources including time, efforts and energies needed for the acquisition of skills and knowledge.

Again, the earning-occupation interrelation is given in Table VI. From this matrix, it may be noted that out of the 359 posts which carry the pay range from 1640-2900, more than 80% of them belong to occupation 001 which is Civil Engineering and Overseer group while a little more than 16% of them belong to 003 which is Electrical Engineering occupation group. The remaining 4% are from the Mechanical Engineering group, i.e. 002.

The next highest number of 258 manpowers are in the pay range of 2200-4000. Out of these 258 workers, 105 of them i.e. 40.6% are from the Civil Engineering and Overseer group. another 80 workers i.e. 31% of them belong to occupation group 030 followed by 003 with 16.2% while the remaining 12% are scattered in the remaining occupation groups of 002, 021, 090 and 099.

The third highest number of 60 manpowers are in the scale of 3000-4500 followed by the pay range of Rs.3000-5000 with the total of 40 workers.

These are followed by the pay range of Rs.2000-3500 with 34 workers followed closely by 23 manpowers absorbed in the pay range of Rs. 3700-5000. The remaining 13 workers are accommodated in the remaining pay ranges.

As our study is concentrated on two technical manpowers i.e. doctors and engineers, the earning-occupation interrelations do not give us much to analyse. There is not much empirical evidence to show that one technical specialisation is endowed with better salary than the other. However, it is still probable that even within technical education, the future promotion prospects and the emoluments and salaries are not exactly the same.

4.4 Nature of Labour Market in Mizoram

According to classical and neoclassical economists, the interaction of the demand for and supply of labour within a competitive labour market will result in the determination of an equilibrium wage rate and level of employment. Any wage above this equilibrium rate will result in competition amongst workers for jobs which will push the level of wages back down to the equilibrium, whereas competition among employers/firms will bid up the wage if it is set below the equilibrium. However, wage rates are also governed by many other factors and not just by demand for and supply of labour. Some of these important factors affecting wage rates are the temporary or permanent nature of the jobs, the risks and the degree of disagreeableness associated with particular works, conditions of works such as the environment or place of work, facilities such as housing, children's

education, medical facilities, bonuses, leaves, etc. the level and nature of educational training required for a particular job and the cost involved therein, future promotion prospects by way of horizontal or vertical mobility, etc. Therefore, there is always a certain element of imperfection in the labour market. In any case, wage rates are flexible practically only upwards, but almost completely sticky downwards. Moreover, it is also very difficult to effect a radical change in the given wage structure within a short period of time. The labour market tries to overcome this inflexibility of wage rates and structure by means of substitution processes. The educational qualification and training often get upgraded or downgraded accordingly as there is surplus or scarcity of manpower of a particular type which directly affect the existing relation between earnings and education.

As already point out, in the case of the two technical manpowers covered by our study, the substitution possibility between formal educations in engineering and medicine is practically zero and neither is there much scope for upgradation or downgrading of the educational qualification to suit the situation of surpluses or scarcity. There is often a minimum for educational qualification fixed for engineers and doctors and it is not, therefore, possible to relax the required educational qualification even in the phase of shortages of supply which is the situation prevailing at present in Mizoram. Looking back at Table I, we find that as many as 99 vacancies of engineers and doctors are lying unfilled due mainly to shortage of supply. Many of these vacant posts are for high income streams of manpower such

as medical specialists, assistant engineers, medical officers and assistant surgeons. The fact that there are as many as 42 posts of assistant engineers and 33 posts of assistant surgeons lying unfilled in Mizoram and that no unemployed personnel of these two types of manpower are available within the state clearly indicates that these posts can be filled up by importing manpowers from elsewhere. The educational qualifications required for these two types of vacant posts are simply B.E. (Civil) and M.B.B.S. which are not very specialised type in their respective lines. In any case, these two types of manpower are available in plenty even in the north-eastern region and, therefore, it should not be very difficult on the part of the government to find suitable candidates from outside the state provided more facilities and incentives are introduced to attract people from outside.

Obviously, there are certain reasons and causes for the existence of these shortages of manpower in Mizoram while at the same time surpluses prevail almost everywhere in the country.

Firstly, very often the vacancies and situations are not reported in the national media as a result of which persons who may be willing to join the work are not in a position to apply whenever the situation arises. It may also be the narrow parochial practice of reserving the posts only for the 'sons of the soil' pursued by the government that may render so many vacancies lying unfilled for so long time.

Another reason could be the remoteness of the state and the political instability and turmoil especially since the outbreak of hostility since 1965.

Besides, the requirement of securing special inner line permit to enter the state of Mizoram for non-tribal personnel may also create some problems with respect to mobility of labour into Mizoram.

Lastly, communication problems, language and cultural barriers, religious differences etc. may, to a certain extent, stand in the way of people seeking employment to migrate to Mizoram.

Notes and References

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4. Lawma, T., ibid.

Chapter V

MAJOR FINDINGS AND CONCLUSION

The following are the major findings of this study :

1. There is an empirical evidence to support the fact that the level of education or educational qualifications of workers influence their average earnings, and university graduates have consistently higher average earnings than workers with only secondary schooling; these in turn, earn more than those with only primary, middle or elementary schooling or illiterate with no schooling at all. This may be cited as a conclusive proof that education is a profitable investment for the individual even though it may not necessarily prove that education confers economic benefits on society as a whole unless it could also be proved that the higher earnings of educated manpowers are a direct result of their superior productivity and hence a measure of their contribution to output.

2. The decisions of students and their parents to enrol in college and universities and to choose various lines/fields of studies are quite responsive to economic incentives, producing substantial elasticities of supply. This indicates that elasticities of supply to specific fields tend to be higher, in general than elasticities of supply to higher education as a whole in Mizoram. The steady increase in the number of students joining the science stream of studies with a view to joining technical education leading to degrees in engineering or medicine indicate the type of supply response to economic incentive as most of the people with technical education are relatively well off than their counterparts with the same level but of general education. The actual increase in the supply of these technical manpowers

could have been much higher had there not been so much restrictions and limitations in admission to engineering and medical colleges.

3. There is also some empirical evidence to support the hypothesis that there is a unique relationship between engineering and medical occupations and formal educational qualifications. If a person fails to have the minimum formal educational qualifications, especially at the degree levels, this has to be made good by on-the-job training or long years of practical experience. The study also reveals that educational qualifications in specific fields of specialization are intimately related to specific occupational categories. Therefore, the substitution possibility between different lines and types of education is practically zero. In this case, engineering and medical specialization may be cited as a case in point.

4. The study also reveals the fact that for most of the occupations, earnings and salaries or grades vary according to the level and type of education and the period of training and experiences as well. This indicates that though earning differentials are mainly due to the differences in the level and type of education, yet, practical experiences and training on the job also contribute to earning differential to a significant extent. In fact, on-the-job training and experiences are invariably accompanied with higher earnings. Moreover, vertical mobility depends, in most cases, largely on age, experience and on-the-job training rather than formal qualifications alone. If a person does not get a job due to lack of experiences or training, he is most likely to reenter the educational system and thereby gain the

requisite training and skill to boost up his chance in the employment market. This point, therefore, lends support to the proposal for delinking of degrees with jobs in the 1986 New Educational Policy measures.

5. There is also an empirical evidence to support the hypothesis that education upto the level of HSLC/Matric or Intermediate degrees like PU or HSLC can no longer be used as a terminal stage for the employment purposes either by students or their parents. This study reveals that these qualifications no longer serve as an entry point to employment markets as no employer is willing to hire a person with these qualifications unless they are supplemented by some technical or professional training such as diplomas or certificates. This has a very important policy implication for the development of education in the north-east region of India in general and Mizoram in particular. Lack of facilities to impart training and expertise to the workers in the relevant field of specialization hinders the rate of economic growth of the state. This point is also quite relevant with the proposals for the vocationalisation of education after or at the +2 level under the New Education Policy measures. However, due to the absence of these training facilities and the failure on the part of the government to effectively implement the New Education Policy measures, the unfortunate students are being forced to turn back to the educational institutions thereby swelling the institutions of higher learning without really improving their job prospects. This process simply increases the number of educated unemployed as the unemployed matriculates gets themselves converted

into unemployed graduates and so on and so forth. Besides, this continuous flow of students for higher learning or degrees without much prospect for employment simply puts more pressure on the already stringent budget of the government as it continuously results in an inflationary increase in expenditures for education without any corresponding increase in the job opportunities. The present situation can be effectively tackled only through the effective implementation of vocationalisation of education and the proper integration of education and manpower planning which should again be in tune with the economic objectives and targets of our development planning.

6) Lastly, the empirical evidence from this study reveals the peculiar nature and characteristics of labour market in Mizoram. It is, in fact, a controversial case, a case of shortages in the midst of plenty". The empirical finding that the two highly specialised technical manpowers, i.e. doctors and engineers are in short supply, and, therefore, unable to meet the requirements and demand of the State while the country as a whole, including the north-east region is having plenty of surpluses of these manpowers is a real paradox. Our investigation reveals that some of the most important reasons for this situation are :

- 1) remoteness of the State
- 2) communication gap, as a result of which workers from outside the state may not be aware of the situations vacant in Mizoram;

3) very often advertisements for vacancies are not widely circulated as in National dailies or newspapers and Employment News,

4) language, cultural and religious differences/barriers, and

5) political and economic conditions of the state.

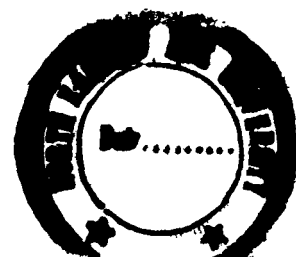
Our study reveals that there are at present, as many as 99 unfilled vacancies. Some of these vacancies have been lying vacant for quite some time and for many of these vacancies there are no aspirants or applicants whatsoever in response to the advertisements floated by the government occasionally. At the same time, our survey also reveals that there are no unemployed engineers and doctors who are available for employment within Mizoram. Thus, these vacancies can be filled up only by importing manpowers either from the neighbouring states or from other parts of the country. It is true that all the new graduates in Engineering and Medical from the local community are accommodated within the State and it is also true, at present, that most of the students who are pursuing their educations in these two specialised fields are sponsored by the government and, therefore, it is incumbent on the part of the State to provide them with employment as and when the students complete their educations. It is not, however, difficult to foresee that this state of affairs cannot continue for any longer. It is sooner rather than later that the State of Mizoram will also fall in line with any other parts of the country where educated unemployment is the order of the day rather than shortages.

This implies that the present peculiar situation is only a temporary phenomenon and it can continue only for a short while as Mizoram, being a new State, is passing through a transitional period in her developmental programmes.

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APPENDICES

Statistical Supplements

Table I

Occupation-Education-Industry-Earning Matrix

Occupational Code	Description of occupation	No. of posts filled up	Educational qualification	Dept./ Firm	Experience (Years)	Salary/ Grade (Rs.)	Within/ Outside the State
001	C.E.	2	B.E., F.I.E.	P.W.D.	29	5900-6700	
			B.E.	P.H.E.	n.a.	-do-	
	Addl. C.E.	1	B.E., F.I.E.	P.W.D.	29	-do-	
	S.E.	10	B.E., M.E.	P.H.E.	n.a.	3700-5000	
			B.E.	-do-	n.a.	-do-	
			B.E.	-do-	24	-do-	
			B.E.	-do-	19	-do-	
			B.E.	-do-	16 = 3*	-do-	
			B.E.	-do-	15 = 2*	-do-	
			B.Sc., Engg.	P&E	25	-do-	
	E.E.	23	B.Tech.	P.W.D.	6	3000-4500	
			B.E.	-do-	6	-do-	
			B.E.	-do-	5 = 5*	-do-	Outside=1
			B.E.	-do-	4 = 2	-do-	
			HSLC + Dip.	-do-	25	-do-	
			HSLC + Dip.	-do-	24	-do-	
			HSLC + Dip.	-do-	22 = 2	-do-	
			HSLC + Dip.	-do-	21 = 6	-do-	Outside 2
			HSLC + Dip.	-do-	20 = 2	-do-	Outside=1
			HSLC + Dip.	-do-	16	-do-	Outside=1
			AMIE	-do-	15	-do-	

Occupational Code	Description	No. of posts filled	Post up	Educational qualification	Dept./ Firm	Experience (Years)	Salary/ Grade (Rs.)	Within/ Outside the State
E.E.		12	11	B.E.	P.H.E.	n.a. = 3	-do-	Outside = 3
				B.E.	-do-	7	-do-	
				B.E.	-do-	6	-do-	
				B.Tech.	-do-	n.a.	-do-	Outside = 1
				B.Sc. Engg.	-do-	n.a.	-do-	Outside = 1
				HSLC + Dip.	-do-	n.a.	-do-	Outside = 1
				HSLC + Dip.	-do-	28	-do-	
				HSLC + Dip.	-do-	25	-do-	
				HSLC + Dip.	-do-	24	-do-	
S.D.O./A.E.		98	74	B.E., AMIE	-do-	4	2200-4000	
				B.E.	-do-	4 = 8	-do-	
				B.E., AMIE	-do-	3	-do-	
				B.E.	-do-	3 = 5	-do-	
				B.E.	-do-	2 = 8	-do-	
				B.E., AMIE	-do-	1	-do-	
				B.E.	-do-	1 = 6	"	
				HSLC + Dip.	-do-	26	"	
				HSLC + Dip.	-do-	25 = 3	"	Outside = 1
				HSLC + Dip.	-do-	24 = 2	"	
				HSLC + Dip.	-do-	23 = "	"	
				HSLC + Dip.	-do-	22	"	

Occupational Code	Description	No. of posts filled up	Post	Educational qualification	Dept./ Firm	Experience (Years)	Salary/ Grade (Rs.)	Within/ Outside the State
				HSLC + Dip.	P.W.D.	20 = 2	2200-4000	Outside = 1
				HSLC + Dip.	P.W.D.	19		
				HSLC + Dip.	-do-	18 = 2	-do-	Outside = 1
				HSLC + Dip. B.A.	-do-	17 = 2	-do-	Outside = 1
				HSLC + Dip.	-do-	16	-do-	
				HSLC + Dip.	-do-	15	-do-	
				HSLC + Dip.	-do-	14 = 5	-do-	Outside = 1
				HSLC + Dip.	-do-	13 = 6	-do-	Outside = 2
				HSLC + Dip.	-do-	12 = 2		
				HSLC + Dip.	-do-	n.a.	-do-	Outside = 1
				HSLC + Dip.	-do-	28		
				HSLC + Dip.	-do-	26		
				HSLC + Dip. failed	-do-	36		Outside = 1
				-do-	-do-	35	-do-	
				HSLC + Cert.	-do-	34	-do-	
				HSLC + Cert.	-do-	29	-do-	
				-do-	-do-	26	-do-	
				-do-	-do-	21	-do-	
				-do-	-do-	12	-do-	
				-do-	-do-	n.a.	-do-	

Occupational Code	Description	No. of posts, filled up	Post	Educational qualification	Dept./ Firm	Experience (Years)	Salary/ Grade (Rs.)	Within/ Outside the State
	S.D.O./A.E.	43	25	B.E.	P.H.E.	3	2200-4000	
	B.E.			B.E.	-do-	2	-do-	
	B.E.			B.E.	-do-	1 = 7	-do-	
	HSLC + Dip.			HSLC + Dip.	-do-	19 = 2		
	-do-			-do-	-do-	18	-do-	
	-do-			-do-	-do-	13 = 2	-do-	
	-do-			-do-	-do-	12 = 2	-do-	Outside = 2
	-do-			-do-	-do-	11	-do-	
	-do-			-do-	-do-	10	-do-	
	-do-			-do-	-do-	16	-do-	
	-do-			-do-	-do-	n.a.	-do-	Outside =
	-do-			-do-	-do-	23	-do-	
	-do-			-do-	-do-	24	-do-	Outside =
	S.D.O./A.E.	6	6	B.E.	P & E	4	-do-	
	-do-			-do-	-do-	2 = 3	-do-	
	-do-			-do-	-do-	1	-do-	
	HSLC + Dip.			HSLC + Dip.	-do-	n.a.	-do-	
	J.E.	184	184	HSLC + Dip.	P.W.D.	10 = 2	1640-2900	
	HSLC + Dip.			HSLC + Dip.	P.W.D.	9 = 7	-do-	Outside = 4

Occupational Code	Description	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (Years)	Salary/ Grade (Rs.)	Within/ Outside the State
J.E.		184	184	HSLC + Dip.	P.W.D.	8 = 4	1640-2900	
				-do-	-do-	7 = 2	-do-	
				-do-	-do-	6 = 4	-do-	
				-do-	-do-	5 = 2	-do-	Outside=2
				-do-	-do-	4 = 17	-do-	
				-do-	-do-	3 = 31	-do-	
				-do-	-do-	2 = 25	-do-	
				-do-	-do-	1 = 32	-do-	Outside=3
				HSLC + Dip. Failed	-do-	15	-do-	
				-do-	-do-	14 = 2	-do-	
				HSLC + Cert.	-do-	29	-do-	
				-do-	-do-	34 = 4	-do-	
				-do-	-do-	31	-do-	
				-do-	-do-	30 = 5	-do-	Outside=1
				-do-	-do-	29 = 3	-do-	
				-do-	-do-	28 = 4	-do-	
				-do-	-do-	27	-do-	
				-do-	-do-	26 = 6	-do-	
				-do-	-do-	25 = 4	-do-	

Occupational Code	Description	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
J.E.		184	184	HSLC + Cert.	P.W.D.	24	1640-2900	
				-do-	-do-	23	-do-	
				-do-	-do-	21 = 2	-do-	Outside=1
				-do-	-do-	17	-do-	
				-do-	-do-	16 = 2		
				-do-	-do-	15	-do-	
				Under Matric + Cert.	-do-	33	-do-	
				-do-	-do-	31	-do-	
				-do-	-do-	30	-do-	
				-do-	-do-	29 = 4	-do-	
				-do-	-do-	28	-do-	
				-do-	-do-	27 = 2	-do-	Outside=1
				-do-	-do-	25 = 2	-do-	
				-do-	-do-	24	-do-	
				-do-	-do-	40	-do-	
				Under Matric + Cert. Failed	-do-	33	-do-	
				-do-	-do-	28	-do-	
				-do-	-do-	26	-do-	
				-do-	-do-	25	-do-	
J.E.		72	72	HSLC + Dip.	P.H.E.	9	1640-2900	

Occupational Code	Description	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
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J.E.		72	72	HSLC + Dip.	P.H.E.	8	1640-2900	
				-do-	-do-	4 = 6	-do-	
				-do	-do-	3 = 11	-do-	
				-do-	-do-	2 = 8	-do-	Outside=1
				-do-	-do-	1 = 35	-do-	
				HSLC + Dip. Failed	-do-	10	-do-	
				HSLC	-do-	2 = 4	-do-	Outside=2
J.E.		38	38	HSLC + Dip.	P & E	4 = 6	-do-	
				-do-	-do-	3 = 15	-do-	
				-do-	-do-	2 = 2	-do-	
				-do-	-do-	1 = 15	-do-	

VII

001 Civil Enggs. 489 446
Overseers, etc.

002	E.E.(Mech.)	2	2	B.E. (Mech.)	P.W.D.	6 = 2	3000-4500	
		1	1	-do-	P.H.E.	6	-do-	
		1	1	-do-	P & E	9		
	S.D.O./A.E.	6	6	B.E.	P.W.D.	4	2200-4000	

VIII

Occupational Code	Description-occupation	No. of posts filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
	S.D.O./A.E.	6	B.E.	P.W.D.	3	2200-4000	
			-do-	-do-	2	-do-	
			HSLC + Dip.	-do-	12 = 2	-do-	Outside=2
			-do-	-do-	11	-do-	
		5	B.E.	P.H.E.	3 = 2	-do-	
			-do-	-do-	2	-do-	Outside
			-do-	-do-	1	-do-	Outside
			HSLC + Dip.	-do-	n.a.	-do-	Outside
		3	-do-	P & E	15	-do-	Outside
			-do-	-do-	14	-do-	Outside
			-do-	-do-	13	-do-	Outside
	J.E.	6	HSLC + Dip.	P.H.E.	8	1640-2900	
			-do-	-do-	1 = 5	-do-	
002	Mech. Enggs. Overseers, etc.	24					
003	C.E.	1	B.E. (Elect.)	P & E	n.a.	5900-6700	Outside
	Addl. C.E.	1	HSLC + Dip.	-do-	n.a.	-do-	
	S.E.	5	B.E.	-do-	14 = 2	3700-5000	Outside=2

Occupational Code	Description	No. of posts	No. of posts filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
				B.E.	P & E	11	3700-5000	
				HSLC + Dip.	-do-	31	-do-	Outside
				HSLC + Dip.	-do-	21	-do-	
E.E.		18	18	B.E.	-do-	25 = 2	3000-4500	
				-do-	-do-	23	-do-	
				-do-	-do-	19	-do-	
				-do-	-do-	11 = 2	-do-	
				-do-	-do-	10	-do-	
				B.E.	-do-	9 = 3		
				-do-	-do-	6 = 8	-do-	
S.D.O./A.E.		42	42	-do-	-do-	4 = 8	2200-4000	
				B.E.	-do-	3 = 2	-do-	
				-do-	-do-	1 = 7	-do-	
				HSLC + Dip.	-do-	18	-do-	
				-do-	-do-	17	-do-	
				-do-	-do-	14 = 2	-do-	
				-do-	-do-	13 = 4	-do-	
				-do-	-do-	12 = 3	-do-	
				-do-	-do-	n.a. = 6	-do-	

Occupational Code	Description	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
	J.E.	59	59	H.S.L.C. + Dip.	P & E	12 = 2	1640-2900	
				-do-	-do-	11 = 2	-do-	
				-do-	-do-	10 = 3	-do-	
				-do-	-do-	9	-do-	
				-do-	-do-	8 = 13	-do-	
				-do-	-do-	7 = 4	-do-	
				-do-	-do-	5	-do-	
				-do-	-do-	4 = 2	-do-	
				-do-	-do-	3	-do-	
				-do-	-do-	2 = 8	-do-	
				-do-	-do-	1 = 16	-do-	
				Under Matric	-do-	2 = 6	-do-	
003	Elect. Enggs. and other related works	126	126					
00	Enggs., Dip., Cert., etc.	639	596					

Occupational Code	Description occupation	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
021	Director	1	1	B.V.Sc., Ph.D.	A.H.& Vety.	31	4500-5700	
	Jt. Director	1	1	B.V.Sc.	-do-	31	3700-5000	
	Dy. Director	1	1	-do-	-do-	30	3000-4500	
	D.I.O.	1	1	M.V.Sc.	-do-	22	-do-	
	Principal	1	1	B.V.Sc.	-do-	26	-do-	
	District A.F. & Vety. Officer	3	3	-do-	-do-	24	2200-4000	
				-do-	-do-	11	-do-	
				-do-	-do-	10	-do-	
	Special Officer	1	1	-do-	-do-	24	-do-	
	R.E.O.	1	1	-do-	-do-	23	-do-	
	Project Officer	3	3	M.V.Sc.	-do-	21	-do-	
				B.V.Sc.	-do-	6	-do-	
				-do-	-do-	5	-do-	
	D.D.O.	1	1	-do-	-do-	19	-do-	
	Gen. Manager	2	2	-do-	-do-	19	-do-	
				-do-	-do-	13	-do-	
	Asst. Director	1	1	-do-	-do-	16	-do-	
	Physio Chemist	1	1	-do-	-do-	11	-do-	
	A.I.O.	1	1	M.V.Sc.	-do-	8	-do-	

XII

Occupational Code	Description occupation	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
S.D.V.O.		7	7	B.V.Sc.	A.H. & Vety.	10	2000-3500	
				-do-	-do-	8 = 3	-do-	
				-do-	-do-	5 = 3	-do-	
Manager		3	3	B.V.Sc.	-do-	6	-do-	
				-do-	-do-	5	-do-	
				-do-	-do-	3	-do-	
Asst. Gen. Manager		1	1	-do-	-do-	6	-do-	
Vety. Surgeon		1	1	-do-	-do-	6	-do-	
Kay Village Officer		1	1	M.V.Sc.	-do-	5	-do-	
Instructor		2	2	B.V.Sc.	-do-	4	-do-	
				-do-	-do-	3	-do-	
A.P.O.		1	1	-do-	-do-	2	-do-	
V.A.S.		18	18	-do-	-do-	5	-do-	
				-do-	-do-	4	-do-	
				-do-	-do-	3 = 5	-do-	
				-do-	-do-	2 = 3	-do-	
				-do-	-do-	1 = 8	-do-	

Occupational Code	Description occupation	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
030	Director	1	1	M.B.B.S.	Health Services	22	4700-5700	
	Jt. Director	3	2	-do-	-do-	19	3700-5000	
	Dy. Director	3	2	-do-	-do-	17	-do-	
				-do-	-do-	17	3000-5000	Outside
	Medical	1	1	M.B.B.S., M.S.	-do-	16	-do-	Outside
	Sr. Sepecialist	2	2	M.B.B.S., D.G.O.	-do-	13	3700-5000	
				M.B.B.S., M.S.	-do-	16	-do-	
	Civil Surgeon	4	4	M.B.B.S.	-do-	12	-do-	
				-do-	-do-	16	3000-5000	
				-do-	-do-	15	-do-	
				-do-	-do-	13 = 2	-do-	
	State Leprosy Officer	1	1	-do-	-do-	13	-do-	
	M.C.W. Specialist	1	1	M.B.S. Dip. (M.C.W.)	-do-	12	-do-	
	Pathologist	2	2	M.B.B.S., M.D.	-do-	12	-do-	Outside
				M.B.B.S., Dip. (Patho.)	-do-	12	-do-	Outside
	S.D.M. & H.O.	11	11	M.B.B.S.	-do-	14	-do-	
				-do-	-do-	12 = 2	-do-	
				-do-	-do-	11 = 3	-do-	

Occupational Code	Description	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
				M.B.B.S., Dip. Health Services (Anaes.)	10	3000-5000		
				M.B.B.S.	-do-	10 = 2	-do-	
				-do-	-do-	9	-do-	
				-do-	-do-	n.a.	-do-	
	District Laboratory	1	1	-do-	-do-	14	-do-	Outside
	D.F.W.M.O.	1	1	-do-	-do-	11	-do-	
	Asst. T.B. Officer	2	2	-do-	-do-	11	-do-	
	Physician	3	2	-do-	-do-	10	-do-	Outside
				M.B.B.S., M.D. (Med.)	-do-	11	-do-	
	Radiologist	3	1	-do-	-do-	n.a.	-do-	Outside
				M.B.B.S., M.D. (Radio.)	-do-	10	-do-	Outside
	District Immunization Officer	1	1	M.B.B.S.	-do-	10	-do-	
	Asst. Director (EPI)	1	1	M.B.B.S., D.P.H.	-do-	10	-do-	
	Asst. Director (SH)	1	1	M.B.B.S.	-do-	10	-do-	
	Gynaecologist	4	2	M.B.B.S.(Gynae.)	-do-	10	-do-	
				-do-	-do-	5	-do-	

Occupational Code	Description of occupation	No. of posts	No. of posts filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
	Paediatrician	3	2	M.B.B.S., D.P.H.	Health Services	9	3000-5000	
				M.B.B.S., M.D. (Pae.)	-do-	7	-do-	
	P.M.O.	1	1	M.B.B.S., D.P.H.	-do-	8	-do-	
	Orthopaedic Surgeon	1	1	M.B.B.S., M.S. (Ortho.)	-do-	8	-do-	
	Asst. Leprosy Officer	1	1	M.B.B.S.	-do-	9	-do-	
	Tech. Officer	1	1	M.B.B.S., D.P.H.	-do-	7	2200-4000	
	Anaesthetist	4	1	M.B.B.S., Dip. (Anaes.)	-do-	3	3000-5000	
	Gen. Surgeon	4	1	M.B.B.S., M.S.	-do-	2	-do-	Outside
	E.N.T. Specialist	2	nil					
	Eye Specialist	4	nil					
	Psychiatrist	1	nil					
	Cyto-Pathologist	1	nil					
	Sr. M.O.	1	nil					
	Asst. Surgeon-I	112	79	M.B.B.S.	-do-	14	2200-4000	Outside
				-do-	-do-	12	-do-	
				-do- M.D.	-do-	10	-do-	
				-do-	-do-	10 = 2	-do-	

Occupational Code	Description of occupation	No. of posts filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
	M.B.B.S., M.D. (Psychia.)		Health Services	9	2200-4000		
	M.B.B.S., M.S. (E.N.T.)		-do-	9	-do-		
	M.B.B.S., D.M.C.W.		-do-	9	-do-		
	M.B.B.S.		-do-	9 = 2	-do-		
	M.B.B.S., M.D.		-do-	8	-do-		
	M.B.B.S., M.S.		-do-	7	-do-		
	M.B.B.S.		-do-	8	-do-		
	-do-		-do-	7 = 6	-do-		
	-do-		-do-	6 =	-do-		
	M.B.B.S., M.D.		-do-	5	-do-		
	M.B.B.S., Dip. (Oph.)		-do-	5	-do-		
	M.B.B.S.		-do-	5 = 5	-do-		
	-do-		-do-	4 = 2	-do-	Outside=1	
	-do-		-do-	3 = 10	-do-		
	-do-		-do-	2 = 2	-do-	Outside=1	
	-do-		-do-	1 = 20	-do-		

Occupational Code	Description	No. of posts	Post filled up	Educational qualification	Dept./ Firm	Experience (years)	Salary/ Grade (Rs.)	Within/ Outside the State
	Asst. Surgeon-I	112	79	M.B.B.S., M.S.	Health Services	1	2200-4000	
				-do-	-do-	1	-do-	
				M.B.B.S.	-do-	n.a. = 5	-do-	
	Dental Surgeon	6	6	B.D.S.	-do-	5	2000-4000	
				-do-	-do-	2	-do-	
				-do-	-do-	1 = 4	-do-	
030	Physician (Allo.) Dental Surgeon, etc.	188	132					
090	Sr. Architect	1	1	B.Arch.	P.W.D.	19	3700-5000	Outside
	Asst. Architect	2	2	-do-	-do-	2	2200-4000	
	Asst. Architect			-do-	-do-	1	-do-	
	Draftman	2	2	HSLC + Dip. (Draftmanship)	-do-	8	3000-4500	Outside
				-do-	P.H.E.	11	2200-4000	
	Architect & Draftman	5	5					
099	Tracer	1	1	HSLC + Dip.	P.W.D.	8	2200-4000	
	Grand Total	886	787					

* Number of persons having same number of years of experience.

XVIII

Table II

Industry-Occupation Matrix

Industries	No. of posts	Occupational Code						
		001	002	003	021	030	090	099
Public Work Department	303	290	8				5	
Public Health Engineering	124	111	12					1
Power & Electricity	175	45	4	126				
Veterinary & Animal Husbandry	53				53			
Health Services	132					132		
Total	787	446	24	126	53	132	5	1

XIX

Table III (A)

Education-Occupation Matrix

	Total	Occupational Code						
		001	002	003	021	030	090	099
Under Matric + 0-10 yrs. Exp.	10	4		6				
+ 11-20 yrs. Exp.								
+ 21-30 yrs. Exp.	3	3						
+ 31-40 yrs. Exp.	1	1						
Under Matric + Cert. + 21-30 yrs. Exp.	11	11						
+ 31-40 yrs. Exp.	3	3						
H.S.L.C. + 0-10 yrs. Exp.	5	5						
H.S.L.C. + Cert. + 11-20 yrs. Exp.	5	5						
+ 21-30 yrs. Exp.	332	32						
+ 31-40 yrs. Exp.	8	8						
H.S.L.C. + Dip. + 0-10 yrs. Exp.	285	228	6	49			1	
+ 11-20 yrs. Exp.	59	37	6	15			1	
+ 21-30 yrs. Exp.	27	26		1				
+ 31-30 yrs. Exp.	1			1				
H.S.L.C. + Dip. Exp. not known	12	3	1	8				
Graduate (Degree) + 0-10 yrs. Exp.	216	55	11	37	36	75	2	
+ 11-20 yrs. Exp.	39	6		6	6	20	1	
+ 21-30 yrs. Exp.	11	2		3	5	1		
+ 31-40 yrs. Exp.	1				1			
Graduate (Degree) Exp. not known	15	9				6		
Graduate + Dip. + 0-10 yrs. Exp.	11	3				8		
+ 11-20 yrs. Exp.	4	1				3		
+ 21-30 yrs. Exp.	5	4			1			
Post-Graduate + 0-10 yrs. Exp.	16				2	14		
+ 11-20 yrs. Exp.	4					4		
+ 30-40 yrs. Exp.	2				2			
Post-Graduate Exp. not known	1					1		
Total	787	446	24	126	53	132	5	1

Table III (B)
Education-Occupation Matrix (Aggregated)

	Total	Occupational Code						
		001	002	003	021	030	090	099
Under Matric + Exp.	14	8		6				
Under Matric + Cert. + Exp.	14	14						
H.S.L.C. + Exp.	5	5						
H.S.L.C. + Cert. + Exp.	45	45						
H.S.L.C. + Dip. + Exp.	372	291	12	66			2	1
H.S.L.C. + Dip. Exp. not known	12	3	1	8				
Graduate (Degree) + Exp.	267	63	11	46	48	96	3	
Graduate Exp. not known	15	9				6		
Graduate + Dip. + Exp.	20	8			1	11		
Post-Graduate + Exp.	22				4	18		
Post-Graduate + Exp. not known	1					1		
Total	787	446	24	126	53	132	5	1

Table IV

Occupation-Education Matrix

Occupational Code	Description of occupation	Educational Qualification	No. of posts	% share in total vacancies	% share in Occupation-division
001	Civil Engineers Overseers, etc.	ME/BE, B.Tech. B.Sc. Engg., AMIE/Matric/ Under Matric/ Diploma (CE)/ Certificate	446	56.67	74.83
002	Mechanical Engineers	ME/BE/Dip.(Mech) Cert./Matric/Under Matric	24	3.05	4.01
003	Electrical Engineers	BE/Dip./Cert.	126	16.01	21.13
021	Veterinarians	B.V.Sc./M.V.Sc./Ph.D.	53	6.73	100
030	Physicians/ Surgeons (allo.) Dental Surgeons	MBBS/BDS/MD/MS/ Dip./Cert.	132	16.77	100
090	Architect	N.Arch./Dip.	5	0.63	83.33
099	Tracer	H.S.L.C./Dip.	1	0.13	16.66

Table V

Earning-Education Matrix

No. of posts	Total	Earning Division (by Pay Scale)										
		1640-2900	2000-3500	2000-4000	2200-4000	258	60	40	23.	2	5	
Under Matric	787	359	34	6	258	60	40	23.	2	5		
0-10 yrs. exp.	10	10										
11-20 yrs. exp.	3	3										
21-30 yrs. exp.	1	1										
31-40 yrs. exp.												
Under Matric + Cert.	11	11										
20-30 yrs. exp.	3	3										
31-40 yrs. exp.												
Matric + Cert.	1											
0-10 yrs. exp.	5	4			1							
11-20 yrs. exp.	33	28			5							
21-30 yrs. exp.	5	3			2							
31-40 yrs. exp.												
Matric	5	5										
0-10 yrs. exp.	289	287			2							
11-20 yrs. exp.	53	4			46							
21-30 yrs. exp.	27				13							
31-40 yrs. exp.	1											
HSLC + Dip.	10				9							
Exp. not known	1				1							
Graduate	217	33	6	6	144	27	7	15	11			
0-10 yrs. exp.	38				8	4	4	5	2			
11-20 yrs. exp.	13				4	5	5	2	1			
21-30 yrs. exp.	3					2	2	1				
31-40 yrs. exp.	9		6	6			2					
Exp. not known												

Table V (Cont'd.)

Earning-Education Matrix

	Total	Earning Divisor (by Pay Scale)									
		1640- 2900	2000- 3500	2000- 4000	2000- 4000	2200- 4000	3000- 4500	3000- 5000	3700- 5000	4500- 5700	5900- 6700
Graduate + Dip.											
0-10 yrs. exp.	17			6		4		5			
11-20 yrs. exp.	4			1		2		2			
21-30 yrs. exp.	3								1		2
Post-Graduate											
0-10 yrs. exp.	18		1		9			6		2	
11-20 yrs. exp.	4							2		2	
21-30 yrs. exp.	2					1			1		
Post-Graduate Exp. not known	1									1	

Table V(B)
EARNINGS-EDUCATION MATRIX (X² Calculation)

	787	10	3	1	11	3	1	5	33	5	5	289	53	27	1	10	1	217	36	13	3	9	17	4	3	15	4	2	1
1640-2900	59	4.60	1.40	0.40	5.00	1.40	0.40	2.30	15.00	2.30	2.30	131.80	24.20	12.30	0.40	4.60	0.40	98.90	17.30	5.50	1.40	4.10	7.70	1.60	1.40	6.20	1.60	0.50	0.40
2000-3500	34	0.40	0.10	0.04	0.50	0.10	0.04	0.20	1.40	0.20	0.20	12.40	2.30	1.10	0.04	0.40	0.04	9.40	1.60	0.50	0.10	0.40	0.70	0.20	0.10	0.70	0.20	0.05	0.04
2000-4000	6	0.07	0.02	0.01	0.08	0.02	0.01	0.04	0.25	0.04	0.04	2.20	0.40	0.20	0.01	0.07	0.01	1.50	0.28	0.09	0.02	0.07	0.12	0.03	0.02	0.13	0.03	0.01	0.01
2200-4000	258	3.30	0.90	0.30	3.60	0.90	0.30	1.60	10.60	1.60	1.60	94.70	17.40	8.60	0.30	3.30	0.30	71.10	12.50	4.30	0.90	2.90	5.60	1.30	0.90	5.90	1.30	1.60	0.30
3000-4500	60	0.60	0.20	0.07	0.60	0.20	0.07	0.40	2.50	0.40	0.40	22.00	4.00	2.00	0.07	0.60	0.04	16.50	2.90	1.00	0.20	0.70	1.30	0.30	0.20	1.40	0.30	0.10	0.07
3000-5000	40	0.50	0.10	0.05	0.60	0.10	0.05	0.20	1.70	0.20	0.20	14.70	2.70	1.40	0.05	0.50	0.05	11.00	1.90	0.70	0.10	0.50	0.90	0.20	0.10	0.90	0.20	0.10	0.05
3700-5000	23	0.30	0.08	0.02	0.30	0.08	0.02	0.10	1.00	0.10	0.10	8.40	1.50	0.80	0.02	0.30	0.02	6.30	1.10	0.40	0.08	0.30	0.50	0.10	0.08	0.50	0.10	0.06	0.02
4500-5700	2	0.02	0.00	0.00	0.03	0.00	0.00	0.01	0.08	0.01	0.01	0.70	0.10	0.07	0.00	0.02	0.00	0.50	0.09	0.03	0.00	0.02	0.04	0.00	0.00	0.05	0.00	0.00	0.00
5900-6700	5	0.06	0.02	0.00	0.07	0.02	0.00	0.03	0.21	0.03	0.03	1.50	0.34	0.16	0.00	0.06	0.00	1.40	0.24	0.06	0.02	0.06	0.11	0.02	0.02	0.11	0.02	0.01	0.00

$$X^2 = 784.38 \quad C = \sqrt{\frac{X^2}{X^2 + N}} = \sqrt{\frac{784.38}{784.38 + 787}} = \sqrt{\frac{784.38}{1571.36}} = \sqrt{C.4991663}$$

C = 0.706517

Table VI

Earning-Occupation Matrix

Earning (by Pay Scale)	No. of posts	Occupational Code						
		001	002	003	021	030	090	099
16400-2900	359	294	6	59				
2000-3500	34				34			
2000-4000	6					6		
2200-4000	258	105	14	42	14	80	2	1
3000-4500	60	33	4	18	3		2	
3000-5000	40					40		
3700-5000	23	11		5	1	5	1	
4500-5700	2				1	1		
5900-6700	5	3		2				
Total	787	446	24	126	53	132	5	1

Abbreviations

XXVI

ABBREVIATIONS

A.D.I.O.	=	Assistant Disease Investigation Officer
A.G.M.	=	Assistant General Manager
A.H. & Vety.	=	Animal Husbandry & Veterinary
A.M.I.E.	=	Associated Member of Institution of Engineers
A.N.M.	=	Auxiliary Nurse and Midwife
Asst.	=	Assistant
B.A.	=	Bachelor of Arts
B.E.	=	Bachelor of Engineering
B.Sc. Engg.	=	Bachelor of Engineering
B.Tech.	=	Bachelor of Technology
B.V.Sc.	=	Bachelor of Veterinary Science
C.E.	=	Chief Engineer
Cert.	=	Certificate
D.D.O.	=	District Dairy Officer
D.I.O.	=	Disease Investigation Officer
Dip.	=	Diploma
Dr.	=	Doctor
E.E.	=	Executive Engineer
Elect.	=	Electrical
Exp.	=	Experience
F.	=	Female
F.I.E.	=	Fellow of Institution of Engineers (India)
Gen.	=	General
H.S.L.C.	=	High School Leaving Certificate
I.L.O.	=	International Labour Organization
J.E.	=	Junior Engineer
Jt.	=	Joint
Kg.	=	Kilogram
K.W.	=	Kilowatt
M.	=	Male

XXVII

M.A.	=	Master of Arts
M.E.	=	Master of Engineering
Mech.	=	Mechanical
M.V.Sc.	=	Master of Veterinary Science
M.W.	=	Megawatt
n.a.	=	not available
Nos.	=	Numbers
P & E	=	Power and Electricity
Ph.D.	=	Doctor of Philosophy
P.H.E.	=	Public Health Engineering
P.W.D.	=	Public Work Department
P.U.C.	=	Pre-University Course
R.E.O.	=	Rinderpest Eradication Officer
Rs.	=	Rupees
S.D.O.	=	Sub-Divisional Officer
S.D.V.O.	=	Sub-Divisional Veterinary Officer
S.E.	=	Superintending Engineer
S.S.I.	=	Small-Scale Industries
T.B.	=	Tuberculosis
V.A.S.	=	Veterinary Assistant Surgeon
yr.	=	year.